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How has climate change impacted the habitat and health of wild elephant populations since the start of the 20th century and what measures can be taken you prevent this?

Joseph Foley

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Dr. Pete Baker

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Introduction

Climate change is a current global issue that is caused by changes in Earth's climate and weather patterns. When greenhouse gases are released into the air, they can trap heat and eventually lead to an increase in temperature. Climate change can either be caused naturally or caused by humans. When climate change naturally occurs, this can typically have no impact on environmental factors, however, when climate change is affected by humans, it can significantly increase the rate at which it occurs (Environmental Protection Agency 2017). This can cause a major disruption to ecosystems, vegetation, animal behavior, and to different species in general (Franz 2010). One species that is greatly affected by climate change is the wild elephant population. Wild elephants are currently dying out due to several factors, however, one of the main ones is the increase in temperatures. Elephants are important because they provide a crucial role in supporting ecosystems, and they do this by promoting biodiversity and shaping landscapes. This happens because they can spread seeds, open up water holes underground, and they can even fend off larger predators. Because of all of this they area important to the sustainability of the many ecosystems they are involved in.

The goal of this research is to successfully identify how climate change is actually affecting wild elephants, while also finding solutions to these effects that are taking place. To do this an interdisciplinary approach is needed to successfully solve the question at hand. Different disciplines are needed to figure out why the elephant

populations are declining and what is needed to prevent this from happening. The many disciplines that cover this question include biology, geography, anthropology, ecology, and physiology. However, this research will only focus on disciplines that are specifically relevant to the topic. These disciplines include biology, geography, and physiology. The use of these disciplines will allow this research question to be answered effectively and this is done so by explaining different problems and solutions. Biologists are looking at how heat affects certain aspects such as the spread of viruses and the impact this has on them. Geographers are focused on water supplies and how the disbursement of elephant species affects them as a whole. Finally, physiologists are mainly focused on how the increase in heat and how that it has affected their body systems and presented new vulnerabilities. Looking at all of these problems, these disciplines will need to find different solutions to help the sustainability of these wild elephants. This begs the question how has climate change impacted the habitat suitability and health of wild elephant populations and what are the solutions to helping them?

Literature Review

To fully grasp the situation of climate change and its effects on wild elephants, there needs to be a deeper understanding of the topic. These animals are easily susceptible to climate change because of how much they depend on the environment. From the discipline of geography, they found that the water sources in Africa are slowly drying out due to the increase in temperature. This causes the elephants to have to travel further

and further to reach water sources (Kanagaraj 2019). This causes them to search for water in areas where they have never been, which can affect the inhabitants of that area, and this can include the human population. Climate change is also causing a lack of rainfall in these areas, which can also cause a decline in vegetation, which also affects the local population of elephants (Franz 2010). These factors alone have already decreased the populations of elephants and will only lead to a further decline. Some biologists have also been analyzing these water sources and found that Foot and Mouth disease is spread more often in these water sources. This is because having fewer areas to drink and eat because of climate change causes them to spread this virus more often (Jiang 2020). There are still other problems that have been reappearing and affecting the wild elephant population. Biology also shows an insight into the many occurring issues that keep appearing in elephant populations. Diseases can be transmitted more rapidly due to the increase in temperatures. It was found that virus Foot-and-mouth disease can be found in elephants in Africa. The rate at which this virus spreads is increasing due to climate change. This is because when there are higher temperatures and less rainfall, the virus can spread more rapidly (Nath et al., 2020). This disease can cause serious health problems for the elephants and even kill some of their population. Another factor that biologists have discovered is that biotoxins from cyanobacteria are prominent in water supplies in Southern Africa. These toxins have killed at least 330 African elephants in Botswana in May and June of 2020 (Wang 2021). It was found that hot and dry climates are the cause of these cyanobacteria and they have steadily increased due to climate change. Physiologists are also working to understand the many problems that are arising due to changes in the elephant's body temperatures. The final discipline that enhances

this study is physiology. It is known that elephants use thermoregulatory mechanisms in order to keep their body heats at their normal temperature. Some of these mechanisms include things such as creases or wrinkles on their skin, however, due to climate change their thermoregulations are challenged and they are not as effective as they should be (Dominguez-Olivia et al., 2022). Elephants do not have sweat glands and rely on water to keep them cool during the day. Because of the lack of sweat glands and in the increasing in temperature, they are struggling to survive because of the heat (Dominguez-Olivia et al., 2022). After conducting a literature search and analyzing the problems that are occurring in the previous data there needs to be connections between these disciplines. These connections should be conflicting viewpoints and alternative solutions to the problem and using an interdisciplinary approach to solve this issue will help make the results more effective.

