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Project 2: Climate Change Impacts Research Paper

Research Question: To what extent do climate change impacts disrupt everyday life?

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Keywords

Climate change, adaptation, species, anthropogenic, phenology, migration

Abstract

Climate change impacts are a rising issue that affect every aspect of life. This problem has driven my inquiry in the fact that these problems are only getting worse. Some individuals are resistant to the belief that climate change impacts are upon us and are detrimental to life due to the disbelief of scientific observations and lack of rapid outcomes. The goal of this paper is to inform readers on the damages that climate change has on everyday life. In addition, I discuss the human actions that contribute to these damages. As a result of this paper, I hope the audience becomes aware of these outcomes and the causalities that occur because of it. I strive for readers to become cautious and proactive in their actions in order to preserve the earth's environment, species, as well as human health and well-being. If these actions are not reversed or eliminated, climate change impacts will continue to occur at an all-time extreme. In order to achieve this, I analyze several academic papers that critique numerous experiments that showcase these impacts on different aspects of life. These sources deal with this issue in a variety of instances, such as climate change impacts on different ecosystems or on humans. These demonstrate the widespread damage resulting from climate change. In doing so, I address counterclaims within these papers and overturn them. Although climate change is elevated due to human actions, climate change impacts damage every aspect of life such as phenology, the disruption of ecosystems, endangerment, glacier melt, sea-level rise, and the relocation of individuals.

Introduction

Climate change is a major issue that occurs worldwide. Climate change results from numerous climate differences. These changes result in detrimental impacts that harm life itself such as species, ecosystems, and resources. These impacts are noted to be irreversible, therefore whatever changes occur cannot be fixed; this will throw off Earth's balance and equilibrium. Climate change is an ongoing problem that, in current day, is revealing most of these impacts. There are numerous elements that influence and intensify climate change. Human actions, as well as natural causes contribute to climate change.

Although there are multiple contributing factors to climate change, anthropogenic causes are a major source. Humans tend to be oblivious and unaware of the life-threatening impacts that their actions cause. This is due to the delayed results that climate change generates. For example, fossil fuel combustion eventually leads to an increase in global temperature, but this increase in temperature has only been observed in recent years. People abuse the power they hold, and this leads to increased damages. Increased awareness is necessary in order for human actions to be changed.

Climate change impacts devastate the earth as a whole. Numerous ecosystems and habitats are disrupted due to climate change, as well as people are displaced worldwide such as forced migration due to inhabitable living conditions. In cases like these, it is common that ecosystems or populations are unable to recover from these altered conditions, which may result in extinction. Despite this, it is possible for organisms to recover from or avoid these climate change impacts. For example, individuals living in MDCs have money and resources in order to dismiss these climate change impacts, but this is not always the case. Although climate change is

elevated due to human actions and affects organisms differently, climate change impacts heavily damage every aspect of life and will result in absolute extinction if this issue is not addressed

Literature review

Within this research paper, there is a total of twelve referenced sources; each source is different in its specific content, but all support my overall claim which strengthens my argument. The sources differ in terms of style, where they come from, and what the authors' purpose was.

Only one of the sources that have been referenced in this paper is solely a dictionary entry. This source is crucial because it gives a valid definition to a word that is frequently included in the paper, phenology. Although this source is narrow and self-explanatory, it is essential in generating an accurate definition of an unknown word.

A couple of other sources included in the paper use an investigation in order to validate or disprove their argument. These authors conduct investigations, for example, a specific number of animals and the impact that increased temperature has had on them after a duration of numerous years. These lab investigations create a visual for the audience and are a solid addition to an argument if they're able to support a claim.

Whereas most of the articles that have been included in the paper are scholarly. For example, a scientist or a group of scientists have narrated select sources or a paper has been written with reference to numerous academic sources for validation and support. In addition, the articles included tend to be specific and focus on a certain element that is a victim of climate change, such as polar bears in the arctic. This allows for a variety of perspectives to be cumulatively analyzed.

