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The Impact of Climate Change on Cultural Heritage: The Case of the Tomb of Askia

Mamadou Samaké

Abstract
The UN SDG Agenda does not mitigate the impacts of flooding and desertification or address the regional insecurity affecting the Tomb of Askia and the surrounding area, Gao, which is experiencing devastating droughts and rainfall, increasing insecurity. Only through a deeper understanding of the interrelation of these issues and by significant reporting improvements, can we realize the UN 2030 Agenda.

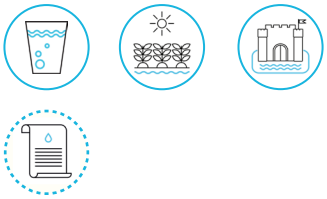
Policy Recommendations

- The mayor of Gao should be supported in his commitment to clean the water collectors and to build others, alleviating the lack of water.
- The mayor should be supported in awareness-raising amongst about the effects of climate change and flood impacts, particularly with those living and working on the Niger River banks, and with the national authorities.
- Improved disaster planning should be supported at the Tomb of Askia, and funding made available.
- Actors working with local communities to highlight and safeguard the site, when people have many other pressing concerns, should be encouraged.
- Funding agencies should encourage flexibility to adapt to changing situations.
- Governments should recognize that cultural heritage deserves a higher and more sophisticated level of protection than that afforded to everyday buildings.
- Collaborative assessments should be undertaken with the World Heritage Committee to understand the level of acceptable climate change vulnerability for removal from the List of World Heritage in Danger.
- Cultural heritage-specific climate change modelling, monitoring and adaptations must be developed.

KEYWORDS

UNESCO World Heritage
Tomb of Askia
cultural heritage protection
desertification
flooding

WATER ICONS



CLIMATE



BWh: Hot desert climate



< Fig. 1 Tomb of Askia, Gao (Source: David Sessoms, 2006. CC BY-SA 2.0, via Wikimedia Commons).

Introduction

The Republic of Mali has a rich, diverse cultural heritage, protected and promoted under national and international laws (including all six of UNESCO's cultural conventions). This article focusses on the earthen heritage of Gao, particularly the World Heritage site, Tomb of Askia.

Mali faces many challenges. It is considered a "high-risk" destination (Global Guardian 2025): travel is not advised. The cessation of tourism, economic insecurity, the exodus of young people to southern regions and border countries, and the difficult cohabitation of ethnolinguistic populations, contribute to a complex security situation, exacerbated by climate change. Climate change has been a concern for the UNESCO World Heritage Committee since 2005 (Perry and Falzon 2014), but mitigations are not well integrated into World Heritage management (UNESCO et al. 2010) and research into what constitutes acceptable levels of climate change vulnerability is limited (G7 Academies 2017). Nor is cultural heritage well integrated into the UN Sustainable Development Goals (SDGs), except via 11.4 (Protect the World's Cultural and Natural Heritage): Mali's 2022 Voluntary National Review indicated this was not a priority.

The article first describes the Tomb of Askia, before discussing the impacts of climate change on the community and cultural heritage, evaluating the mitigation measures to date, before concluding with policy recommendations.

About the Tomb of Askia

The Tomb of Askia materializes the grandeur and power of the fifteenth century Songhai Empire, centered in Gao. Built with local materials (clay, wood and terracotta) in 1495 on the orders of ruler Askia Mohamad, this monument has been maintained by local communities: today it is the most important and best conserved vestige of the Songhai Empire (figs. 1 and 2). In addition to the 17m high pyramid tomb, it consists of two flat-roofed mosques (one for men and one for women), the cemetery and an open-air prayer space, which are still in use today. The public space, also called White Stone Square, is dedicated to the Tabaski festival prayer, major sporting and cultural events, and local students use it for physical education and sports. Local people maintain a close connection with the Tomb of Askia, recognized by international organizations (World Heritage Committee 2023, 2024; ALIPH 2018).

Classified as national cultural heritage in 2003, it was inscribed on the World Heritage List in 2004 under World Heritage Convention (1972) criteria II, III and IV (UNESCO n.d), referencing the "unique architectural style" of local building traditions and the continuation of the "regular, traditional maintenance practices," such as plastering (*crépissage*) by the local community.

In 2012, extremists occupied Northern Mali (Eloundou Assomo 2022): the Tomb of Askia was inscribed on the List of World Heritage in Danger and placed under (tentative) Enhanced Protection under the 1954 Hague Convention's Second Protocol (1999), despite insufficient emergency planning (Committee 2023). Yattara, a former Sahel Museum Director, conducted a study of the movable heritage and the establishment of emergency plans for the site (Yattara 2017). However, as no technical service cited in the document (including the Cultural Mission) was involved, it was not implemented. No emergency plan currently exists. In 2022, Blue Shield International supported the site's GIS mapping as part of the Enhanced Protection registration, finally completed in 2023.

