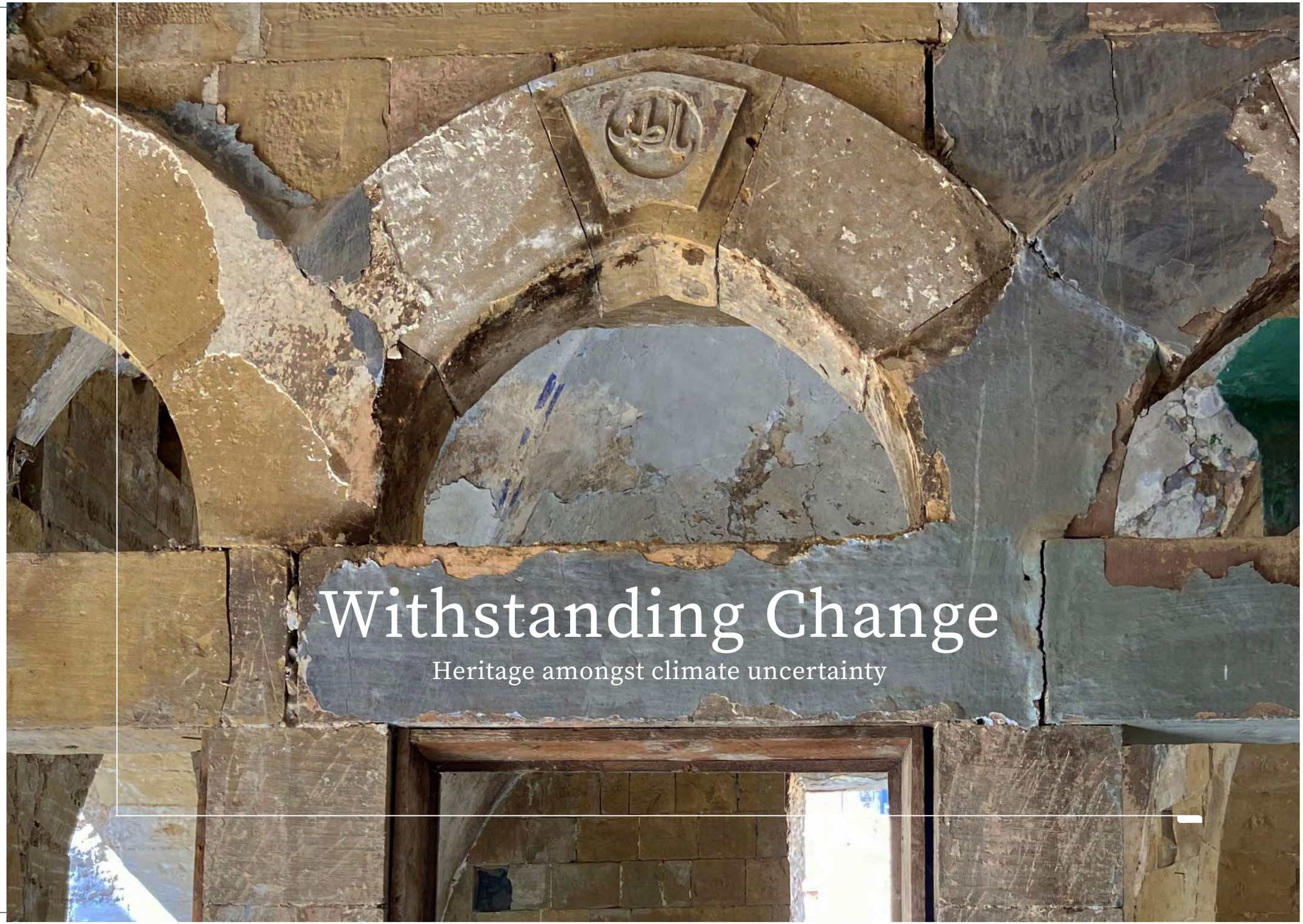


Withstanding Change

Heritage amongst climate uncertainty

Cover image: A carved internal stone arch inside Bayt al-Jaghbeer, As-Salt, Jordan. © Dave Simpson.

Withstanding Change is funded by the British Council's Cultural Protection Fund, in partnership with the Department for Culture, Media and Sport.

In partnership with

BRITISH COUNCIL

Department for Culture, Media & Sport

Project partners

INTERNATIONAL NATIONAL TRUSTS ORGANISATION

PETRA NATIONAL TRUST
الجمعية الوطنية للمحافظة على البترا

HERITAGE WATCH

CCFU
The Cross-Cultural Foundation of Uganda

EGYPTIAN HERITAGE RESCUE FOUNDATION

National Trust

Withstanding Change

A very brief introduction

We at INTO (the International National Trusts Organisation) are incredibly proud of the success of the Withstanding Change project, and delighted to showcase our partners' achievements in this collection of essays. Across Africa, the Middle East and in the UK, our project partners have safeguarded a range of highly significant sites from the impacts of climate change, ensuring that these are preserved for local communities to use and enjoy, now and into the future.

Amongst the full range of fantastic initiatives supported by the British Council's Cultural Protection Fund, I am proud of Withstanding Change's distinctive ambition, international scope, and the diversity of the sites involved. Physically strengthening and building resilience at heritage sites is expensive and carries significant risks, but the INTO team has worked hard to ensure that the British Council's generous grant has delivered excellent value across each and every aspect of the project, with all of our funded partners delivering on budget and exceeding many of their own ambitious targets.

Withstanding Change was originally conceived around three core strands of work, with a series of INTO members delivering:

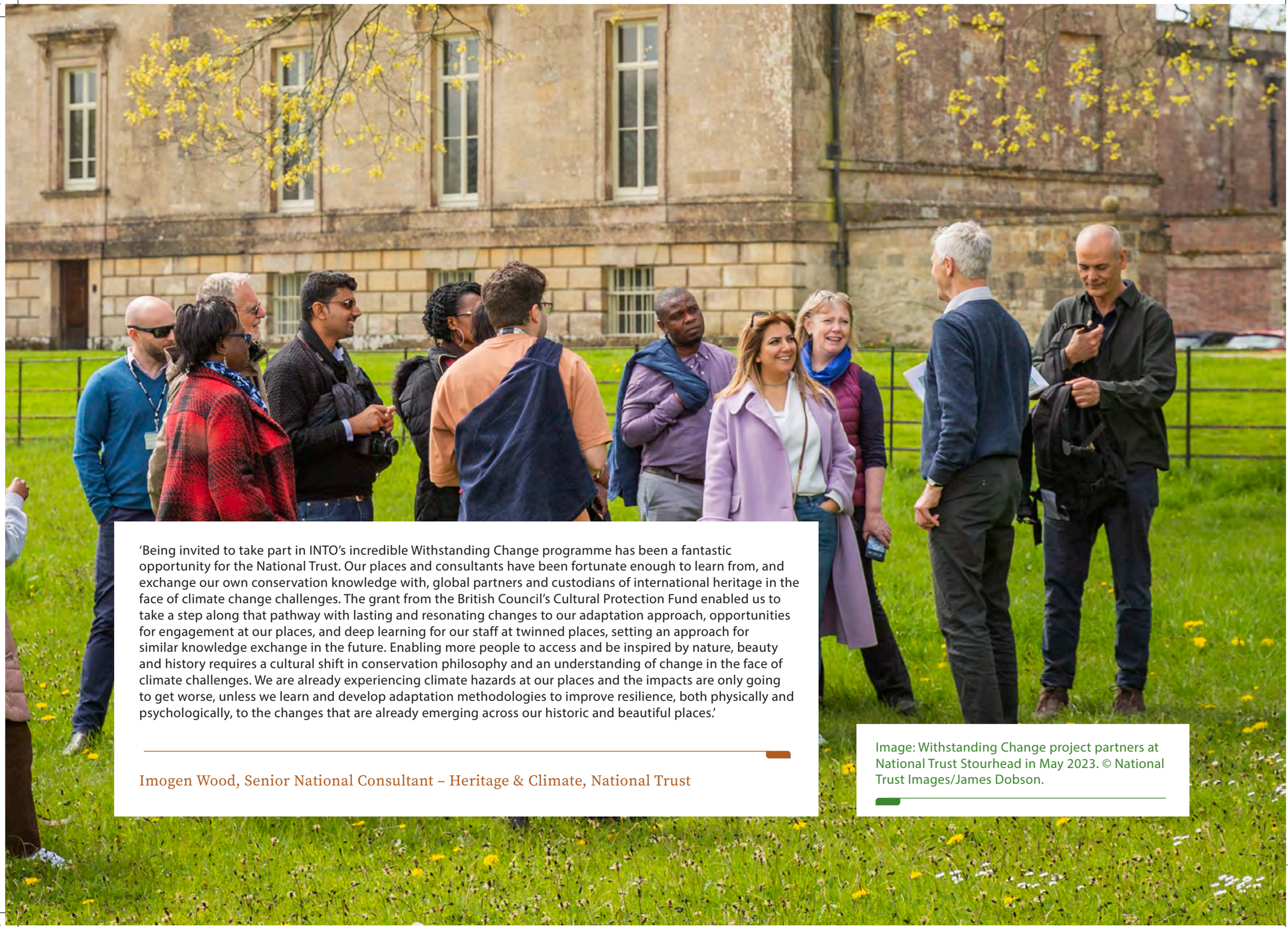
- Climate change adaptation for a particular heritage asset – preserving and increasing the resilience of each site, but also providing examples of pioneering best practice from which others in the heritage sector will be able to learn;
- Community engagement, opening a conversation with local people about the changing climate and its impact on their heritage, and fostering the skills to deal with this challenge into the future;
- Exhibitions at each site, telling the story of climate change and its interaction with heritage.

All of this was delivered with the support of the National Trust of England, Wales and Northern Ireland, acting as knowledge partner by sharing its vast expertise. The National Trust supported the project partners in the Middle East and East Africa through one-to-one twinning arrangements between sites that were matched due to their shared climate challenges. Twinned sites learned together about the possible adaptive measures that can be applied to heritage sites affected by climate hazards, but they also engaged in wide-ranging conversations about all aspects of sustainable heritage site operations. National Trust teams were able to benefit from the expertise of partner organisations who are, in many cases, very much on the frontline of the climate crisis. From sensitively adapting rainwater goods and roofing materials to prevent water ingress resulting from more intense and prolonged periods of rainfall, to landscape-level interventions to control the flow of water and prevent flooding and erosion, through to managing precious collections items in the context of climate change, a huge amount of learning has been exchanged, in both directions.

Crucially, this has in many cases enabled a new conversation about the intersection between heritage and climate. This includes the impact that climate change will have on heritage, but also the critical role that our heritage can have in mitigating and showing us ways in which to adapt. There is much more that can be done in this space, to include others in the conversation, learn from those already facing climate extremes and ensure that government policy globally is keeping pace with adaptation needs. Thanks to Withstanding Change, our partners' work has grown in profile and this call is now being heard by local and national governments (for instance, in Uganda and Zanzibar).

INTO champions the global philosophy of the National Trust movement, which includes a commitment to care for places for everyone, forever. This long-term perspective makes the heritage sector in some ways uniquely well-placed to consider the impact of climate change, as well as inspiring local people to care about their heritage. In this vein, we were able to be led by the needs of each partner organisation, working with local communities and being driven by their concerns. That the project as a whole has been able to avoid broad-brush, top-down approaches, and to work instead in a sensitive, community-led way, has been another marker of its huge success.

