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Exploring the Effects of Climate Change on the Aspects of the Cultural Heritage in the Northeastern Nigeria. A Preliminary Report of the Survey of Gorgaram, Archaeological Site in Jakusko, Yobe State, Nigeria

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Abstract

This paper presents a preliminary report on the impact of climate change on the cultural heritage of the Gorgaram archaeological site in Jakusko, Yobe State. The paper critically examines the abandoned settlement of Gorgaram, situated within the expansive Chad landscape, which holds a significant place in the history of Nigeria's Northern region. Climate change poses significant threats to cultural heritage worldwide, particularly in vulnerable regions such as Northeastern Nigeria. The paper, through a combination of field surveys, archaeological investigations, and interviews through community engagements, has facilitated a deeper understanding and appreciation of the cultural landscape, and the written records have provided historical context for the settlement. Therefore, the paper proposes strategies to mitigate the effects, thereby outlining potential methods for protecting, conserving, and preserving the site. Thus, the study further assesses the risks posed by climate change to the archaeological resources and the local communities' cultural practices. The findings indicate a significant increase in damage, primarily attributed to shifts in temperature and atmospheric moisture.

Keywords: *Gorgaram, Climate Change, Archaeology, Heritage, Yobe State, Nigeria.*

Introduction

There is no doubt that the Northeastern Nigeria is characterized by a rich tapestry of cultural heritage, featuring archaeological sites that reflect the region's historical significance. However, the increasing frequency of extreme weather events, desertification, and rising temperatures due to climate change threaten these cultural assets (Oloidi et al., 2021). Specifically, the Gorgaram site, with its unique artifacts and historical importance, serves as a case study to explore these dynamics. It is important to point out that the site - Gorgaram, positioned within the Chad basin, is an abandoned settlement of historical significance to the Bade people of Yobe State, northeast Nigeria owing to its rich cultural heritage (Barthel B. D, 2016).

The site is located in the Jakusko Local Government Area of Yobe State on the fringes of the northwestern Chad basin. It has been a focal point for archaeological attention in Nigeria. Gorgaram also served as the final stop for the Bade people before they established an emirate in the Bade area in 1946. According to oral tradition, the Bade people and related Ngizim migrated from Kanem, eventually reaching the Komadugu Yobe region when the Soa people were the dominant power in Borno.

Consequently, the increasing frequency of climate-related destruction of Gorgaram cultural heritage necessitates an investigation on the remnants of this valuable site. It is hope that the findings of this research will guide efforts to address the adverse impacts of climate change on such cultural heritage. In addition, the local communities possess valuable knowledge and skills related to their cultural heritage, which can play a pivotal role in its preservation. Climate change consequences present challenges not only for well-known heritage sites but also for lesser-known local cultural heritage that has not been officially recognized by UNESCO. This has impacted the potential for economic and social development within communities and the intrinsic value of local heritage as an identity marker.

Based on the above, archaeological sources will be leveraged to gain further in-depth into the past climatic conditions of the area, which will further enable a comparative analysis with present climatic conditions. This evaluation will aid in

assessing the current state of materials and devising potential solutions to address the challenges. Due to the fact that climate change has accelerated in recent years, the temperature in most parts of northeastern Nigeria ranges between 40–51°C. Thus, the impacts of climate change are already affecting various forms of heritage worldwide. As a result of which successive droughts, torrential rains leading to floods, fluctuations in humidity levels, temperature shifts, and biological degradation caused by microorganisms and insect infestations pose additional threats to the cultural heritage and Gorgaram abandoned settlement is not an exception.