Impacts on ecosystems

Climate change places a strain on ecosystems and alters the systems that occur within these habitats. Although these impacts occur, each ecosystem is affected differently. For example, small island states are affected by climate change. “Global climate change, resulting in sea level rise, poses a threat to the very existence of the peoples of the Pacific region” (Barnett and Campbell). Greenhouse gas emissions are especially harmful and contribute to sea-level rise for regions such as these. For these small islands, sea-level rise may result in swamping or clearing out the mainland. This damage disrupts living organisms that reside here because they’re forced to move due to inhabitable conditions. “The danger of climate change is that it threatens humanity’s ability to ensure an equitable standard of living for present and future generations” (Barnett and Campbell). The inhabitants of such small island states tend to be unaware of these disastrous impacts, therefore a system is necessary, The Alliance of Small Island States (AOSIS), was among the first groups to alert the international community of the danger (Barnett and Campbell). This group works together in order to spread awareness and works towards altering humans’ actions. Although, human-induced climate change is major and urgent, there are a variety of other natural contributions to climate change (Barnett and Campbell). “Climate change will occur naturally as it has in the past” (Stukel). Evidently, climate change impacts small island states due to their location and vulnerability.

Climate change impacts also harm land, such as land degradation. “Human-induced drivers such as deforestation, wetland drainage, overgrazing, and unsustainable land use practices could be the most significant proximate cause of land degradation” (Chisholm). Although anthropogenic forces are major contributing factors to climate change, natural causes such as variations in the sun’s energy reaching Earth, changes in the reflectivity of Earth’s atmosphere and surface (EPA). These elements contribute to climate change that impact land

degradation. After an elongated period of time where land has been degraded, the more degraded land becomes, the less it can ecologically support. This can cause land degradation to accelerate, as organisms that would normally play a part in restoring the soil are unable to survive (Chisholm). These changes result in land to become unable to sustain life such as plants and trees. If this continues, soil will be unable to sustain any life or withhold any nutrients; this will cause a lack of plants and “food security” (Chisholm). This will generate a lack of food for populations and species. Land is increasingly degraded due to climate change.

Marine ecosystems are also impacted due to climate change. One main contributing factor to climate change is the rise of greenhouse gases, especially carbon dioxide. This rise in carbon dioxide leads to increasing ocean temperatures and acidity, increased temperatures lead to rising sea level, increased ocean stratification, decreased sea-ice extent, and altered patterns of ocean circulation, precipitation, and freshwater input (Doney et al.,) These increased temperatures alter the conditions in which marine organisms thrive which may result in extinction of these organisms. There has also been a link to reduce subsurface oxygen concentrations (Doney et al.,) This lack of oxygen causes the death of numerous oceanic organisms such as corals, fish, and more. Due to this, species are forced to adapt, but in reality, these impacts are too severe for them to do so. For example, “shifts in ranges as species align their distributions to match their physiological tolerances under environmental conditions” (Doney et al.,) This means that species must migrate to other areas in which they’re physically able to survive such as cooler waters or increased oxygen. Climate change harms marine ecosystems and the organisms that inhabit them.

Impacts on organisms

Organisms belong to certain ecosystems in which they thrive in. Organisms are impacted by climate change. Phenology refers to the study of the periodicity of leafing, flowering, and fruiting in plants (Allaby). Phenology is altered by climate change due to the new environmental conditions that arise. Climate change causes significant damage to polar bears. “Their preferred habitat is the annual sea ice over the continental shelf and the inter-island archipelagos that encircle the polar basin. Recent research has individuated that the total sea ice extent has declined over the past few decades” (Derocher, Lunn and Stirling). Due to increased temperatures and climate change, there have been a decrease in days with frost and glacier retreat (Stukel). This shift in temperature forces polar bears to relocate, but this is a tough task. “It will become progressively more difficult for them to reach their presently preferred locations” (Derocher, Lunn and Stirling). Although polar bears are challenged due to decrease snow, they’re also challenged when faced with an abundance of snow. “Excessive snow could influence oxygen flux through the snow layer” (Derocher, Lunn and Stirling). In addition, decreased snow in polar regions results in declining productivity in that region. This will likely alter seal distributions which will in turn result in changes in the distribution of polar bears. (Derocher, Lunn and Stirling). Prey will likely go extinct which will cause a decline in food for the polar bears, and eventually result in the extinction or death of polar bears. Polar bears are forced to adapt or migrate in order to survive these changes put forth by climate change.