Alexander Lamont Bishop
Deputy Secretary-General,
International National Trusts Organisation



‘Being invited to take part in INTO’s incredible Withstanding Change programme has been a fantastic opportunity for the National Trust. Our places and consultants have been fortunate enough to learn from, and exchange our own conservation knowledge with, global partners and custodians of international heritage in the face of climate change challenges. The grant from the British Council’s Cultural Protection Fund enabled us to take a step along that pathway with lasting and resonating changes to our adaptation approach, opportunities for engagement at our places, and deep learning for our staff at twinned places, setting an approach for similar knowledge exchange in the future. Enabling more people to access and be inspired by nature, beauty and history requires a cultural shift in conservation philosophy and an understanding of change in the face of climate challenges. We are already experiencing climate hazards at our places and the impacts are only going to get worse, unless we learn and develop adaptation methodologies to improve resilience, both physically and psychologically, to the changes that are already emerging across our historic and beautiful places.’

Imogen Wood, Senior National Consultant – Heritage & Climate, National Trust

Image: Withstanding Change project partners at National Trust Stourhead in May 2023. © National Trust Images/James Dobson.

Heritage Watch Ethiopia

Preserving history through garden restoration

The work delivered by Heritage Watch Ethiopia (HWE) as part of the Withstanding Change project has been focused on the campus of the Faculty of Business and Economics at Addis Ababa University, a site that once served as the residence of Crown Prince Asfawossen. Initially, HWE aimed to restore the historic residence itself, and rehabilitate its surrounding gardens. However, due to the difficulty of relocating some academic departments from the residence itself, HWE found itself having to think creatively and adapt its initial approach, creating two distinct garden spaces within the campus, over two phases.

The Tsegereda Garden: a journey through Ethiopian horticulture

The first garden, inaugurated on 5 December 2023, is named after the *tsegereda* or rose plants that once flourished as the site's centrepiece. During the imperial era, the garden around the Crown Prince's residence was adorned with fragrant roses, symbolising elegance and tradition. HWE's interventions saw the

Left: The Tsegereda Garden seen from above. © Heritage Watch Ethiopia.

garden redesigned and revitalised to reflect Ethiopian cultural heritage, showcasing plant collections from the 1940s and 1950s while also incorporating modern techniques for climate adaptation and mitigation. It features five thematic areas that tell the garden's story, including plants from the royal palace such as lavender, veronica, and amaryllis, and a tribute to the pioneering landscaper Ato Sibehatu whose collection included the plants canna, lantana, and iris. The Tsegereda Garden also features the Ethiopian herbs *koseret, tej sar* (a type of lemongrass) and *gesho* (dogwood), alongside drought- and flood-tolerant species, a rain garden, permeable pavements, and retaining walls to prevent soil erosion. A landmark initiative in modern Ethiopian garden design, the Tsegereda Garden aims both to educate visitors about garden heritage and to inspire them to adopt sustainable practices.

The Terrace Garden: where the past meets the future

The Terrace Garden was the focus of HWE's work in the second phase of the project, and was inaugurated on 25 November 2024. Its name reflects the terraced layout of the site. A unique discovery of archival footage showing the Crown Prince and his family strolling through the garden added historical depth to the restoration. HWE retained most of the original pathways, conducting selective repairs to respond to weathering, while the flower beds were entirely redesigned to accommodate new themed areas.

The Terrace Garden is organised into four quadrants, each with a unique focus. The biodiversity quadrant features plants that attract pollinators like butterflies and bees, addressing urban biodiversity loss. The royal quadrant echoes the formal garden designs of the imperial era, with monochromatic hues, hedges, and permeable gravel pavements for flood reduction. The tropical quadrant represents Ethiopia's diverse climatic zones and includes an underground rainwater reservoir, showcasing historical water conservation methods. The natural resource quadrant serves as a bird sanctuary that highlights Ethiopia's ecological wealth and features low-maintenance native plants.

Situated within the university compound, these rehabilitated gardens offer a tranquil space that benefits students, faculty and staff while serving as a prototype for horticultural education and research. They highlight Ethiopian natural and cultural heritage, sustainable practices, and historical plant collections from the 1940s and 1950s, bridging the gap between the imperial gardening legacy and the present generation. The gardens benefit from a permanent exhibition of interpretive panels to prompt exploration and foster awareness of heritage conservation and sustainability in an academic setting.

Above: planting work at the Terrace Garden in June 2024. © Heritage Watch Ethiopia.

Climate change impacts

The Tsegereda Garden and Terrace Garden have both been significantly impacted by climate change over the years, with the effects compounded by poor management. The Tsegereda Garden had been particularly badly affected: high rainfall resulted in soil erosion, which weakened the land and caused a decline in plant life. The garden's position at the lowest point of the campus made it highly prone to flooding, which contributed to the deterioration of the vegetation. The previous lack of community engagement and minimal investment in maintaining the space or cutting back overgrown bushes further worsened its condition, and the garden eventually fell into disuse. Even during the early stages of HWE's redevelopment of the site, heavy rainfall had a negative impact on new planting, adding to its vulnerability.

The Terrace Garden retained its beautiful terrace layout, but had also experienced severe challenges prior to HWE's interventions. The garden's design incorporated a historic groundwater reservoir system which helped manage water flow and provided backup water supplies for times of drought – a feature that made it resilient to climate-related challenges. However, over the years, mismanagement and neglect led to the deterioration of these significant historical features. The system designed to manage water and reduce runoff faced blockages and damage due to lack of upkeep. The terraces, which were designed to control water distribution, failed to do so, contributing to flooding during heavy rains. As the infrastructure continued to decay, pathways and flower beds were severely impacted by erosion. The absence of maintenance allowed invasive plant species to thrive, replacing native plants and reducing biodiversity. This shift disrupted the ecological balance of the garden and reduced its ability to recover from environmental disturbances.

Adaptation in action

Over the course of the Withstanding Change project, the HWE team has implemented a range of climate adaptation and mitigation strategies in the restoration of the Tsegereda Garden, making it much more resilient for the future. The garden was redesigned not only as a recreational space but also as an educational resource to support climate adaptation in Ethiopian gardens and promote environmental education and sustainability within the campus community.

To manage stormwater effectively, permeable surfaces combining grass and stone were used throughout the Tsegereda Garden's pathways. This design slows down stormwater, enabling rainwater to infiltrate the soil rather than run off and carry away fertile topsoil. A rain garden was installed at the lowest point in the site to further help with managing water. As urban development increases, natural environmental processes can become less effective. In response, the rain garden reduces stormwater runoff, promotes groundwater recharge, and filters pollutants before they reach nearby waterways.

The Tsegereda Garden also features a mix of perennial flowers with varying heights, creating both a visually appealing and functional space. Plant species were carefully selected for their ability to thrive in different moisture zones. The garden thus showcases a variety of both flood-tolerant and drought-resistant plants, many of which are indigenous to the region.

At the Terrace Garden, HWE has worked hard to optimise water use. One of the primary steps was restoration of the site's groundwater reservoir, allowing it to serve as an additional water source for the garden. The reservoir helps ensure a more reliable and sustainable water supply, especially during dry periods, and reduces reliance on mains water.

Low-maintenance plants were carefully selected to minimise the need for frequent watering. By choosing species that are naturally drought-tolerant, the garden becomes more water-efficient while still providing a beautiful and functional space. To further improve water management, a drip irrigation system was installed in the Terrace Garden. This system delivers water directly to the roots of the plants, ensuring that water is used efficiently and only where it is needed. By minimising water loss due to evaporation or runoff, the drip irrigation system contributes to more sustainable gardening practices and reduces overall water consumption.

The Terrace Garden's fountain, which was previously wasting a large amount of water, was also restructured to promote water conservation. The size of the fountain was reduced, and a new pump was installed to make the water recyclable. Water is now continuously circulated, rather than being wasted, and the redesigned fountain now offers a visually appealing feature without compromising water conservation efforts.

Top: An area containing drought-tolerant plants at the Tsegereda Garden in June 2024.
Bottom: Selam Mosisa of Heritage Watch Ethiopia at work in the Tsegereda Garden.
All images © Heritage Watch Ethiopia.

‘Initially we approached the twinning with great curiosity, not knowing what the rose gardens in Ethiopia and England would have in common given our different climates, soils and community uses. The observed impacts from both teams showed how extremes of weather – long droughts and heavy rainfall – were already impacting gardens in both countries. Some great tips were shared from both teams about improving and conserving soils to help support plant health.

‘Gardens are such physical entities; the twinning programme really came alive through an exchange visit. Our gardeners from the UK were amazed to see species that only survive as house plants in the UK growing in gardens in Addis and the innovative garden design features being trialled at Tsegereda in response to climate change. They were also fascinated by the types of Ethiopian heritage roses being conserved there and stories behind them.’

– Vicky Fletcher, General Manager, National Trust Mottisfont

Image: Michael Harvey, National Trust Mottisfont, and Esther Selassie Antohin, Heritage Watch Ethiopia, discuss planting in the Tsegereda Garden. © Heritage Watch Ethiopia.

Twinning with the National Trust

In developing both gardens, the Heritage Watch Ethiopia team were lucky to be able to exchange knowledge and best practice with site teams from the National Trust’s Mottisfont and Hinton Ampner, both in Hampshire. Mottisfont is well-known as home to the Trust’s national collection of pre-1900 roses – but the collection has faced a number of challenges in recent years, particularly relating to extremes of hot and wet weather. The wonderful grounds at nearby Hinton Ampner have been seeing increasing issues with waterlogging due to wet weather. The three sites were brought together to share knowledge and best practice on different aspects of climate change adaptation in gardens. Online meetings focused on sustainable gardening practices, including climate-informed plant selection and improving soil health, but also looked at aspects of visitor operations, including accessibility, seasonal programming, and financial sustainability. Following this series of online meetings, in September 2024, two National Trust gardeners travelled to Addis Ababa to work alongside the HWE team and share their approaches.

‘We discovered how important it is to research and document plant types and use clear visuals to explain ideas. We also gained practical advice on improving visitor experiences, making our site accessible for people with disabilities, and recruiting and managing volunteers. These ideas have already influenced how we plan and run activities at our site. The twinning sessions also showed us how to involve the community better and use creative exhibition designs and marketing ideas to attract visitors and teach them about climate change through gardening.’

– Esther Selassie Antohin, founder and executive director of Heritage Watch Ethiopia

Engaging local communities

Thanks to HWE's interventions, the Tsegereda and Terrace Gardens have become vibrant hubs of activity. Students now make use of these spaces for studying, group discussions, personal reflection, and socialising with friends. University staff members also occasionally use the gardens, particularly for events or for video backdrops. A post-design survey revealed that students found the gardens refreshing and revitalising, a sentiment echoed by the faculty dean. As one student commented in a survey response, 'It's a place where we can unwind after the stress of class. We're grateful for the space being restored.'

Beyond their aesthetic appeal, the gardens serve as a platform for knowledge and skills development. Through hands-on training. horticulture micro small enterprise (MSE) groups, volunteers, and HWE maintenance teams have learned about plant selection, the character of the plants and plant care techniques, ensuring the sustainability of these green spaces.

Over the course of the two-year Withstanding Change project, HWE has built close relationships with the Climate Change Centre at Addis Ababa University, including two faculty members, Drs. Biniyam Tasew and Kassahun Ture, who collaborated with the HWE team to develop a rainy season climate change awareness programme for public high school students. This resulted in a teaching module and a highly engaging comic book for young learners, focused on water and soil conservation. A three-day workshop was developed to utilise these learning tools, and was offered to over ninety students. HWE plans to expand this programme to private schools in 2025 and beyond. They are keen that these gardens serve as a bridge reconnecting younger generations with Ethiopia's rich cultural heritage, particularly its traditional herbs, allowing them to explore and experience these plants beyond mere hearsay. Onsite interpretation also highlights Ethiopia's potential as a global biodiversity treasure, encourages

Above: new interpretation at the Tsegereda Garden. © Heritage Watch Ethiopia.

recognition of early landscape designers who paved the way before the field became a formal profession, and fosters awareness about sustainable practices such as proper flower watering techniques.