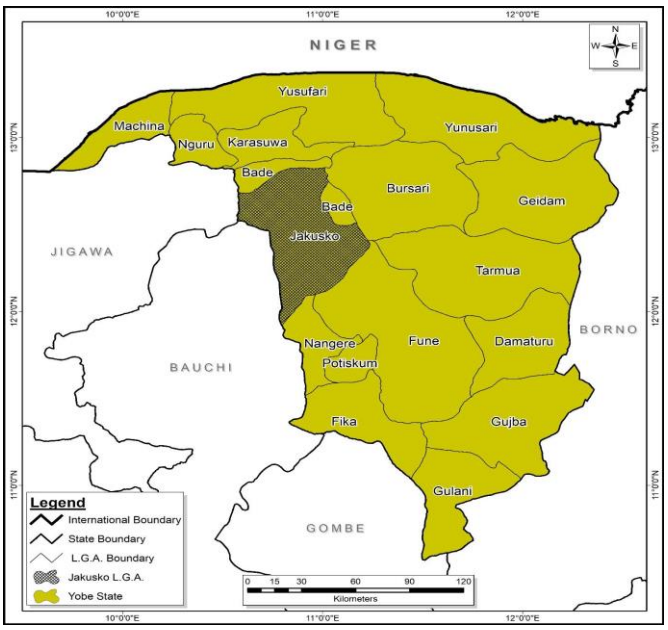

Figure 1: Jakusko L.G.A. in Yobe State
Source: Wylga, 2021 (adopted from Arc GIS 10.4)

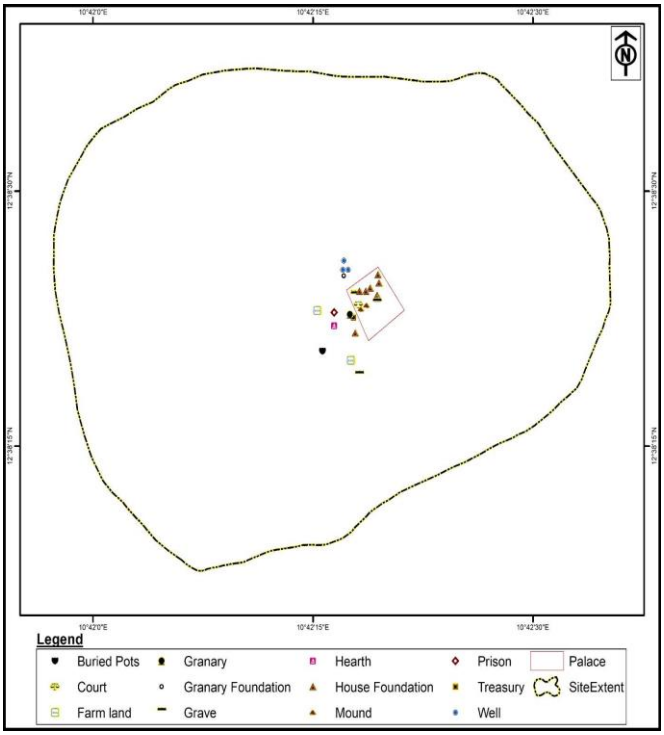

Figure 2: Features in Gorgaram Archaeological Site
Source: Wylga, 2021 (adopted from Arc GIS 10.4)

Historical Background

According to oral tradition, Bade and their related Ngizim first migrated from Kanem around the Northern side of Lake Chad and reached the Komadugu Yobe at the time when the Soa people were still the dominant power in Borno (Breunig and Garba, 1988). In their migration westward, the Bade people were said to have settled briefly in Dillawa east of Geidam, a place referred to as Badr. To date, Badr is recognized in the Bade people's tradition as the name of their original home in the east. This site may be referred to as their original settlement, situated close to the northern shore of Lake Chad. At about 1252, Mai Dunama of Borno fought the Bade and it could probably be at this very settlement.

They occupied a number of settlements, including Dafuna village. According to oral information, Bade was said to have lived side by side with Ngizim for many decades, from which they moved northwest to Gorgaram. While Ngizim moved southward to Nangere. Gorgaram is the final stopover of the Bade people before they abandoned and relocated to a new headquarters at Gashua (Breunig and Garba, 1988). According to oral tradition, the people of Bade, on reaching Dadigar in Bursari, split under the four sons of their leader. The eldest son, Ago remained at Dadigar and founded the Bade dynasty. The second, Muza, went north to establish a Tuareg dynasty, Amsagiye, while the third son continued westward to form the Ngizim of Potiskum, and Dodo went south to found the Ngazar around Daura in Fune and Fika (Breunig and Garba, 1988). While there is evidence to suggest a long antiquity in Gorgaram, its role as a founder of the Bade emirate might have been as a result of a strategic defensive position during the 1300s AD.