The World Heritage Committee (2023, 2024) record insecurity and risk of site collapse as two of the three reasons the site was placed on the List of World Heritage in Danger. However, links to climate change are not mentioned.

Climate Change Impacts in the Gao Region: People and Heritage

Climate Change in Gao

The Gao region is located in Mali's Saharo-Sahelian zone. For decades, it has faced negative and multifaceted effects of climate change, resulting in a rural exodus that contributes to insecurity in the cities.

The temperature has increased to around 45°C during the day and 15° or less at night. Mali is now experiencing an ongoing drought: Precipitation is less than 500mm per year. The Gao Regional Director of Nature Conservation, Mr. Touré (pers. comm. 12 February 2025) estimated that the rainfall isohyets have moved 200 to 300km, evidencing the desert's advance. The Niger is also silting up; sand is accumulating in a minor riverbed. Violent winds are loaded with sand dust. Sudden torrential rainfall now regularly results in upsurges in the Niger River levels and catastrophic flooding. Alerts are raised when water rises 4.60m above normal. In 2024, the level reached 3.99m, 4.53m in 2023 and 4.50m in 2022.

Between July and September 2024, Mali experienced the most significant rainfall since 1967, impacting over 180,000 people. Gao was one of the most affected regions (IOM 2024). The Gao Regional Social Development Department (pers. comm. 2025) surveyed the consequences: Most affected buildings were in Gao's old town.

The Regional Directorate of Agriculture (pers. comm. 2025) recorded the Niger River reaching its highest ever alert level on 26 January 2025 (4.95m): 19,716 ha of cultivable land in the Gao region were flooded between December 2024 and January 2025, impacting approximately 20,000 households and cutting off the roads linking villages to Gao city.

Consequences for cultural heritage

Climate change has caused drastic decreases in local building materials, contributing to the degradation and loss of Gao's earthen architecture. Intensifying rainfall has also increased the Tomb of Askia's structural vulnerability. Following torrential rains in August 2006, 2011, and

Impact	Numbers affected
Collapsed houses	2632
Affected (flooded) houses	2013
Collapsed toilets	28
Number of people affected Women Girls Men Boys	45,623 12,799 11,274 12,252 9,298
Households affected	6451
Number of deaths	6

^ Table 1. 2024 rainy season impacts on the Gao region (Source: Regional Social Development Department, 2025).

2017, parts of the men's prayer room roof collapsed. In 2024, two further collapses occurred following heavy rains (fig. 3). 16m^2 (4.60m x 3.70m) collapsed overnight on August 2–3; and 18m^2 (5m x 3.60m) overnight on August 22–23 (Cissé et al. 2024). Fortunately, there were no casualties: damage was discovered around 5 a.m. by the mosque's faithful attending the first daily prayer.

Advancing desertification causes fine sand to cover many tombs in the cemetery, leaving only tombstones visible, as well as the White Stone Square, hindering preparation for events and festivals.

Resilience and Protective Measures

Drought affects the people of Gao's livelihood daily, while the torrential rains and floods places their homes at great risk. Local communities' solidarity, the provision of emergency tents, shelters and the financial support of international NGOs, has alleviated (but not halted) the victims' suffering. UNHCR, the UN Refugee Agency, appealed urgently, but unsuccessfully, for US$10.6 million to address the impacts of climate-induced flooding across West and Central Africa, aiming to directly support the population, and enhance flood preparedness activities (UNHCR 2024). Now, the Regional Directorate of Civil Protection, the youth of Gao and the Town Hall municipality have been supporting the people and undertaking protective measures themselves. Activities include inspections of flood-affected buildings and moving families to safer places. Given the scale of displacement and decrease in available building materials, many homes will not be rebuilt in the traditional style and many people may not return.

The cultural sector is paying significant attention to the Tomb of Askia. The Malian authorities complete a regular State of Conservation Report which the UNESCO World Heritage Committee reviews, a monitoring requirement for sites on the World Heritage in Danger List. In 2016, the Committee and the Malian authorities agreed measures to repair and stabilize the site and to develop a timetable for conservation work (World Heritage Committee 2016). In 2018, UNESCO World Heritage Centre funded the replacement of eucalyptus wood with traditional hasu wood, hasu plant regeneration and the spreading of fine sand to counter water erosion. These are now part of the site's ongoing maintenance.