The project has also had an impact on the wider campus, with the University's facilities department actively seeking HWE's expertise in gardening and landscaping. There are now large portions of the campus that are being developed – changes that have come about as a direct result of the positive reactions to HWE's two garden redevelopment projects received by the University President's office. HWE's work has inspired a shift in the university's approach to landscaping, with factors like light exposure and water requirements now taken firmly into account when selecting plants.

Next steps

These gardens have enriched the campus environment while establishing a model for showcasing heritage through innovative gardening techniques – a concept not previously well known in the Ethiopian heritage sector, but now gaining significant interest. Heritage Watch Ethiopia is currently focused on ensuring the sustainable maintenance of the gardens by organising floriculture events. These events educate attendees about various plant characteristics, including their resilience to changing conditions such as drought and flooding, as well as unique traits that emphasise their heritage value. Hosting these floriculture bazaars provides HWE with a valuable opportunity to inform the public about plant selection, generate income for garden maintenance, and encourage community members to visit and engage with the garden. HWE will also continue to work with Addis Ababa University to develop beautiful, educational garden spaces within the campus.

The HWE team are also in the initial stages of discussion to collaborate with their twinning partners at National Trust Mottisfont and Hinton Ampner on a revamped heritage garden at Fairfield House in Bath, United Kingdom. This historical site is centred around Ethiopian history, having been the residence of His Imperial Majesty Haile Selassie I, Emperor of Ethiopia, while in exile. This exciting new project is an opportunity to build on all the teams have learned together as part of Withstanding Change, merging British and Ethiopian horticultural influences and providing another space to engage local communities with climate change and its impact on gardens.

Image: The Heritage Watch Ethiopia team give National Trust colleagues a tour of the Tsegereda Garden in September 2024. © Heritage Watch Ethiopia.

Zanzibar Stone Town Heritage Society

Protecting and promoting Stone Town's heritage

Zanzibar Stone Town Heritage Society (ZSTHS) is a civil society organisation, officially registered in 2002. Its main aim is to support the government's efforts to preserve the Stone Town of Zanzibar – a UNESCO World Heritage Site – and to raise awareness and provide training and capacity building for stakeholders in Stone Town's heritage. ZSTHS also encourages the local community to actively participate and engage in safeguarding the historic and natural environment.

Within the framework of the Withstanding Change project, ZSTHS has carried out a suite of capital works at the Old Customs House, as well as community engagement and outreach programmes.

Left: The Mizingani seafront in Stone Town, Zanzibar. The Old Customs House is the white building at the centre.

The Old Customs House

The Old Customs House is a Grade II-listed building located on Mizingani Road, the most prominent waterfront area of the Stone Town of Zanzibar. The building is a typical mid-nineteenth-century Omani mansion with later additions of European- and Indian-influenced architectural elements. Executed principally in coralline ragstone and mangrove timber, the building's walls are set in a thick lime mortar, and covered with lime-washed plaster. The three-storey building is roughly rectangular, with a central courtyard and an additional courtyard at the rear. Three quarters of the third storey were covered with corrugated galvanised iron roofing sheets, while the remainder is comprised of a flat roof. The building's main facade is decorated with characteristic mouldings and an ornamental timber balcony supported on cast-iron columns – an addition dating from 1896, with the columns reputed to have come from the nearby House of Wonders, one of Zanzibar's most famous architectural landmarks, completed in 1883. The Old Customs House also features a large ornamental carved teak wood double door (dated 1254 in the Hijiri calendar, or 1838/39, making it the third oldest in Stone Town) and steps finished with marble. Inside, it has a typical central courtyard with valuable decoration such as floor marble inlays and arches typical of Islamic architecture.

Following the development of a new port at Malindi in the early 1920s, the Customs and Tax Authority was moved to the building in 1928. The building served as a customs house until 1987, when it was vacated due to its derelict state, and subsequently fell prey to squatters and vandals. In 1993, the building was rehabilitated and its timber balcony reconstructed under the supervision of UNESCO experts and with funds from the Italian government, the Aga Khan Trust for Culture, and the Swedish International Development Cooperation Agency.

The Revolutionary Government of Zanzibar had already in 1993 recognised the need for an institution that could provide knowledge and practical know-how on heritage conservation. In 2002, the building was officially inaugurated as the Zanzibar Conservation Centre, and the mandate to manage the centre was given to the Zanzibar Stone Town Heritage Society.

Climate change impacts

Stone Town is at significant risk as a direct consequence of sea level rise and extreme storm events, which are anticipated to be more frequent in future. An engineering intervention was undertaken in 2017 to rehabilitate the Mizingani stretch of 1900s coral ragstone sea wall, setting its crest level one metre above the Highest Astronomical Tide (HAT) level. The area is also prone to pluvial floods due to increasingly extreme precipitation events, aggravated by an outdated storm drainage system. The geography of the Stone Town peninsula makes its coastline extremely vulnerable, with significant risk from direct sea level rise and pluvial flooding. Settlement and collapse of facade walls of buildings along Stone Town's seafront have been evidenced in recent years – including the House of Wonders, whose facade collapsed in late 2020.

Due to its location on the Mizingani seafront, the Old Customs House is constantly exposed to humid and salty air, which deteriorates its external lime wash and lime-based render and also causes salt corrosion to the metal roof covering. Frequent pluvial floods saturate the earth around the foundations, accelerating the capillary rise of moisture-borne salts. Upon evaporation, salt particles are forced to the surface of plasters, renders and washes, causing spalling, flaking and peeling. More frequent and prolonged rainfall also prevents the walls from drying out, leading to growth of algae on the surfaces of the damp walls. The ever-present dampness and humidity foster a growth of biological agents of deterioration such as termites and other wood-boring insects, and an increased concentration of chemical agents including airborne salts and pollutants that in turn cause the timber elements of the building to deteriorate.

Left: Salt crystallisation on external renders of Old Customs House. © Sharida Diaz Gautier.

Adaptation in action

Zanzibar Stone Town Heritage Society responded to these climate change impacts by rehabilitating and adapting the Old Customs House through community-led design. Through consultation with the local community, the ZSTHS team developed an approach to adaptation which privileged the use of locally available, sustainable and breathable building materials, and a blend of traditional and modern building techniques suitable to local conditions. The Old Customs House was fully documented before works began, and a set of detailed survey drawings was developed to aid the conservation of the building and document the interventions.

The pitched roof of the Old Customs House was previously covered with corrugated galvanised iron sheets that suffered from salt-induced corrosion, accelerated by rising humidity. In view of these climate change impacts, the sheets were replaced with corrugated aluminum sheets of same form and design, providing more resilience to the changing climate. In a similar intervention, the concrete flat roof was locally repaired and protected with a breathable waterproof coating consisting of a geotextile membrane and resin-based coating. All rainwater goods were repaired and new aluminum hoppers were introduced at gutter outlets in the internal courtyard, allowing for increased flow capacity – in other words, a drainage system better able to cope with increasingly intense rainfall. As per article two of the Venice Charter,[1] according to which conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of architectural heritage, this project showed that sympathetic and proven techniques, both traditional and non-traditional, can be harmoniously incorporated in adapting historic buildings to meet the challenge of climate change.

Inside the building, water ingress resulting from the leaking flat roofs had resulted in decay of the mangrove poles (*boriti*) that supported the ceilings. Roof repairs prevented further damage, and the damaged poles were replaced with new ones, with the replacements coated with mixture of anti-termite solution and natural preservative oil.

Where the building's renders had suffered damage from salt crystallisation, they were treated with salt extraction using a specially formulated poultice consisting of lateritic clay, coconut coir fiber and water to achieve required workability before undergoing repairs with calcium-rich lime- and earth-based render. The external surfaces affected by mould growth were treated with an anti-fungal solution and then whitewashed to return them to their original appearance.

Local repairs were also made to damaged historic timber elements including the ornamental main door, joineries and external balcony. The main door and joinery elements were coated with a custom-made solution of natural preservative oils to better adapt the timber to increasing humidity.

These interventions have served as a showcase for climate change adaptation – demonstrating that highly significant buildings such as the Old Customs House can accommodate a certain amount of change, even while applying an integrated heritage conservation approach.

1 Venice Charter (1964); see https://www.icomos.org/en/participer/179-articles-en-francais/ressources/charters-and-standards/157-the-venice-charter

Twinning with the National Trust

The ZSTHS team partnered with National Trust teams in North Wales – at Penrhyn Castle and Gardens and the Llŷn Peninsula – to share their approaches to climate change adaptation and learn from one another about sustainable heritage management. Community engagement and heritage skills were also a focus of the learning exchanges. See the National Trust's short film about the twinning partnership here.

'It was really useful seeing other sites with similar problems and their solutions. The impacts of climate change are more stark and pressing for many of our twinning partners but we at the National Trust have also been working on solutions and responses. What we haven't been doing is telling visitors, staff and volunteers about it and sharing our knowledge with others in the same field. We have also been working in isolation and being informed about other people's responses and seeing if they could be applied to our problems has been very useful. I come away from this project determined to keep talking and showing people the effects of climate change on Penrhyn and other sites around the world.'

Richard Pennington, Senior House and Collections Manager, National Trust Penrhyn Castle and Gardens

Engaging local communities

The Withstanding Change project as a whole has placed community engagement at its core, emphasising the importance of collective action to safeguard heritage in the face of growing climate uncertainty. In Zanzibar, ZSTHS's activities have not only preserved tangible and intangible heritage but also empowered the local community to take an active role in the process. Community-focused heritage conservation activities have included:

- **Training in traditional techniques**

Local youth including women were trained in sustainable and climate-resilient restoration methods, incorporating traditional practices and materials. Two week-long workshops on repair of lime renders and coral masonry and repair of historic timber were conducted alongside the adaptation works carried out at the Old Customs House. Many of the trainees were then retained for further hands-on experience as paid workers. This enhanced their capacity to maintain and repair heritage structures for the future, while creating a route to skilled conservation jobs.

- **Tourism development**

ZSTHS organised a two-week refresher course for tour guides, on 'Heritage tourism amongst climate uncertainty'. Selected applicants received training on the history and culture of Zanzibar, sustainable tourism, and the impacts of climate change on heritage. The Old Customs House's restoration is thus part of a broader effort to enhance visitor experiences and connect both local people and visitors with Zanzibar's rich cultural heritage.

- **Climate awareness and education**

The project organised community seminars and school programmes to raise awareness about the impact of climate change on heritage sites.

- **Exhibition**

An interactive exhibition hosted at the Old Customs House demonstrated the vulnerability of Stone Town's unique architecture to climate-related risks and highlighted potential solutions.

- **Revitalisation of heritage spaces**

The Old Customs House serves as a prime example of adaptive reuse of historic buildings – showcasing how heritage can be repurposed while respecting its authenticity. The Old Customs House is, crucially, used and useful: restored and repurposed as a community hub for cultural and educational activities.

Top left: A training session on historic timber conservation at the Old Customs House, May 2024
Bottom left: ZSTHS's team at work in the courtyard of the Old Customs House. All images © Zanzibar Stone Town Heritage Society.

A lasting legacy

The Old Customs House was officially reopened in October 2024, at an event attended by Mudrick Ramadhan Soraga, Minister of Tourism and Heritage. In his keynote speech, he extended thanks to INTO, the British Council, and ZSTHS for leading the way in climate change resilience and heritage conservation. He also acknowledged that the Withstanding Change project is not merely a restoration project but a community-building process that will leave an enduring legacy, having fostered a deep sense of ownership and pride in the local community.