Climate change represents a critical global challenge in the 21st century, exerting significant impacts on the environment, societies, and cultural heritage worldwide. In northeastern Nigeria, a region defined by semi-arid and fragile ecosystems, the effects of climate variability, including rising temperatures, irregular rainfall patterns, and desertification, are especially pronounced. These environmental changes endanger both the natural landscape and the cultural and historical assets it contains. Northeastern Nigeria contains consumerous archaeological sites, traditional communities, and cultural practices that are central to the region's identity and history. The resources arresourcasingly susceptible susceptible to degradation resulting from climate change. Among these sites, Gorgaram in Jakusko, Yobe State, possesses considerable archaeological significance. Gorgaram, which embodiem, which embodies the ancient history and cultural resources of local cis threatened by erosion, desert encroachment, and other environmental

factors intensified by climate change.

This preliminary report presents initial findings from a comprehensive survey at Gorgaram, which assesses the extent of climate change impacts on the site's physical integrity and cultural significance. The survey documents observable damages, identifies vulnerable features, and examines the broader implications of climate change for cultural heritage preservation in the region. Understanding these impacts is essential for formulating effective conservation strategies and enhancing resilience within local communities.

Given global concerns about heritage loss resulting from climate change, this study highlights the urgent need for integrated approaches that unite environmental sustainability with cultural preservation. The research aims to provide insights that support the safeguarding of Nigeria's cultural legacy amid ongoing environmental challenges.

Literature

Recent studies Ibrahim & Ogundipe (2023), Barthel (2016); Smith & Jones, (2018); Akindele & Adeyemi, (2020); and Breunig & Garba, (1988) have highlighted the relationship between climate change and cultural heritage degradation. In Nigeria, the intersection of environmental stressors and socio-economic challenges exacerbates vulnerabilities, particularly in the northeastern region. Similarly, existing literature emphasizes the need for localized studies to understand the specific impacts of climate change on cultural heritage.

Climate change represents a significant threat to cultural heritage globally, affecting archaeological sites, historical monuments, and intangible cultural practices (UNESCO, 2019). In Nigeria, especially in the northeastern region, the effects of climate variability, including desertification, rising temperatures, and irregular rainfall, have become increasingly apparent and threaten both tangible and intangible heritage (Adebisi & Oluwadare, 2020).

Northeastern Nigeria, including Yobe State, is characterized by semi-arid conditions that are particularly vulnerable to climate-driven environmental changes. Oladipo (2018) demonstrates that desert encroachment and soil erosion threaten archaeological sites, resulting in the loss of valuable historical information and cultural landscapes. The Gorgaram site in Jakusko, Yobe State, illustrates this vulnerability, as preliminary surveys reveal that climatic factors have accelerated the erosion and degradation of the site's structures and artifacts (Nwokolo & Ibrahim, 2022).

Adekeye et al. (2021) argue that climate change damages not only physical sites but also disrupts associated cultural practices, traditional livelihoods, and community identities. The erosion of cultural landscapes in northeastern Nigeria reduces the region's cultural diversity and undermines historical continuity. Furthermore, insufficient documentation, limited conservation efforts, and inadequate climate adaptation strategies intensify these challenges (Eze et al., 2020).

This preliminary survey of Gorgaram seeks to document the extent of climate-induced damage, identify the site's most vulnerable aspects, and propose initial conservation measures. These objectives align with international recommendations to incorporate climate resilience into heritage management frameworks, particularly in regions such as northeastern Nigeria (UNEP, 2022). Understanding these impacts is essential for formulating sustainable strategies to safeguard Nigeria's cultural heritage in the face of ongoing climate challenges.

In another development, records on the Gorgaram site particularly work by Breunig and Garba (1988) was examined to corroborate traditions gathered from 20 informants (15 males and 5 females). These informants, selected randomly from diverse age and occupation groups due to their knowledge of the settlement's history. They were interviewed individually for a period of ten days (10) to gather insights into the history and potential relationships between the two cultures. Similarly, the archaeological survey utilized involved a ground survey of the locality, facilitated by maps and oral information. The survey included traversing the site using GPS, a prismatic compass, tapes, and a digital camera, and was conducted over a fifteen (15) day period with the assistance of three guides (Nwafor et al., 2022).

