EFFECTS OF CLIMATE CHANGE ON ANIMAL HEALTH

S.V. Mavadiya[1]and R.S. Ghasura[2]

[1] Assistant Professor, Livestock Farm Complex, College of Veterinary Science and A.H., Kamdhenu University, Junagadh, Gujarat, [2] Assistant Professor, VASREU, College of Veterinary Science and A.H., Kamdhenu University, Anand, Gujarat

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INTRODUCTION

Indian climate significantly impacts animal health, both directly and indirectly, with rising temperatures and changing weather patterns leading to stress, reduced productivity, and increased disease risk. These changes can lead to heat stress, reduced feed availability, increased disease prevalence, and disruptions in animal reproduction and growth. Climate change decisively impacts the epidemiology of infectious animal diseases and directly influences production environments. The repercussions include a surge in heat-related diseases and stress, extreme weather events, an urgent need for adaptation in production systems, and the re-emergence of infectious diseases that rely on specific environmental conditions. These factors disrupt the biology of hosts, pathogens, and vectors. While some may suggest potential benefits for animal health, the negative consequences vastly outweigh these claims, leading to increased costs in livestock production. Vector-borne diseases such as bluetongue, West Nile fever, vesicular stomatitis, and New World screwworm are glaring examples of this alarming trend. Additionally, climate-induced migration of birds is reshaping the dynamics of diseases like Highly Pathogenic Avian Influenza, underscoring the critical interconnectedness of ecosystems. Increased instances of droughts and floods in South America and Eastern Africa are forcing pastoral communities into more frequent migrations, which raises contact rates between vectors and hosts and accelerates the spread of animal diseases. Such migrations disrupt livestock access to essential services and heighten their exposure to pathogens. It is imperative for the agricultural sector to recognize and respond to these evolving challenges effectively.

SIGNIFICANT EFFECTS OF CLIMATE CHANGE ON ANIMAL HEALTH AND PRODUCTION

- **Fluctuations in Ecosystems**

Climate change can alter ecosystems, impacting the availability of natural habitats and food sources for wild animals and domestic livestock. Climate change causes significant shifts in ecosystems globally, impacting their structure, function, and services. These changes can be observed in both terrestrial and marine environments, affecting species distributions, ecological interactions, and the timing of natural events.

- **Increased Risk of Zoonotic Diseases**

Changes in climate and ecosystems can increase the risk of zoonotic diseases, which can spread from animals to humans. Climate change increases the risk of zoonotic diseases by altering ecosystems, shifting the geographic ranges of vectors and pathogens, and increasing human-animal contact. This leads to more frequent outbreaks and wider transmission of diseases like Lyme disease, avian influenza, and West Nile virus.

- **Influence on Wildlife and its Habitats**

Climate change effects on wildlife include increases in disease and changes to pathogen distributions, patterns, and outbreaks in wildlife changes in range distributions and shifts in latitudinal and elevational gradients; changes in phenology or the timing of life cycle events that may create phenological mismatches and extinction or population reduction. The effects of climate change across a species' range will most likely not be homogenous, meaning it can vary substantially, especially if a species' range spans across different continents as exhibited by many migratory birds.

- **Reduced Feed Accessibility and Quality**

Climate change reduces feed availability and quality through several mechanisms, including changes in rainfall

patterns, increased temperatures, and altered pest and disease environments, ultimately impacting animal productivity and health. These changes can lead to lower crop yields, reduced grazing land, and increased risks of heat stress for livestock.

- **Increased Heat Stress**

  Climate change significantly increases heat stress risks through rising global temperatures and more frequent, intense heatwaves. This leads to greater exposure to extreme heat, affecting human health, particularly for vulnerable populations, and impacting various sectors like agriculture and labor productivity. Rising temperatures and humidity can cause heat stress in livestock, affecting their metabolism, reproduction, and overall health.

- **Fluctuations in Disease Patterns**

  Climate change can alter the distribution and prevalence of animal diseases by impacting the survival, reproduction, and transmission of pathogens and their vectors. Climate change alters disease patterns by influencing the distribution and transmission of infectious diseases, affecting both humans and animals. Warmer temperatures can expand the geographic ranges of disease vectors like mosquitoes and ticks, while extreme weather events can disrupt food and water supplies, leading to increased transmission of waterborne and foodborne illnesses.

- **Altered Reproductive Success**

  Heat stress can negatively impact reproductive rates in livestock, leading to reduced fertility and smaller litters. Climate change significantly impacts animal reproductive success through various mechanisms, including shifts in breeding seasons, alterations in food availability, and changes in habitat conditions. These changes can lead to mismatches between breeding timing and resource availability, affecting offspring survival and fitness. Additionally, extreme temperatures can disrupt fertility and fecundity, while altering endocrine functions can further impact reproductive processes.

- **Deteriorated Immune Systems**

  Stress from heat, malnutrition, and disease can weaken the immune systems of animals, making them more susceptible to infections. Climate change weakens animal immune systems by creating stressors that impact their ability to fight off diseases. These stressors include increased temperatures, changes in precipitation, and shifts in habitat, which can all directly or indirectly affect an animal's immune function and increase their susceptibility to infections

- **Deviations in Parasite Populations**

  Warmer temperatures can extend the breeding seasons of parasites and alter their geographic distribution, increasing the risk of parasitic infections in animals. Climate change significantly impacts parasite populations in animals by altering their distribution, increasing their prevalence in some areas, and potentially leading to the emergence of new diseases. Rising temperatures, shifts in precipitation patterns, and changes in host distributions can all affect the life cycles and transmission of parasites. This can lead to increased parasite burden in animals, potentially impacting their health and ecosystem functions.

- **Trouble of Water Resources**

  Changing precipitation patterns can lead to water scarcity or flooding, impacting access to clean drinking water for animals and increasing the risk of waterborne diseases. Climate change disrupts water resources for animals, impacting their availability, quality, and access. Increased droughts and evaporation due to rising temperatures lead to water scarcity, forcing animals to travel longer distances for water and increasing competition. Altered precipitation patterns also disrupt ecosystems, affecting plant and animal life, and potentially contaminating water sources

CONCLUSION

The impact of climate change and heat stress on feed nutrient absorption, animal production, reproduction, and health requires immediate research. We must enhance our understanding of cattle metabolism to adapt

management practices that boost performance. Developing early warning systems for weather changes is essential for protecting livestock from severe conditions. The direct effects of climate change on animal health, including heat stress and reproductive issues, arise from shifts in environmental conditions like temperature and humidity. Indirectly, these changes also increase the risk of infectious and parasitic diseases. Mitigation strategies must prioritize climate-resilient breeding and effective shelter management. Sustainable disease surveillance and public awareness are crucial. Livestock producers need to implement strong adaptation strategies to combat the negative effects of climate change and ensure the long-term health and productivity of their herds.

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