The restoration of the Old Customs House has empowered local craftspeople and cultural leaders to advocate for heritage protection and sustainable practices. Moreover, the Old Customs House now hosts cultural events, including traditional music and dance performances, community events like wedding ceremonies, and art exhibitions. These activities celebrate Zanzibar's rich Swahili heritage and provide a platform for local artists and performers to showcase their talents. The building serves as a venue for workshops and seminars focused on teaching young people about Stone Town's history, architecture, and conservation methods. The building also functions as a tourist information centre, offering guided tours and information about Zanzibar's heritage.

ZSTHS's efforts to safeguard the unique heritage of Stone Town – which is at risk not only due to climate change but due to the challenge of private development – were also acknowledged by His Excellency the President of Zanzibar and Chairman of the Revolutionary Council, Dr. Hussein Ali Hassan Mwinyi, who invited ZSTHS and INTO partners to meet with him to discuss the achievements of the project. His Excellency the President was presented with a special award in appreciation of his own efforts to revitalise Zanzibar's heritage sector, and he warmly accepted ZSTHS's invitation to become a patron of the organisation.

Above: View of the Old Customs House on Mizingani seafront, Stone Town. © Jacqui Sealy.

Next steps

The Zanzibar Stone Town Heritage Society (ZSTHS) is now working on upgrading the Zanzibar Conservation Centre to serve as a focal point for residents and out of town visitors. The Zanzibar Conservation Centre will comprise a museum of Swahili culture and architecture, a learning space focused on heritage conservation techniques, a children's corner, a photo gallery showcasing the transformation of Zanzibar, a music academy, conference facility and a vibrant public space for live concerts. The proposed upgrades will make the Zanzibar Conservation Centre a central hub for cultural and heritage activities in Stone Town, providing a new space for cultural programming to respond to the needs of a diverse community.

Following on from the success of the Withstanding Change project in Zanzibar, the Australian government has provided a grant of 47 million Tanzanian shillings in support of ongoing works. Some of these funds will be used to conduct a laboratory analysis on the building's fabric, to determine the ongoing impacts of climate change, while the remainder will support further work on two of the building's rooms.

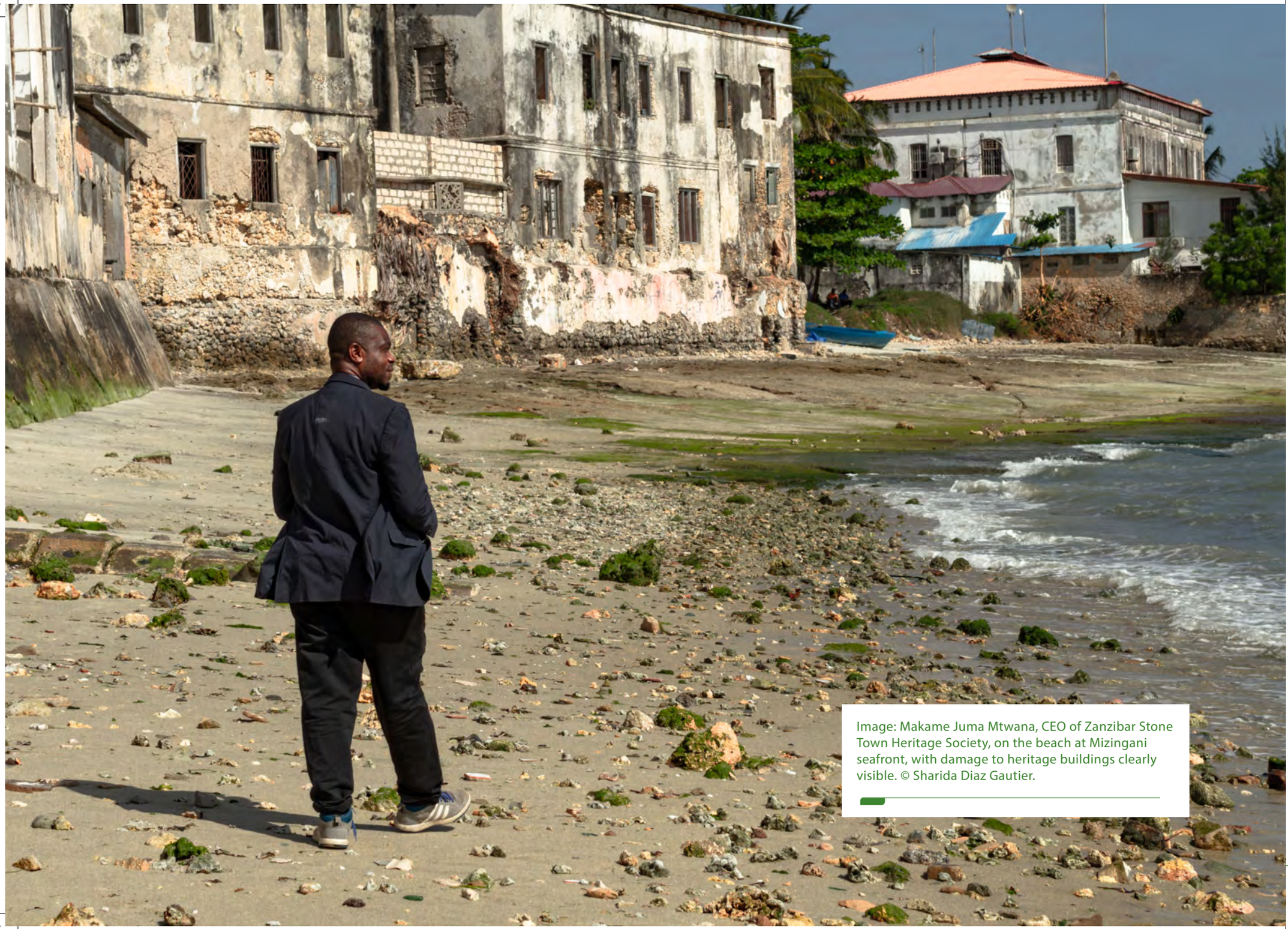


Image: Makame Juma Mtwana, CEO of Zanzibar Stone Town Heritage Society, on the beach at Mizingani seafront, with damage to heritage buildings clearly visible. © Sharida Diaz Gautier.

The Cross-Cultural Foundation of Uganda

Revitalising the Semei Kakungulu heritage site as a hub for climate and culture

The link between culture and climate change is not always obvious, but the recently opened Semei Kakungulu museum and heritage site serves to demonstrate not only the effects of climate change on built, natural, and cultural heritage, but also the role that culture can play in climate change mitigation and adaptation. The Cross-Cultural Foundation of Uganda (CCFU) has restored and rejuvenated the site to bring to life the legacy of Ugandan statesman Semei Kakungulu – including his engagement with the environment – while also providing learning and engagement opportunities, especially for young people.

Left: The Semei Kakungulu heritage site from above.

The Semei Kakungulu site

Situated on top of Gangama hill at the foot of Mount Elgon, with a scenic view of Mbale City in Eastern Uganda, the Semei Kakungulu heritage site was the retirement home for Semei Kakungulu (1868–1928), who played a pivotal role in the expansion and pacification of Eastern and Northern Uganda in the pre-colonial and colonial eras. He is credited for his military brilliance and leadership, which enabled the British to take over Uganda as a protectorate, but his role in this complex period of history also makes him a controversial figure to some.

The heritage site includes three highly significant buildings: a mausoleum where Kakungulu and his close relatives are buried; the remnants of the first synagogue for the Abayudaya, a religious sect founded by Kakungulu, which practices a form of Orthodox Judaism; and Kakungulu's residence. The latter is representative of a new era in Uganda's architectural landscape, mixing traditional and vernacular with 'modern', colonial building techniques. The residence is believed to have been built between 1915 and 1920 using sun-dried bricks jointed with mud mortar, which was a grand accomplishment at the time. With a gross floor area of approximately 170 square metres, the house has 400 mm-thick masonry walls and comprises five bedrooms, two sitting rooms, a storage room, and two verandas. The load-bearing wall system was applied throughout the whole house, with internal spaces designed with small spans and thick, high walls to ensure the stability of the structure. Some of the openings were built with arches above them for added stability. Roofed using poles made of wood and iron sheets that were nailed using special screws capped with coins, the house is believed to have been among the first colonial-era modernist buildings in Mbale City.

Sitting on 3.5 acres of land, the site is complemented by a green landscape that demonstrates Kakungulu's legacy as an environmental advocate. The site was previously part of an expansive estate, measuring 147 acres, currently largely occupied by squatters. On this estate and in some other parts of the country, Kakungulu planted vast groves of *mvule* (milicia excelsa) and fruit trees such as mangoes, bringing to life his vision of a landscape adorned with nature's bounty. Some of these trees are still evident at the site, in cities such as Jinja, Mbale and Soroti, and along major highways.

Climate change impacts

The Semei Kakungulu site is located in a geographical area prone to climate change disasters, especially floods and landslides. The impacts of climate change in Eastern Uganda, especially around Mount Elgon, are becoming increasingly severe, affecting people's lives and livelihoods and seriously impacting the built and natural environment. Due to climate change, the seasons have shifted, with the rainy season becoming more variable in length, and droughts more common. As a result, this part of the country has become more susceptible to floods and landslides. On 1 March 2010, landslides occurred on the slopes of Mount Elgon in Bududa district (formerly part of Mbale), killing fifty people and leaving thousands displaced. In 2018, there was another landslide that killed twenty-eight people, and again left thousands displaced. As of 30 September 2021, a total of 20,739 people had been internally displaced.[1] In 2022, Mbale City – up until then relatively spared by these disasters – experienced floods that left twenty-four people dead and more than 5,600 people displaced.

Climate change in Uganda is of course related to global greenhouse gas emissions, but its impacts are exacerbated by local deforestation and unsustainable farming methods. Between 2001 and 2020, 918 kha of tree cover was lost, equivalent to a 12% decrease in tree cover since 2000 and 413 Mt of CO_2 emissions.[2] At the Semei Kakungulu heritage site, the once-forested hill and its surrounding slopes and lowlands have been left bare due to human activities that significantly reduced the vegetation cover. These activities include deforestation driven by stone quarrying, the demand for timber for construction, fuelwood and agricultural land, increasing urbanisation, and the expansion of Mbale City.

Prior to embarking on restoration works at the Semei Kakungulu site in November 2023, CCFU commissioned a climate change risk assessment study which revealed that the site was affected by climate change stressors such as increased temperatures coupled with prolonged dry spells, and increased precipitation. Over time, these stressors had seriously affected the site. Exposure to solar radiation had led to weakened roof coverings and water ingress. Increased precipitation led to soil erosion and flooding, both exacerbated by storms and droughts that weakened the soil and left it less resilient to extreme conditions. Soil erosion and floods were in turn undermining the foundations of the site's buildings, leading to structural instability. More intense rainfall caused increased dampness of walls and mould growth in the buildings, leading to peeling of paint and deterioration of the screed and plaster. Thermal stress caused expansion and contraction of building materials, resulting in cracks in some sections of the walls of the main house.

1 See https://reliefweb.int/report/uganda/uganda-floods-landslides-and-hailstorms-dg-echo-uganda-red-cross-society-iom-office, 18 October 2021.

2 See https://www.globalforestwatch.org/dashboards/country/UGA/

Adaptation in action

The capital works undertaken by CCFU as part of the Withstanding Change project focused largely on Kakungulu's residential house. Splash aprons were added to safeguard the foundations from flash floods and erosion, and an effective drainage system was installed to divert rainwater away from the building. Gutters and down pipes were installed to direct both roof runoff and ground water to newly installed water tanks. This has not only helped protect the historical building from water ingress, but has also enabled the site to have access to clean water.