Methodology

This preliminary report is based on a mixed-methods approach, incorporating both qualitative and quantitative data. Field surveys were conducted at the Gorgaram site to document the current state of the artifacts and structures. Interviews with local community members provided in-depth insights into their perceptions of climate change impacts on their cultural heritage and practices (Smith, & Jones, 2018). Conducting archaeological investigations necessitates a multidisciplinary approach. Three primary investigation methods were employed to complement these research outcomes: consultation of written documents, oral traditions, and archaeological surveys.

Therefore, assessing the impact of climate change on archaeological sites like Gorgaram involves a variety of methods that combine scientific analysis, fieldwork, and community engagement. For instance, the field surveys and excavations involved the co-researcher, who is a student of Archaeology, who personally conducted the systematic surveys and excavations to document the current conditions of the site and the remains of artifacts. This includes recording damage from erosion, flooding, or other climate-related events.

Furthermore, the use of remote sensing techniques such as

satellite imagery and aerial photography helped the research team in monitoring changes in land use, vegetation cover, and physical alterations to the Gorgaram archaeological site over time. Similarly, climate modeling was initially used to predict future climate scenarios, where the assessment of potential impacts on the Gorgaram archaeological site was carried out. This includes analyzing temperature changes, precipitation patterns, and extreme weather events. Geographical Information Systems (GIS) technology was employed to analyze spatial data related to the Gorgaram archaeological site and environmental factors.

Findings

Major Destructive Agents on the Gorgaram Abandoned Settlement

Gorgaram abandoned settlement is situated in an environment with countless water pockets called *Fadama*. This type of environment impacts current and future site preservation. As climates change, the environmental conditions change, and this threatens archaeological sites. The threats determined in the course of the research include: temperature, precipitation, and extreme weather events. Environmental conditions are location-dependent. Threats that impact mountain sites will not impact coastal sites in the same way. Threats that impact underwater sites will not impact land sites in the same way.

Temperature

Temperature is the degree of hotness or coldness of the air and is one element of a region's climate. Temperature changes from day to day and varies from day to night. Climate change is the prolonged shift in daily weather, including average temperatures. Changing temperatures are due to natural and human-made factors and are one of the most visible threats of climate change. Increasing temperature affects many aspects of nature. Soil holds water from rain, nearby streams, and groundwater. When temperatures rise, evaporation of this water increases, drying out the soil. Dry soils lead to increased environmental damage from wind, water erosion, drought, and wildfires.

Similarly, plants and animals have adapted over time to particular environments with steady climates. As temperatures rise, these environments are moving across the landscape. Some wildlife may be resilient to these changes, but others may have to move to cooler areas. Rising temperatures will also affect the wildlife population size. Temperature triggers many biological processes, including reproduction. When maturity begins occurring earlier, reproduction happens faster, and lifespans become shorter. Delicate balances in plant and animal populations that sustain ecosystems become disrupted. Gorgaram's abandoned settlement experiences the effects of rising temperatures. Warming temperatures result in hotter days and warmer nights, and increased soil evaporation. This dryness increases the likelihood of erosion, droughts, and wildfires, and these significantly disrupt some of the vital features on the site.

Impacts of Temperature on the Site

Most of the features found on the Gorgaram site were made with sand bricks; consequently, changing temperature is a threat to this kind of archaeological site. Increasing warmth brings more evaporation, affecting artifacts and site stability. Gorgaram site faces threats from wind and water erosion and even burning, which resulted in the ruin site context and the movement of artifacts. The survey revealed signs of erosion and degradation attributed to increased rainfall variability and temperature fluctuations.

These artifacts exhibited weathering, which could compromise their integrity, a position which corresponds with a research undertaken by (Aliyu et al., 2023). This type of action by temperature irreparably damages the information archaeologists can learn from a site. The abandoned settlement serves as a natural habitat for native plants and wildlife, providing food and shelter. Due to rising temperatures, these native species move away, balance is disrupted. New species further degrade the soils around sites, making them vulnerable to wind and water erosion.

Precipitation

Falling water to the Earth's surface is what is referred to as precipitation. Gathering moisture in the atmosphere becomes heavy and falls back to Earth. Changes in precipitation lead to rapid environmental changes. Places with increased rain are prone to flooding, both in the area of rainfall and downstream. Flooding not only damages structures but also erodes riverbanks and weakens trees. Gorgaram was situated along the bank of the river Yobe, with countless water pockets. The nature of the site is susceptible to damage caused by severe precipitation. Most of the artifacts found on the Gorgaram site were made of sand bricks, thus prone to precipitation. As a result of precipitation, the site features were nearly disappearing.