Also in 2018, donor ALIPH granted US$500,000 to the National Directorate of Cultural Heritage, the Cultural Mission of Gao, CRAterre, (and Pyramis auditors), in collaboration with local communities. The project, which eventually launched on 2 March 2024, aimed to "improve the state of conservation and authenticity of the site while continuing traditional mainte-



^ Fig. 2 Collapsed men's mosque roof (Source: Mamadou Samaké, 2024).

nance practices, such as the traditional wooden carpentry and plastering techniques which are characterized by rounded shapes resulting from the regular renewal of the plaster layer eroded by the rains each winter" (ALIPH 2018). It would:

- Repair the buildings and fence,
- Train masons and guides,
- Develop the ablutions area,
- Update the electrical installation,
- Construct latrines,
- Replace metal doors with wooden ones,
- Regenerate hasu plants at the site and supply hasu poles,
- Spread fine sand in the prayer area to counter water erosion,
- Produce booklets and a conservation manual,
- Provide computer equipment and materials to the Gao Cultural Mission.

Local labor was paid; however, two interns from the Cultural Mission worked voluntarily. The complete restoration of the men's mosque roof had not been planned for. Work was largely completed by July 2024. However, following the August collapse, the local community requested restoration, which the donor agreed to. Local masons and workers, supervised by CRATerre, carried out the repairs. Old masons' expertise and the local workforce's commitment contributed effectively to the property's conservation and promoted traditional knowledge of earthen architecture.

In 2022, the African World Heritage Fund donated US$15,000 to document historic burials (World Heritage Committee 2023). Protection at the necropolis was also strengthened by installing a stone cordon to mitigate the effect of water erosion.

The World Heritage Committee reports that "insecurity is still the major threat to the property" (World Heritage Committee 2024). However, they are now realizing that whilst insecurity impacts site conservation, it is not the only issue. In 2024, they asked if "a more in-depth and up-to-date analysis could be provided in order to better understand precisely how insecurity actually affects the management and conservation of the property" (World Heritage Committee 2024). What is not yet appreciated is the close relation between climate change, insecurity and conservation: Without addressing climate change, the other issues will remain.

It is critical that, despite the challenges facing them, the local people remain actively involved (Perry and Falzon 2014, 45). Site authorities work closely with local people to maintain and develop their attachment to the site. For example, community engagement, including the now annual African World Heritage Day celebrations on 5 May (fig. 3), raises awareness. Young people are given a tour and there are celebrations at the site (BSI 2023). The World Heritage Committee (2024) called it "commendable".



^ Fig. 3 Repair work on the roof of the men's mosque after the 2024 collapse (Source: Mamadou Samaké, 2024).



^ Fig. 4 Tomb of Askia World Heritage Site. The red and blue shield protective emblem of enhanced protection under the 1999 Second Protocol to the 1954 Hague Convention is visible in the foreground, the World Heritage sign in the background, adjacent to a UN peacekeeper vehicle, showing the tense security situation (Source: ©M. Bagayoko, with author's permission).

As of 2024, the site remains on the List of World Heritage in Danger. However, workshops were held in Senegal in 2022 and Morocco in 2024 to strategize conservation improvements for the removal of West African sites from the List (World Heritage Committee 2024). This included addressing the risks of collapse and insecurity.

Conclusion

SDG13 targets focus on strengthening resilience, knowledge and capacity for disasters and integrating climate change measures into policies and planning. However, targets report against emissions management, indicating Mali is successfully meeting SDG13 (SDR 2024). Yet in Gao, climate change rhymes with insecurity, though the links between them and heritage protection are poorly understood in policy. Many recommended heritage adaptations (UNESCO et al. 2010, Perry and Falzon 2014) are inadequate in this situation. Heritage-specific climate change modelling must be developed, with monitoring that supports targets.

Local, national, and international authorities must encourage adaptation to the effects of climate change, including building cleaning collectors to facilitate the flow of rainwater to the river. The population must comply with the safety instructions proposed by the authorities and

technical services such as civil protection, the hydraulics and metrology departments. NGOs and partners should be supported to continue to alleviate the suffering of those impacted. Young people should support technical services in raising awareness, particularly amongst those living in the riverbeds, to better protect them in the future.

This protects not only our World Heritage, but the people attached to it. Developing Climate Change resilience (SDG13) will protect heritage (SDG11.4) and tackle Mali's increasing population displacement and insecurity, improving the other targets which are negatively impacted by climate change.

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Mamadou Samaké obtained a degree in history and archaeology from the University of Bamako, Mali, in 2000. He worked on the Ancient Cities of Djenné World Heritage Site from 2004 to 2017, when he became head of the Cultural Mission of Gao and manager of the Tomb of Askia and associated sites. Mr. Samaké is vice-president of the ICOM-Mali National Committee and president of the Malian Committee of the Blue Shield. He has participated in training courses in Burkina Faso and France on archaeology and regional museum management, and ICCROM First Aid to Cultural Heritage in Times of Crisis, in Bamako, Mali, in 2018.

Contact: mamadousamaké2004@gmail.com