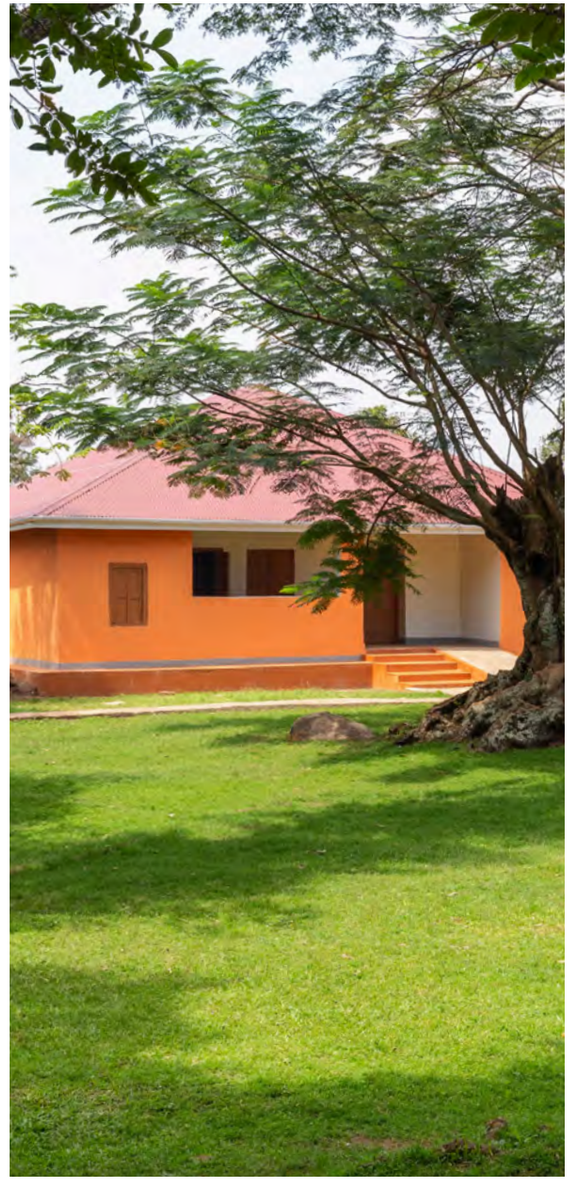
Unfortunately the residence's original roof was beyond repair, so a decision was made to change the roof, maintaining the strong trusses but replacing the rotten support poles in order to strengthen the structure. Furthermore, a ramp was introduced to the building to make it accessible to people with disabilities.

For the landscaping, the site was divided into three green spaces and interventions were made in green space one to demonstrate best practices in agroforestry on hilly sites. The sustainable land management practices showcased here include the construction of contour trenches, water basins and water ditches. Each of these was reinforced with callindra trees that were planted to form a fence around the trenches, water basins and ditches. This helps to control surface water runoff and soil erosion, which impacts the site itself but also, crucially, the community downhill.

Green space one was already planted with banana trees and Arabica coffee. The project complemented these by planting indigenous trees such as *mvule*, Cordia Africana (*kokikili*), Albizzia Chinaisis (*musita*), Musambya Ficus Natalensis and Elastic (*omugaire*). These trees capture carbon, and control erosion by stabilising and conserving the soil.

Tropical plants were also added; these were selected due to their ability to adapt to different weather conditions while creating visual interest through colourful flower displays. Species now on show include Mother in-law's tongue/Snake plants, which repel snakes and are also drought-resistant; agave and cactus plants, prized for their beauty and medicinal uses; ground lantana, notable for their purple, white, and yellow colours; and Bulbinella and spider plants, valuable as cover plants that protect the surface from runoff water. All the tropical plants mentioned above were planted around the main residence and the resource centre/visitor information centre, an existing building within the site that the CCFU team repurposed.

Another crucial element of the project was upgrading the road to the Semei Kakungulu site. CCFU's contractors installed culverts with headwalls to manage floodwater and protect the road surface from erosion. Additionally, *mvule* trees were planted on both sides of the road leading to the museum to create a future driveway canopy. The site was also connected to the national grid for hydroelectricity.



Right: The newly restored main residence, now a museum, at the Semei Kakungulu site. © Cross-Cultural Foundation of Uganda.

Twinning with the National Trust

CCFU received support throughout the project from National Trust teams at Stourhead, who have been dealing with very similar issues with soil erosion due to increased rainfall, with significant impacts on their network of paths. Learning exchanges also covered collections care in the context of climate change, spatial planning, visitor programming and interpreting colonial and post-colonial stories. Further support came from Fountains Abbey and Studley Royal, who had collaborated with CCFU on a previous Cultural Protection Fund project and who were able to share their particular expertise in managing flooding.

'I can honestly say that our twinning with the Cross Cultural Foundation of Uganda has been a transformative journey for our team at Stourhead. Despite coming from two very different cultural and geographical contexts, we discovered a shared passion for heritage conservation and climate resilience that transcends borders. Through open dialogue and collaboration, we exchanged knowledge on physical climate adaptation, sustainable site management, and the vital role of community engagement in safeguarding cultural landmarks.

'Learning from CCFU's deep-rooted connections to local heritage and their approaches to sensitising the public to climate change has enriched our perspective, just as sharing our conservation management planning and business strategy processes has offered valuable insights to our Ugandan colleagues. This partnership has not only strengthened our collective expertise but has also fostered a sense of global stewardship, proving that by working together, we can create meaningful and lasting impacts for heritage and communities worldwide.'

Philip Niemand, General Manager, National Trust Stourhead

Image: CCFU's heritage programme manager Simon Musasizi taking part in a workshop at Stourhead in May 2023. © National Trust Images/James Dobson.

Engaging local communities

Using CCFU's pre-existing Heritage Education Programme (HEP), the project engaged the Manafwa High School HEP club, enabling young people to compose songs and poems about Semei Kakungulu that raised awareness about the impact of climate change on heritage resources. These are included in the project video for learning purposes.[3]

Additionally, the CCFU team conducted community engagement workshops where key stakeholders shared indigenous knowledge relating to climate action. During the workshops, stakeholders identified drought-resistant tree species and genera that play a role in controlling floods. As a result of these workshops, Mt. Elgon Tree Growing Enterprise (METGE) offered to donate over 2,000 trees to the site, and provided technical support in setting up the green spaces. This NGO has also been engaged in orienting the museum staff about the different tree species planted and their importance in mitigating climate change and its effects at the site. The CCFU team also established a partnership with the Bugisu Cooperative Union to supply coffee to the museum, in a nod to Semei Kakungulu's contribution towards the introduction of coffee production in the Elgon region.

With its newly opened museum and spaces for outdoor learning, the site has now become a learning centre for neighbouring schools and educational institutions across the country. Students in higher education, especially those from the Islamic University in Uganda (IUIU) and their lecturers, are using the site for research purposes. The community heritage site is not only open to students but to the community at large: locals from Gangama Hill and surrounding communities were offered seven days of free access to the heritage site to visit, learn, and appreciate the unique architectural design of the historical buildings and also connect with nature, as well as contribute their views on how to further improve the site – an offer taken up by fifty-one people. The site has become a source of employment for the local community, with most of the project contractors as well as permanent members of staff drawn from the local area. The project also improved CCFU's working relationship with Mbale City local government, which waived taxes and provided graders to maintain the road to the site as the opening of the museum approached.

3 https://youtu.be/3g5RMSZplfI?si=vb52tmoEp5AKuRmB

Research

As part of the rehabilitation of the site, CCFU conducted historical research into Semei Kakungulu and his legacy. This research project, entitled 'Interpreting and Presenting Complex Colonial Histories from a Postcolonial Perspective', involved interviews with members of the Kakungulu family, academic researchers, and political leaders in areas where Semei Kakungulu settled. A full literature review was conducted, covering books, journals, and newspaper articles as well as Semei Kakungulu's chronicles. This generated new knowledge, which enabled the CCFU team to gain a better understanding of Semei Kakungulu's life and legacy, extract information for the museum panels, and compile simplified reading material for the museum's resource centre. The research was discussed with academic partners at the University of Manchester and Centre College (Kentucky, USA), as well as with the team at National Trust Stourhead, who were able to share their own experience of interpreting and presenting difficult aspects of history in an inclusive and informative way. This research forms the basis of a book that will be disseminated on the CCFU website.

Right: Semei Kakungulu's great-granddaughter, Rachael Kakungulu, takes part in a launch event at the Semei Kakungulu site. © Cross-Cultural Foundation of Uganda.

Next steps

CCFU's long-term plan for the Semei Kakungulu site is to turn it into a self-sustaining education and learning centre, focusing on the interaction between cultural heritage and climate change. There is already a section in the museum designed to trigger dialogue about climate change and the role that culture can play in mitigating and managing its effects on heritage sites and beyond. The centre will gather ideas from visitors, and these will be periodically assessed with actions designed to improve climate adaptation strategies. To ensure the long-term sustainability of the site, CCFU is exploring different ways to encourage visits and generate income – such as offering camping during local religious festivals.

The CCFU team also hope to carry out further works to enable a full programme of visitor operations. The water currently collected through rainwater harvesting is insufficient to meet the demands of the site as a whole – including both irrigation and sanitation facilities for visitors. Initial studies have revealed that it would be possible to drill a borehole at the site, but the investment required was beyond the scope of the Withstanding Change project. CCFU hope to fund this, and other initiatives such as adding solar panels to the site to provide electricity, through future projects.

Plans are already underway to reinvigorate the other green zones within the site. CCFU are looking to identify the most suitable environmentally friendly methods of greening zone space two and three. Green space two, which is located on the rocky side of the site, with a vantage point overlooking the city, will be designed to demonstrate terracing as a method in addressing surface runoff, and will also be planted with drought-resistant tree species such as Terminalia superba. Rocky gardens will be created and planted with drought-resistant flowers. Green space three will be designed to suit the needs of schoolchildren (the site's projected primary audience). It will be planted with fruit trees and medicinal plants, with a view to creating trails and plant-hunting activities.

The Semei Kakungulu heritage site is the second site that CCFU has rehabilitated and is managing on an ongoing basis, alongside the railway museum heritage site in Jinja. Its opening has received significant interest and attention. As such, it presents an opportunity for CCFU to grow a network of heritage sites that will eventually lead to the establishment of a National Heritage Trust in Uganda – a first for the country. In support of this long-term vision, owners of other heritage sites are being engaged to share information and learn from each other about the value of safeguarding built and natural heritage.

Right: The veranda of the Semei Kakungulu residence after restoration. © Cross-Cultural Foundation of Uganda.

Image: Local stakeholders at an event at the Semei Kakungulu site. © Cross-Cultural Foundation of Uganda.

Petra National Trust

Reinvigorating a cultural hub in As-Salt

As climate change increasingly threatens cultural heritage sites across the globe, local initiatives are emerging to safeguard cultural assets through sustainable practices. Bayt al-Jaghbeer, a historic house in As-Salt, Jordan, stands as a beacon of heritage preservation intertwined with community engagement and climate resilience. Petra National Trust's work at Bayt al-Jaghbeer as part of the Withstanding Change project shows how restoration coupled with educational programmes can address the dual challenges of heritage preservation and climate change adaptation.

About Petra National Trust

Petra National Trust (PNT) is a non-governmental, non-profit organisation which was established in 1989 as Jordan's leading pioneer in cultural heritage conservation. When it was first established, PNT focused on the UNESCO World Heritage Site of Petra. Three decades later, and after a series of projects to preserve the ancient heritage of Petra as well as modern architectural gems such as Bayt al-Yaish in Amman, PNT has become a regional leader in cultural heritage

Left: The facade of Bayt al-Jaghbeer. © Petra National Trust.

protection and has grown to offer heritage protection solutions and services across the Middle East and North Africa. HRH Princess Dana Firas, president of Petra National Trust and UNESCO Goodwill Ambassador for Cultural Heritage, oversees the implementation of PNT's mission and the fulfilment of its vision. Princess Dana leads a vibrant team dedicated to the protection and promotion of Jordan's rich cultural heritage through a series of world-leading engagement and outreach programmes.