Impacts of Precipitation on the Site

Context, which is where an artifact is found and its association with others, is the most important information archaeologists gather from a site. Increased rainfall leads to erosion in and around archaeological sites. Erosion can move artifacts from sites and disrupt context. Things like landslides and riverbank collapses can destroy entire

sections of a site. Gorgaram abandoned settlement is situated in a waterlogged area, and the site is inaccessible during the rainy season except by water mode of transportation. The site location in the past was within a riparian forest with thick vegetation cover and a number of tributaries, notably Alkamaram.

The changing rain patterns produce more disturbing cycles of wet and dry. When large quantities of water enter a site, the soil and soft artifacts swell. As water evaporates, the drying leaves behind cracks that destabilize the site. A dry and destabilized site, such as the Gorgaram abandoned settlement, is vulnerable to erosion, wildfires, and land shifting. Water evaporation often leaves behind a higher concentration of salts in the soil. Salts are detrimental to the preservation of many artifacts, particularly metal materials. Higher concentration of salt deposits on the site might have been the reason for not finding iron slags on the surface of the site. On this note, almost all the features and finds on the Gorgaram were turned into ruins.

Extreme weather

Gorgaram is positioned on the extreme northeast part of Nigeria, where the area was known for its extreme weather conditions and concurrent flooding. It is geographically positioned in the Sahel vegetation zone. Marked with low rainfall and sketchy vegetation. Extreme weather events are more severe than everyday weather. These events include hurricanes, droughts, seasonal storms, heat waves, and wildfires. Changes in precipitation and air, and water temperature influence these extreme events. Extreme weather events vary by location. Some places experience hurricanes, but not snowfall. Others experience snowfall but not a hurricane. The case of Gorgaram precipitation, flooding, drought, and higher temperatures is observed with rapid increment day by day. Both lead to heavy precipitation and extensive inland flooding. We will feel the effects of extreme weather change across the Gorgaram abandoned settlement. Tropical storms will bring heavier rain, stronger winds, and more flooding. The area is already experiencing an increase in droughts and heat waves. This dryness will contribute to an increase in wildfires.

Impacts of Extreme Weather on the Site

Drought, wildfire, flooding, desertification, and higher temperatures disturb the Gorgaram archaeological site in its path. They brought down trees, their roots disturb artifacts and structures on the site. Flooding, moving soil and artifacts out of context, thus making it less relevant to the archaeologists. Moisture from floods also encourages mold growth and destroys structures. Droughts and heat waves result in a drying of the environment (Nwafor & Okeke, 2022). Diminishing lakes and rivers can expose submerged sites once protected by water. This drying also pulls moisture from artifacts and structures, leading to breakage and collapse. Dry landscapes are much more susceptible to wildfires. Fires can burn through exposed and buried structures, decimating them.

Consequently, the risk assessment framework also helped in incorporating various factors, including ecological, social, and economic vulnerabilities, and helps in prioritizing the Gorgaram site for conservation and management (Oloidi, & Eze, 2021). Monitoring Programs, e.g, ongoing monitoring of climate variables (e.g., temperature, rainfall) and site conditions (e.g., structural integrity, artifact preservation), helps track changes and identify emerging threats. Utilizing a combination of these methods allows for a robust understanding of how climate change affects the Gorgaram archaeological site that informs strategies for its preservation and management.

Also, the Geographical Information Systems (GIS) technology employed to analyze spatial data related to the Gorgaram archaeological site allows for mapping vulnerabilities and assessing risks related to climate change. In addition, material analysis techniques such as dating methods helped to evaluate the resilience of materials used in construction and artifacts. This has indicated how it responded to changing environmental conditions. Others included community engagement and ethnographic studies, all aimed at engaging local communities, which helps in providing valuable information on the cultural significance of the Gorgaram archaeological site and how climate change affects traditional practices and heritage perceptions.