Conflict and Solutions

In order to successfully combat all of these effects that are occurring due to climate change affecting wild elephants, different disciplines have conflicting insights on how this should be done. Biologists, physiologists, and geologists have all come up with different solutions. First, the discipline of biology believes that protecting the wild elephants habitats should be the primary focus. Conservations should be put in placed so that these elephants have a much better chance of survival. This strategy requires a lot of effort and getting these wild elephants into safer habitats may be difficult. A work around this would be to improve and preserve their existing habitats. Geologists also

agree that conservations should be put in place, however, they believe in an alternative solution. The people from this discipline argue that we should focus on preventing climate change in general, which will help prevent its impact on these animals. Things such as transitioning to renewable energy and reducing carbon emissions would eventually help the wild elephant population in the long run. This strategy however will take a lot more time to accomplish and does not help the current issue. Physiologists have also considered habitat protection to ensure the stability of their thermoregulation. If put into place correctly the overall heat that the elephants are receiving should stable out and be resolved. The final discipline is physiology, and they argue that we should continue to monitor wild elephants and implement strategies to reduce the stress from heat they receive from climate change. This stress causes a major strain on the elephants and can even harm them to the point where they can die. Successfully monitoring and helping elephants that are in need could alleviate and stop this issue from happening. All of these problems that are occurring because of climate change can be stopped if common ground were to take place. These disciplines and their solutions combined could offer a final solution and plan to enact that will secure the future of wild elephants.

Common Ground

After analyzing the solutions from the multiple disciplines there is a mutual understanding of what needs to be done in order to protect the health and habitats of wild elephants. First, climate change needs to be addressed in order for this species to

survive in the future. A policy or change needs to occur in order to slow down or even prevent climate change from occurring in the future. This is to ensure that the increase in temperatures do not kill off the entire population before we can enact other solutions. The main solution that needs to be enacted is protecting their habitats. If policies were implemented to strengthen the water supplies and vegetation the elephants feed off of, these animals will have a better chance to survive in the future. Also setting up conservations of large amounts of land dedicated to these animals should be enough to keep them alive while building and protecting their habitats is occurring. Overall, we need to strengthen their water supplies in order to keep the elephants from overheating. They have sensitive thermoregulation and slight changes in temperature can cause them to die out. The common ground that needs to be made is to integrate the three main ideas for protecting these animals and combine them so that we can effectively save the wild elephant populations in Africa and Asia. Doing so will enable the species to survive and even thrive in the future even with climate change occurring at a pace that is hard to stop.

Conclusion

It has been discovered that wild elephants are an endangered species, and they play a crucial role in their ecosystems. Climate change has increased in recent years and temperatures are slowly rising. These increases in temperatures are causing the elephants to die out faster then they were before. In order to prevent this from

happening., interdisciplinary research was enacted, and it was discovered that there is a solution to protecting this species. Disciplines from geology, biology, and physiology have discovered three different solutions to helping save elephants from climate change. When these solutions have been integrated and found common ground, there is finally a final solution to help save the wild elephant population. First, there needs to be continuous observations on their health to ensure that the elephants wellbeing is maintained. After that, everyone should try to limit the amount of carbon emissions that they are producing in order to slow down the rate at which climate change is occurring. The temperatures are rising at a much faster pace, and it will only get worse for the elephants if this were to continue. Finally, to put an end to the dying of elephants once and for all, habitat restoration and protection plans need to be put into place so that the current populations do not diminish before its too late. After all three of these plans from different disciplines have been integrated, there is finally an understanding of the problem and a solution has arisen. This interdisciplinary study has shown that wild elephants and their habitats are dying out, however, now there is a known solution. Combining the work that has been completed by these three disciplines has shown that there is a chance to save this species from dying out completely.

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