About Bayt al-Jaghbeer

Located at Khader Street, one of the key heritage areas in the UNESCO World Heritage Site of As-Salt, Bayt al-Jaghbeer is a prominent historical building. It is known for its distinctive spatial layout centred around two internal courtyards, as well as its elaborate decorations including ornate arches typical of the late Ottoman era. Built from As-Salt's characteristic yellow limestone, the house exemplifies As-Salt's transformation from a rural village to a thriving merchant town between the late nineteenth and early twentieth centuries, showcasing unique stone carvings, intricate stair formations and a blend of local and regional architectural influences. As-Salt's broader architectural landscape reflects a unique fusion of tribal traditions and influences from migrating merchants, reinforcing the city's identity as a centre of tolerance and cohabitation, where Muslim and Christian communities share many traditions and are closely intertwined within the dense urban fabric.

Petra National Trust selected Bayt al-Jaghbeer for restoration due to its deep historical and architectural significance. Originally built as an extended family home, it stands out as one of the few remaining houses in As-Salt with two courtyards, making it an exceptional example of traditional urban design. However, despite its historical value, the house had been neglected for years, becoming little more than a dumping ground for the local community. Through careful restoration, it has now been transformed from an abandoned space into a clean, revitalised heritage site, preserving its legacy for future generations while showcasing sustainable restoration techniques.

Above: A vaulted space within Bayt al-Jaghbeer. Right: Ornate arch with carved stonework. All images © Dave Simpson.

Responding to climate change impacts

Bayt al-Jaghbeer, like many heritage sites in Jordan, faces growing environmental challenges, including rising temperatures, fluctuations in precipitation, and increased humidity. These are all factors that accelerate structural decay.

Bayt al-Jaghbeer is a striking example of how climate change directly affects heritage sites. Built primarily from limestone, the structure had suffered significant deterioration due to extreme weather fluctuations. During periods of heavy rainfall, the yellow limestone absorbs water, which later evaporates during prolonged droughts and periods of high heat, causing the stone to crack. Additionally, fluctuating humidity levels have further accelerated the building's decay, making it highly vulnerable to environmental changes.

Recognising these challenges, PNT conducted a climate impact assessment on Bayt al-Jaghbeer, making it one of the few heritage sites in Jordan to be studied in this context. Given the country's limited evidence base on how climate change affects cultural heritage, PNT relied on available meteorological data to analyze long-term environmental impacts.

Once the impact assessment had been completed, PNT's programme of restoration and adaptation began with extensive documentation and preservation planning, involving detailed assessments to record the house's condition. This laid the groundwork for a comprehensive rehabilitation process designed to ensure the site's structural stability and longevity while respecting its historical authenticity.

Rehabilitation efforts focused on revitalising the building's core infrastructure and mitigating environmental risks. A major milestone has been the environmental cleaning of interior spaces, where invasive weeds and accumulated waste were cleared to prevent further deterioration. Simultaneously, roof restoration and structural reinforcement were prioritised to stabilise key architectural elements.

To address vulnerabilities caused by water damage, the project incorporated the installation of rainwater drainage systems and gutters. The original drainage plan underwent significant revision to prevent potential harm to the inner facade, reflecting the project's attention to preserving the integrity of the structure. Courtyard stairs and selected walls have been carefully reconstructed using yellow stones sourced to match the original materials, ensuring that the building's historic character remains intact. In the building's ground floor courtyard, layers of clay and debris were removed to expose the original tiled floor. Where the tiles were no longer present, these will be replaced with terracotta pieces crafted from As-Salt clay, using traditional techniques.

The capital works undertaken by PNT in response to climate stressors integrated adaptive strategies drawn from traditional practices, such as utilising local materials and enhancing drainage systems. This initiative reflects a broader national effort to align cultural preservation with environmental sustainability, reinforcing Jordan's commitment to climate adaptation policies and the protection of its rich architectural legacy.

As part of securing the site, a temporary wooden door replaced a cement block barrier, and a permanent metal door inspired by the original design was subsequently installed.

The restoration of Bayt Al-Jaghbeer follows a philosophy of contrast, ensuring that the conservation process is both respectful of the house's historical integrity and transparent about the interventions made. Rather than attempting to replicate the original materials exactly, the approach highlights the distinction between old and new elements, allowing visitors to clearly see what has been restored or added.

This philosophy is essential in maintaining the house's identity while ensuring that any new additions are compatible with its historical character. By carefully selecting materials that complement the original limestone and architectural features, the restoration extends the house's legacy in a way that is both authentic and modern. The result is a harmonious blend of tradition and contemporary craftsmanship, where new materials integrate seamlessly without compromising the historical essence of the site.

Above: Internal courtyard at Bayt al-Jaghbeer with intricate stair formations. © Dave Simpson.

Educational initiatives and youth engagement

In the face of mounting environmental challenges, PNT has launched a series of forward-looking programmes aimed at preserving Jordan's cultural heritage while equipping children and young people with the tools to combat climate change. Through comprehensive educational initiatives and hands-on restoration training, PNT is fostering a generation of future leaders committed to sustainable development and heritage conservation.

PNT's new Climate Heritage Youth Leaders programme stands out as a flagship initiative, addressing the pressing threats that climate change poses to both biodiversity and cultural heritage. Designed for participants aged 16 to 18 and 18 plus, the programme educates young people on sustainable development practices and encourages them to become advocates for heritage preservation. The programme's curriculum was developed in phases, beginning with in-depth research on the effects of climate change on cultural sites. Key outputs include a structured trainer's guide, trainee handbooks, and interactive presentations combining theory with practical application. Participants were carefully selected from over 100 applicants. Fifty-four young leaders were ultimately chosen for two workshops held in As-Salt. These workshops combined classroom learning with field visits to Al-Shumari Wildlife and Azraq Wetland Reserves, immersing participants in local ecosystems to highlight the links between natural and cultural heritage. Practical activities such as ecosystem diorama creation and recycling crafts reinforced lessons on environmental responsibility.

In parallel, restoration training has been central to PNT's preservation strategy. A comprehensive training course on heritage resource management brought together twenty-seven participants from diverse academic backgrounds. The programme combined lectures, site visits, and hands-on demonstrations, offering participants practical skills in restoration techniques such as surface cleaning, stone treatment, and structural reinforcement.

PNT's commitment to heritage preservation extends to public engagement through exhibitions and conferences. An exhibition hosted in December 2024 during the Facing Change conference (co-organised with INTO and the British Council) put a spotlight on the use of natural restoration materials such as mud and their vulnerability to climate change. Experts presented on the resilience and challenges of these materials, fostering an international dialogue on sustainable restoration practices.

Through these interconnected initiatives, PNT continues to lead the charge in protecting Jordan's cultural heritage while empowering future generations to play an active role in preserving the past for a sustainable future.

Twinning with the National Trust

PNT's twinning partnership with the National Trust team at Buscot and Coleshill Estates in Oxfordshire represents another pillar of cultural exchange and collaboration. Discussions between PNT's education and outreach experts and the children and young people team at Buscot and Coleshill have focused on community engagement and youth education, with both teams sharing their extensive knowledge and expertise in this area. As a result of the exchange, Buscot and Coleshill launched a new climate and heritage workshop programme for young people aged 16-18, inspired by PNT's Climate Heritage Youth Leaders. The new programme has recently been piloted with a local SEN school, with the aim of extending this to mainstream schools in the summer of 2025. Buscot and Coleshill is also home to the National Trust's Heritage and Rural Skills Centre, and the two teams have been exchanging best practice around encouraging and showcasing traditional craft skills.

'Petra National Trust have created a unique and successful 15-week programme for young people, and we've been able to learn from the success of this. The new programme we'll be delivering focuses on allowing young people with SEN to see a future career path that will help to save our planet. In being able to communicate with our Jordanian counterparts, we have been able to strengthen our power and enthusiasm, as individual teams and together, to work towards our united goals in protecting our heritage and teaching sustainable practices for the future.'

Katy Lamb, Programming and Partnerships Manager, National Trust Buscot & Coleshill Estates

Above left: Participants in PNT's Climate Heritage Youth Leaders programme making a diorama. © Petra National Trust.

Next steps

Bayt al-Jaghbeer serves as a model for climate-adaptive heritage conservation, demonstrating how traditional knowledge and modern strategies can intersect to safeguard cultural assets, and how youth engagement and skills training can help to support the safeguarding of cultural heritage.

Building on this foundation, Petra National Trust is committed to the following priorities at Bayt al-Jaghbeer:

- Finalise the full restoration of Bayt al-Jaghbeer and establish the building as a dynamic cultural hub, showcasing the local craft skills for which As-Salt is renowned;
- Develop a comprehensive conservation plan for the building, integrating climate data and adaptive preservation techniques;
- Curate an immersive visitor experience that showcases Bayt al-Jaghbeer's historical significance and role in climate resilience;
- Expand restoration training for local artisans, ensuring the transmission of traditional craftsmanship and sustainable building practices;
- Expand the Climate Heritage Youth Leaders programme, equipping young heritage ambassadors with climate-responsive conservation skills;
- Strengthen collaborations with local and international stakeholders to advance sustainable heritage management.

Beyond Bayt al-Jaghbeer, Withstanding Change has laid the groundwork for broader impact by:

- Fostering a culture of knowledge exchange in heritage conservation, through twinning with the National Trust and exchanges with other international heritage organisations;
- Equipping young leaders with the skills to advocate for and implement climate-conscious policies, allowing heritage sites to be safeguarded well into the future;
- Contributing to a global movement for sustainable heritage management.

As the climate crisis accelerates, the insights gained from this initiative will inform future restoration efforts, positioning As-Salt and Jordan as leaders in climate-resilient cultural heritage preservation.

Right: The view from Bayt al-Jaghbeer. © Dave Simpson.

Image: Architect Sahel AlHiyari gives INTO and British Council delegates at the 'Facing Change' conference a tour of Bayt al-Jaghbeer, in December 2024. © Petra National Trust.

Egyptian Heritage Rescue Foundation

Safeguarding Bayt al-Razzaz, a palace in Historic Cairo

As part of the Withstanding Change project, the Egyptian Heritage Rescue Foundation (EHRF) has been working in partnership with the Supreme Council of Antiquities, part of Egypt's Ministry of Tourism and Antiquities, to restore and rehabilitate Bayt al-Razzaz, a fifteenth-century palatial complex.

EHRF was established in 2013 by a group of cultural heritage documentation and conservation experts, with the aim of studying, safeguarding and promoting Egypt's heritage. Its initial programme of activities focussed on design and delivery of a series of specialised training courses on disaster risk preparedness and first-aid to cultural heritage, to public and private cultural institutions in Egypt and the Middle East.

Left: The external facade of Bayt al-Razzaz from Bab al-Wazir street. © Egyptian Heritage Rescue Foundation.

Bayt al-Razzaz and its history

Bayt al-Razzaz is situated at the south-east end of Historic Cairo, itself a UNESCO World Heritage Site since 1979. The building is the property of the Supreme Council of Antiquities (SCA), and has been in the care of EHRF since 2018. The palace is situated at the intersection of two medieval avenues: Suq al-Silah and Bab al-Wazir. The latter was an important ceremonial route connecting the city to Cairo's citadel, built in the twelfth century and Egypt's seat of power until the mid-nineteenth century. The palace is in al-Darb al-Ahmar, a transitional neighbourhood between the southern gate of Bab Zuwayla and the citadel. This historic neighbourhood developed during the Mamluk Sultanate (1250–1517), when it was endowed with numerous monuments and historic buildings. It still houses many workshops for traditional craftspeople, particularly specialists in woodwork and inlay.