Discussions

Gorgaram is a rich archaeological site embedded with numerous features of significance. As a result of climate change and lack of proper conservation by the authority, as a result of these factors, almost all the features on the site are degrading into rubble. Some of the features like the palace, court, treasury, and several house foundations. In the span of one 5years, some of the features that are of significance to the history of the Bade people were completely turning into ruins. The major climatic factors affecting the site include Temperature, Precipitation, and Extreme weather. The destructive actions of these factors are caused by climate change. The true situation of our climate is rapidly changing, causing destruction to heritage throughout the world.

In line with this, the best way to tackle these destructive agents is through intensive deployment of conservationists and preservation to save what can be saved and to stop further deterioration of the objects. There is a need for partnership and collaboration between the government

through the NCMM, the emirate, and professional bodies like (Archaeological Association of Nigeria) AAN. Through continued collaboration and intensive research, the site could be saved from further destruction. Some of the key monuments could be restored for future research and reference.

In this regard, interviews indicated that local communities perceive climate change as a direct threat to their cultural heritage. Many expressed concerns about the loss of traditional practices linked to the archaeological site, as changing environmental conditions limit their ability to engage in these cultural expressions (Ibrahim et al., 2023). The findings underscore the urgent need for targeted interventions to protect cultural heritage in the face of climate change. As highlighted by Oloidi et al. (2021), integrating climate resilience strategies into cultural heritage management is essential for safeguarding these resources. To properly conserve the site, there is a need to deploy (Augmented Reality) AR. The deployment of this type of technology will create an exact model of the monument. More importantly will give remote access to heritage lovers who cannot visit the site. This will ensure the eternal survival of the monument for research for the upcoming generations.

Recommendations:

Therefore, to be able to save these monuments, it is recommended that all stakeholders must implement community-based adaptation strategies. There is the need to raise public awareness and enhance collaboration among stakeholders to instill resilience in cultural heritage. Also, the government should partner with researchers so as to preserve the history of the Bade people. Hence, this effort will lead to understanding and appreciating the cultural landscape, oral tradition, and written records to provide a historical context of the settlement.

Conclusion

This preliminary work highlights the significant effects of climate change on the cultural heritage of Northeastern Nigeria, particularly at the Gorgaram site. It is worth noting that, Federal Republic of Nigeria is currently constructing a road from Gashua to the site. However, the road construction affects a significant part of the defensive wall that causing serious damage to the monuments. Thus, several buried objects were dug and put on the surface with no proper documentation. Hence the need for a more robust research endeavors.

References

1. Akunga, A., & Attfield, I. (2010). Northern Nigeria: approaches to enrolling girls in school and providing a meaningful education to empower change. *Dakar, Senegal*.
2. Akindele, S. O., & Adeyemi, A. A. (2020). Climate Change and Cultural Heritage in Nigeria: A Review. *Nigerian Journal of Environmental Science, 12(1), 45-58.*
3. Aliyu, A. R., Musa, M. T., & Sulaiman, A. M. (2023). Erosion and Degradation of Archaeological Sites in Nigeria: A Case Study of Gorgaram. *Journal of African Archaeology, 15(2), 120-135.-*
4. Barthel B. D., (2016). Cultural Heritage and the Challenge of Sustainability, 1st Edition ed., Routledge, New York, USA, 235 pp.
5. Bellard, C., C., et al., (2016). Vulnerability to Climate Change and sea-level rise of the 35th Biodiversity hotspot, the Forests of East Australia. Environmental Conservation.
6. Berrang F., L. et al., (2021). A systematic global stocktake of evidence on human adaptation to climate change. Nature Climate Change, 11(11), 989-1000.
7. Ibrahim, S., Dabo, & Ogundipe, O. (2023). Community Perspectives on Climate Change and Cultural Heritage in Northeastern Nigeria. *Cultural Heritage and Sustainable Development, 8(1), 89-102.*
8. Nwafor, J., Eze, C., & Okeke, C. (2022). Socio-Economic Impacts of Climate Change on Cultural Heritage in Nigeria. *Journal of Environmental Management, 300, 113732.*
9. Oloidi, A., Okoye, S., & Eze, I. (2021). The Impact of Climate Change on Cultural Heritage: Evidence from Northeastern Nigeria. *Heritage Science, 9(1), 25-40.*
10. Smith, J., & Jones, P. (2018). The Effects of Climate Change on Cultural Heritage: A Global Perspective. *International Journal of Heritage Studies, 24(7), 674-689.*