Foodborne bacterial pathogens are impacted due to climate change. Despite the common trend of organisms being negatively impacted by climate change, these pathogens are positively impacted by these changes. Climate change results in increased precipitation in regions around the globe. “Heavy precipitation that results in flooding and runoff is a means of dispersal for microorganisms, potentially spreading them to new areas, such as agricultural croplands or

bodies of water” (Hellberg and Chu). Although this may be true for some organisms able to persist in these conditions, this is not always the case. Increased precipitation may “overwhelm sewer systems and increase the possibility of sewage overflows, as well as increase water turbidity, resulting in the re-suspension of pathogens from the sediment” (Hellberg and Chu). Each of these pathogens are equipped for varying conditions such as drought or precipitation, therefore these climate change impacts may affect them differently.

Humans and societal features are impacted by climate change conditions. Climate change alters the climatic conditions that the earth is faced with. These changes are able to sustain differing variations of life. As one phase of organisms or individuals are unable to adapt to these climatic conditions, their societal features go extinct as well. “In many areas of the world, languages have already gone extinct and are currently dominated by large-range widely spoken languages” (Dunn). Evidently, as humans go extinct throughout time, their languages fall with them. Humans are often forced to relocate due to inhabitable climatic conditions. If they’re unable to adapt, this results in extinction. Another societal factor impacted by climate change is cultural elements. “The effects of climate change on cultural integrity and survival can lead to civil unrest and political instability” (Dunn). Individuals often have different opinions on climate change and how to deal with this issue, this disagreement results in unrest and instability in the government. Many anthropogenic factors are influenced due to climate change.

Contributing factors to climate change

As previously mentioned, climate change is due to a variety of reasons such as natural and anthropogenic. The most common anthropogenic cause of climate change is fossil fuel combustion. Emissions of greenhouse gases contribute to increased carbon dioxide in the atmosphere which results in increased temperatures on earth (Mathez). Not only do these

anthropogenic causes impact the environment directly, there are numerous indirect links that result from climate change. “Climate change will continue to adversely affect socio-economic sectors, including water resources, agriculture, forestry, fisheries, human settlements, ecological systems (particularly forests and coral reefs), and human health (particularly diseases spread by insects), with developing countries being the most vulnerable, especially those communities with little or no capacity to react or adapt” (Barnett and Campbell). Another major link to climate change is sea level rise. This is due to glacier melt and increased precipitation. Sea level rise can be detrimental to organisms as well. Evidently, these anthropogenic causes of climate change ultimately cause the most harm to less developed countries (LDCs) because they lack the resources to adapt to these catastrophic changes.

“Climate change is no longer a distant possibility. Potentially harmful climatic changes are already underway. If we want to or believe we ought to minimize the harmfulness of eventual climate impacts, it will therefore be necessary for us to adapt to climate change” (Hartzell-Nichols). Climate change is no longer an issue of the future, it is an issue of the present. In order to attempt to overcome these changes, we must alter our actions and adapt to these new standards. In order to do this, society must work as a whole. “Recognizing the need to strengthen international cooperation and expertise in order to understand and reduce loss and damage associated with the adverse effects of climate change” (Voigt). Teamwork and cooperation must be in place across boundaries in order to preserve the ecosystems and organisms that function in our daily world. Without this, extinction will take over.

Conclusion

Climate change is a natural entity that is heightened by anthropogenic causes such as fossil fuel combustion. Climate change impacts damage numerous aspects of earth such as

organisms, ecosystems, and displacing humans. Even though select species or populations are able to adapt and recover from this damage, this is not always the case. Most of the time, organisms are unable to recover which results in extinction or mutations. In order to lighten this damage and avoid extinction, society must work together in order to adapt and alter human actions. Although it is too late to cure this problem, light must be shed on the subject in order to increase awareness and create change to save the earth.

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