Bayt al-Razzaz itself is a rare surviving example of Cairene domestic architecture. Extending over 3,400 square metres, it is lavishly decorated, with 105 spaces including four ceremonial halls and one monumental loggia. It is connected by twelve staircases and four terraces. The multi-story structures are arranged around two courtyards, originally part of two separate houses. The courtyard to the east, where the Withstanding Change project has focused its attention, has an entrance from Bab al-Wazir street. It is the smallest and the oldest of the two courtyards, built around 1475 by Mamluk Sultan al-Ashraf Qaytbay (c. 1468–1498). The house to the west, opening onto Suq al-Silah street, is three times larger. Historical records state that it was built in 1778, but its monumental scale suggests an earlier dating. In 1638, under the Ottoman rule (1517–1798), the eastern courtyard was gifted to Khalil Agha, a military officer famous for collecting taxes from farmers in the Nile Delta. He and his descendants adopted the name of al-Razzaz (from 'al-ruzz', rice in Arabic), a family name surviving to this day.

Image: View of the eastern courtyard.
© Egyptian Heritage Rescue Foundation.

Conservation history

In the late nineteenth century, attempts were made by the state through the *Comité*[1] to consolidate the structure and conduct repairs. Their intervention was minimal at this point, not being able to officially list the entirety of the palace due to the complexity of carrying out works on an inhabited private property. However, the *Comité* acknowledged Bayt al-Razzaz's architectural significance by listing three architectural elements: the entrance portal with the sultan's foundation inscription and blazon on the eastern courtyard, the large ceremonial hall, and the loggia in the western courtyard. By 1951, the state was able to list the entire complex as a monument (no. 235). Bayt al-Razzaz appears in many photographs and drawings from the nineteenth and early twentieth centuries, but it was only in 1975 that the first comprehensive study was made, when the palace was featured in one of the first publications on Cairo's palaces and houses.[2] The photos taken at this date show the ruinous state into which it had fallen. The last tenants were evicted in 1977, and only the guardian remained until he passed away in 2005.

The American Research Centre in Egypt (ARCE) held an official concession for the repair of the palace for over three decades. A number of conservation projects took place between 1995 and 2007, with funding from the USAID, with works limited to the eastern courtyard of Bayt al-Razzaz. The western courtyard has remained untouched since the last refurbishment made in the early nineteenth century. It has no modern utilities and has reached a very critical state of ruin. The palatial complex returned to the care of the SCA in 2007, but remained closed and isolated from its communities until EHRF took up residence in the eastern courtyard in 2018. An agreement with the SCA has allowed EHRF to house their teams and host events and programmes without paying rent, in return for covering the cost of maintenance and urgent repairs.

There are very few historic houses of a similar monumental scale surviving in Cairo. Many were destroyed and replaced in the past century, as they were not listed and protected by law. In the past decade alone, four courtyard houses in al-Darb al-Ahmar have been demolished, or destroyed clandestinely, two in the vicinity of Bayt al-Razzaz. The palace is embedded within a broader historic urban fabric that includes layers from the thirteenth century to the present. It shares exterior walls with two other listed monuments: the Mamluk religious foundation of Umm al-Sultan Sha'ban (b. 1368), and Bayt Mazhar Pasha, an early nineteenth-century Ottoman house. It is this surrounding architecture and the community of craftspeople living and working around Bayt al-Razzaz that make it particularly special. This is why EHRF is working tirelessly to ensure the doors remain open to the immediate community, to all residents of Cairo, and the many tourists visiting al-Darb al-Ahmar. EHRF's goal is to maintain a connection with Historic Cairo, and to allow its communities to continue to appreciate and return to these historic neighbourhoods.

Climate change impacts

Like many heritage sites, Bayt al-Razzaz is increasingly exposed to the impacts of climate change. In March 2020 the north-eastern side (corner house) was severely damaged by the collapse of an adjacent building during an unusual storm (nicknamed the 'Dragon Storm') that hit Cairo with heavy rain and wind. This was an alarming reminder of the monument's fragile condition, as most ceilings were severely affected. Furthermore, this damage is intensified by ongoing increased rainfall due to climate change. These impacts are sending alarm signals, highlighting the urgent need for implementing climate adaptation measures.

The damage triggered by the storm was exacerbated by several pre-existing vulnerabilities. The most visible of these relates to a lack of maintenance during a decade of closure and neglect, which left the site structurally weak and ill-equipped to withstand extreme weather events. In addition, the poor drainage infrastructure contributed to the accumulation of rainwater in the walls and ceilings, increasing the severity of the damage. Not to forget the absence of a thorough climate risk assessment, hindering proactive planning and mitigation efforts. It is important to plan ahead, as there are future impacts to consider. Increased rainfall and flooding will inevitably lead to structural damage, erosion of surrounding soil, and potential flooding of the site.

In recent decades, Cairo has also witnessed rising temperatures. Extreme heat can cause material degradation, such as cracking and discoloration of building materials. Drought also has an alarming impact, affecting the surrounding environment and microclimate: the EHRF team have already witnessed significant impacts on the mortar of Bayt al-Razzaz, leading to further collapse.

1 The *Comité de conservation des monuments de l'art arabe* (Committee for the Conservation of Arab Art), known as the *Comité*, was established in December 1881 by a Khedivial decree.

2 Bernard Maury and Jacques Revault, *Palais et maisons du Caire* (Cairo: Institut français d'archéologie orientale, 1975), I, 36–65.

Adaptation in action

Over the course of the Withstanding Change project, EHRF implemented climate adaptation measures to enhance the site's resilience to future climate change impacts. The following measures were executed during the reconstruction of the corner house on the north-east side, and the design hub at the south-west side:

- **Structural reinforcement**

The reconstruction focused on strengthening the site's structural integrity using traditional building techniques and modern engineering principles. This included:

- Repair and stabilisation of damaged walls and foundations;
- Improvement of drainage systems to prevent water accumulation;
- Installation of a robust roofing system to withstand heavy rainfall.

- **Climate-resilient materials**

Wherever possible, EHRF used durable and locally sourced materials. Climate-resistant materials were prioritised, improving the mortar by using natural lime.

- **Improved drainage**

The area surrounding the corner house was regraded to improve water flow and prevent flooding.

- **Green infrastructure**

In the site's future plan, EHRF aims to enhance the incorporation of green spaces, such as planting drought-resistant vegetation to help mitigate the impact of heat stress and improve the site's microclimate. Three trees were planted in the courtyard for that purpose.

- **Monitoring and early warning systems**

EHRF is developing a mobile application to help implement a monitoring system that will track weather patterns and provide early warnings for potential extreme events, to enable timely interventions.

In parallel with the capital works, EHRF conducted extensive research and documentation of the site. Historical research allowed an understanding of the site's development and architectural significance. It also revealed some original construction methods. An architectural survey took place, with detailed drawings and photographs to record the site's condition before, during and after the intervention. The survey also extended to all rooms and spaces in the eastern courtyard, producing magnificent prints and drawings of the monument. Finally, archaeological investigations were conducted whenever necessary to uncover and preserve any hidden archaeological features. During the digging of the foundation of the corner house, human remains were uncovered, and were reburied in the same location.

Twinning with the National Trust

One might imagine the impacts of climate change on a Jacobean house in Norfolk to be quite different from those affecting a fifteenth-century palace in Cairo – and yet when the teams at EHRF and the National Trust's Blickling Estate first met, they soon realised they were dealing with many similar issues. At Blickling, extremes of heat and wetter weather have caused repeated flooding to the mansion and gardens, and the team have spotted evidence of shrink-swell in the form of cracks around windows and doors. Blickling's iconic clocktower has struggled to cope with increasing volumes of rain, and there is evidence of water ingress into the bedroom below this, with damage to precious Chinese wallpaper. Summer heat has also caused damage to collections items and has caused the leaded windows to soften, with some glass panels falling out as a result.

EHRF and Blickling have been discussing their adaptive responses to these issues and have drawn on each other's moral support throughout the process. As well as developing new interpretation to highlight the impacts of climate change, Blickling also hosted EHRF's Nesreen Sharara for a week-long artistic residency drawing attention to the links between Blickling and Bayt al-Razzaz, and their shared climate challenges.

'The twinning process has been an exciting and eye-opening project to work on. At the micro-scale, the team at Blickling have been able to think differently about how we approach telling the stories of our climate adaptation work, test artist-in-residence programming with Nesreen Sharara's visit, and take great pride in sharing the work that they are doing. […] We have created a lasting relationship with EHRF, gained a broader platform and influence in the Trust around our climate work, and made us feel that we are not alone in this – something that is incredibly meaningful.'

Heather Jermy, General Manager, National Trust Blickling Estate

Community engagement

The Withstanding Change project contributed to securing and consolidating the spaces within Bayt al-Razzaz, allowing these to be opened up for EHRF's public programme of events. Throughout the project, EHRF designed and delivered series of workshops, talks and events for the local neighbourhood and the broader Cairo community. The project delivered three series of camps for local children during the winter and summer holidays. EHRF partnered with several organisations to develop educational activities centred around climate change and environmental awareness. These programmes included activities such as recycling scrap into sculptural artworks, making geometric patterns in natural wood veneer, clay modelling of self-portraits and streetscape models, storytelling around Bayt al-Razzaz, gardening, block printing, and Arabic calligraphy. The newly reconstructed corner house hosted the camp activities, and provided exciting spaces for the children to discover. The camps provided local children with opportunities to explore their creativity, connect with their heritage and community pride, and build lasting relationships with others in the neighbourhood. EHRF also finalised the production of a children's book and a black and white graphic novel, with support from a previous grant from British Council Egypt. These two publications tell the story of Bayt al-Razzaz and create opportunities for engagement with Cairo's architectural heritage.

In September 2024, EHRF launched the Bayt al-Razzaz Salon, with a monthly lecture inviting professional speakers, covering topics ranging from literature, traditional fashion and food, art and architecture, and the impacts of climate change on historic buildings and towns.

Top right: A wood veneer workshop, held as part of the summer camp at Bayt al-Razzaz, 2024. Bottom right: Open studio at the newly restored corner house, with artist Mariam Youssef. All images © Egyptian Heritage Rescue Foundation.

The public programme contributed to:

- **Raising awareness**

These public events and talks have sparked meaningful conversations on a variety of cultural heritage topics, including the effects of climate change on historic buildings. These discussions are helping people understand how heritage and climate are connected.

- **Building stronger connections**

Bayt al-Razzaz connects people from different social backgrounds, professions, and communities, both in the local vicinity and beyond. Through EHRF programmes, we support collaboration, mutual understanding, and collective problem-solving around heritage conservation.

- **Creating community-centred solutions**

By directly engaging with the community, we are co-creating solutions that address local needs and challenges, ensuring that our work has a lasting and meaningful impact on the neighbourhood.

Finally, through a partnership with ARD Institution, EHRF launched an artist residency programme at Bayt al-Razzaz to support local young artists. An open call gathered seventy-four submissions, from which two artists were selected. EHRF provided a platform for the artists to create and engage with the community, and adapted spaces into art studios in the corner house. This initiative not only enriches the local cultural landscape, but also draws inspiration from the monument and the surrounding neighbourhood, supporting collaboration between the artists, local residents and craftspeople. An open studio afternoon followed by a panel discussion took place in January 2025 at the end of the two-month-long residency, inviting new audiences to discover Bayt al-Razzaz and engage with the artists.

Next steps

Bayt al-Razzaz serves as a valuable case study in climate change adaptation for heritage sites, and EHRF's work is directing SCA decision-makers towards a better understanding of the impacts climate change is causing. By addressing the site's vulnerabilities and implementing proactive adaptation measures, this project aims to ensure the long-term preservation of this important cultural asset. It also provides a platform for further fundraising to safeguard the building for the future. In October 2024, EHRF successfully organised a fundraiser in collaboration with Kahhal Looms, with sponsorship from the Egyptian private sector (Madinet Masr and Valu), to raise funds to cover the restoration of the eighteenth-century coloured ceiling of the main reception hall (EGP6M).

EHRF events were attended by more than a thousand visitors; this would not have been possible if the site had not already been secured thanks to the Withstanding Change project. The project has also brought EHRF closer to their neighbours through their events and programmes. The EHRF team now consider themselves part of the Bab al-Wazir community, and have noticed how the shops in the area are slowly changing their activities to produce and sell more local crafts and cuisine to cater to the new public visiting Bayt al-Razzaz.

More funds need to be raised to continue the restoration, especially in the western courtyard, and to run the children's camps, public programme and creative residencies, but the project has shown that EHRF are not alone. The twinning between Bayt al-Razzaz and Blickling Estate in Norfolk proved precisely this, as heritage organisations are all facing similar challenges. EHRF knows that it can count on its partners, donors and friends who extend their help and expertise, to ensure that this exceptional monument is saved for the future.

Image: Panel talk with the private sector, showing three rugs exclusively produced by Kahhal Looms to raise funds for capital works. © Egyptian Heritage Rescue Foundation.

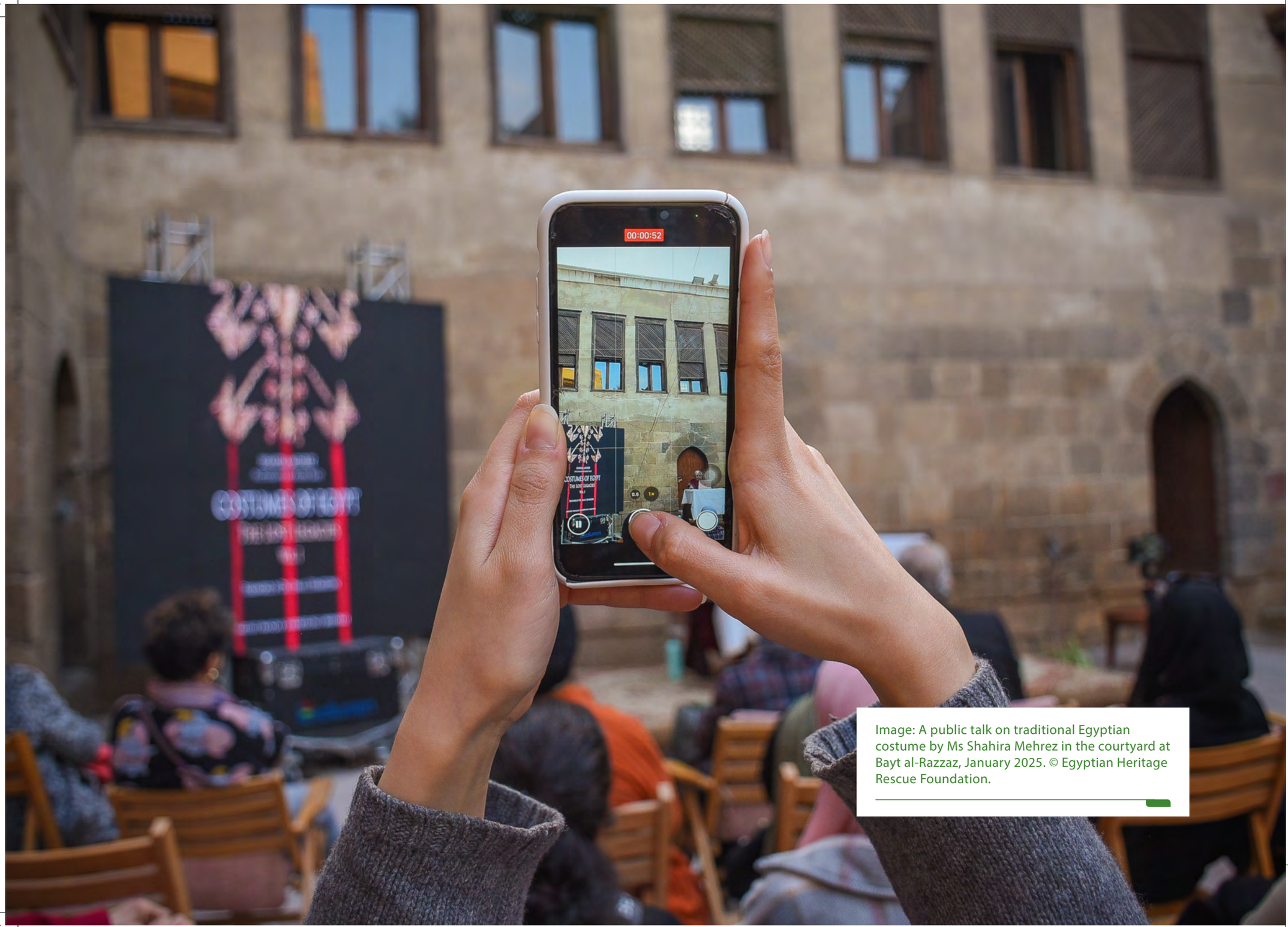


Image: A public talk on traditional Egyptian costume by Ms Shahira Mehrez in the courtyard at Bayt al-Razzaz, January 2025. © Egyptian Heritage Rescue Foundation.

Negotiating challenging contexts

Achieving impact

One of the major achievements of the Withstanding Change project has been to provide a broad demonstration of the ability of non-governmental organisations in Sub-Saharan Africa and the Middle East to safeguard, restore and manage important heritage sites. This has however taken place within a challenging context in all the partner countries: on the one hand, government entities usually assume a lead role (and often an exclusive one) in heritage protection and management; on the other hand, there is an active and often well-financed drive for 'modernisation' that is not pro-conservation (and that can result in the wholesale destruction of heritage sites), even where protective laws exist.

It is also worth noting that none of the implementing partners involved in the Withstanding Change project own the site on which they have been working (contrary to the situation that normally obtains with Heritage Trusts in the United Kingdom). Historic properties tend to be owned by the state, religious institutions and/or prominent entrepreneurial families, which may or may not have maintained them. The authority to save, modify or demolish such properties is therefore subject to the needs and vision of these institutions or prominent individuals, which are usually profit-driven and rarely built heritage-friendly.

Successfully navigating such a daunting context has revealed the resilience and skill of the Withstanding Change partners. It is perhaps premature to fully assess the impact made on their respective sites and on their operating environment, given the short time period involved. Nevertheless, the project can claim some important firsts: to start with, it has proved pioneering in working on and pointing out the important interface between heritage and climate change, and its impact on historical sites. Safeguarding threatened sites has also involved a unique and creative approach that included learning from and mobilising past practices and community skills, while integrating present-day conservation and adaptation techniques.

Withstanding Change also made considerable headway in other directions, whether by enhancing the concept of culture and conservation, providing a bridge of peace amongst communities of diverse backgrounds, or adopting a consultative approach to state/non-state collaboration.

At all the partner sites, the project highlighted the critical importance of involving local communities and other stakeholders in restoration efforts and site management, thus providing a measure of sustainability to the conservation efforts expended during the life of the project. Several other measures were adopted to enhance such sustainability: creating local trusts, developing income generating activities and launching innovative fundraising efforts.

The project also presented a very rare opportunity for the partners not only to implement a time-bound project, but also to grow their organisations, whether in terms of management capacity, visibility and networking nationally and beyond, financial systems, and organisational flexibility and learning. This has resulted in an ability to influence government regulations or practice and to stimulate local enterprises and tourism. Such capacity and enhanced confidence can now also be applied to new initiatives.

While meeting and in some cases exceeding its intended objectives, the Withstanding Change project has thus demonstrated significant impact, whether by providing replicable models for heritage conservation in the face of climate change, strengthening cultural heritage organisations in Sub-Saharan Africa and the Middle East, or putting the climate change and heritage connection more firmly on the national and local agenda in the six participating countries.

Emily Drani and John De Coninck
Withstanding Change project evaluators

Acknowledgements

Authors

For Cross-Cultural Foundation of Uganda: Simon Musasizi, with contributions from Annet Sumba

For Egyptian Heritage Rescue Foundation: Omniya Abdel Barr, with contributions from Abdelhamid el-Sherief and Leena Mekawi

For Heritage Watch Ethiopia: Esther Selassie Antohin, Bethlehem Gebremedhin and Simret Arega

For Petra National Trust: Zeina Khashashneh, with contributions from Leen A. Fakhoury (consultant heritage specialist) and Lina Abu Saleem (architect)

For Zanzibar Stone Town Heritage Society: Hoshil Dhanji and Makame Juma Mtwana

Editor
Katherine Shingler

Designer
Emma Taylor

Rear cover image: Photographic documentation of the coloured ceiling in the main reception hall (*salamlik*) at Bayt al-Razzaz, Cairo. © Egyptian Heritage Rescue Foundation.

INTO would like to acknowledge the hard work and commitment of the project teams:

Cross-Cultural Foundation of Uganda

Barbra Babweteera (executive director and project supervisor), Fredrick Nsibambi (deputy executive director), Simon Musasizi (heritage trust programme manager and project lead), Annet Sumba (heritage programme and research officer), Kisa Kasifa (heritage programme and communications officer, Phiona Magooba (capital works volunteer), Hadijja Luwedde (senior finance and administration officer)

Egyptian Heritage Rescue Foundation

Project directors: Abdelhamid el-Sherief (chairman) and Omniya Abdel Barr (head of development)
Public programme and community engagement: Shereen al-Samit, Leena Mekawi, Jane Smythe, Nesreen Sharara, Youssef Soliman, Israa Fathi
Architecture and photographic documentation/capital works coordination: Hebatallah Abdelhamid, Ibrahim Bahaa el-Deen, Mohamed Abdel Zaher, Radwa Osama, Rehab Shabaan, Walaa Hassan, Omaima Mohamed
Administration/accounting: Nesma Fathi
Security: Hassan Salah

Zanzibar Stone Town Heritage Society

Eng. Hoshil Dhanji (built heritage conservation consultant and capital coordinator), Makame Juma Mtwana (CEO; community engagement and communication coordinator), Dr. Maryam Jaffar Ismail (chairperson), Kassim Daud Suleiman (accountant and logistics manager)

Heritage Watch Ethiopia

Project management team: Esther Selassie Antohin, Bethlehem Gebremedhin, Simret Arega, Meron Bekele, Zelalem Tadesse, Sewaynes Samuel, Mebrat Melaku, Melaku Tanew
Board members: Ato Belay Girmay, Wiezero Rahel Lemma
Garden team: Lemma Mosisa, Melat Ketsela, Ato Gezahegn Metaferia
Garden crew and support staff: Tagesse Matios, Selamawit Mosisa, Kefyalew Fesseha, Ayush Anteneh, Nahom Tadesse, Turuworq Dangew, Yohannes Ashebir (John)
Photographer: Isaac Midekessa, Mule
Children's Climate Change programme: Yohannes Assefa, Ambachew Gebrewold
Volunteers: Yohannes Eshete, Daniel Temesgen, Gete Shewandagn

Petra National Trust

Zeina Khashashneh (head of programme development and delivery), Huda Amareen (training manager), Farah Nahar (head of operations), Ghaith Nofal (financial manager)

International National Trusts Organisation

Jacqui Sealy (programme officer), Dave Simpson (programme manager), Katherine Shingler (project manager, National Trust)
With further thanks to Imogen Wood (National Trust) and Alex Lamont Bishop (INTO) for design and conception of the Withstanding Change project, and the National Trust property teams who have enthusiastically supported the project throughout.