Cultural heritage in the context of disasters and climate change

Insights from the DCMS-AHRC Cultural Heritage and Climate Change Cohort

A research report by PRAXIS: Arts and Humanities for Global Development and CRITICAL: Cultural Heritage Risk and Impact Tools for Integrated and Collaborative Learning

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Front cover: Nomadic old Woman. They live for several months a year in tents, looking for fresh pastures for their goats, from which comes cashmere wool. In Ladakh, Kashmir, India. Credit: klublu, Adobe stock

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Contents

Foreword

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In 2020 the Arts and Humanities Research
Council (AHRC) and the Department for
Digital, Culture, Media and Sport (DCMS)
launched a funding partnership, funded as a
part of UK Official Development Assistance
(ODA) and working collaboratively with
other partners such as the British Council,
to support research on how developing
countries could respond more effectively
to the challenges for cultural heritage resulting
from natural disasters and climate change.

Research proposals were sought which responded in an agile way in order to inform future research and policy in this area, ranging in scope from prevention and resilience, to preparedness and response, including emergency response, to living with, and adapting to change and/or loss. Projects which explore learning from past cultural heritage emergency responses and/or which explore learning or intersections with responses to risks to, and impacts upon, cultural heritage resulting from other crises (e.g. conflict, displacement) were welcomed. Nine awards were made through the call, creating a dedicated cohort of projects focussed on cultural heritage and climate change that is showcased and discussed in this report.

This report comes at an important time for threatened cultural heritage sites and people throughout the world. In fact, a recent report by the International Council on Monuments and Sites (ICOMOS) highlighted the 'immense' and 'untapped' potential for cultural heritage to spur action on climate change and support a transition towards resilient and low carbon pathways. These AHRC-DCMS funded projects go some way to tapping this potential and highlighting the multiple roles that heritage can play in supporting efforts to mitigate and adapt to climate change and disaster impacts.

The projects underline not only the multiple threats associated with climate change and natural hazards but also the multiple forms of cultural heritage that people value across the world. Researchers focused on tangible households, cityscapes and traditional objects and intangible songs, knowledges, belief systems, memories, and cultural practices in different local, regional, and national contexts. But heritage should not be characterised as solely passive and vulnerable to the changing environment; heritage provides capacities in the form of traditional knowledge transmitted between generations, including local-specific practices and traditions that can provide culture-inspired solutions to heat stress, drought, flood management, and so on. In addition, the broad field of cultural heritage studies incorporates innovative methodologies and technologies that allow heritage attributes and risks to be quantified and visualised.

This report benchmarks the importance of cultural heritage as medium through which we can think about climate change and natural hazards differently. Heritage is how people invest value in places, structures, objects, practices, ideas, and sounds. Understanding what people value could therefore provide a greater indication of what is at risk and how we negotiate an uncertain future.

Introduction

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In a collaboration between the UK Government's Department for Digital, Culture, Media & Sport (DCMS) and the Arts and Humanities Research Council (AHRC), the Global Challenges Research Fund (GCRF) Urgency Grants invited proposals from researchers using innovative approaches to address the impacts of natural disasters and climate change on tangible and intangible cultural heritage in Low- and Middle-Income Countries (LMICs).

This AHRC-DCMS collaboration operated in a wider workstream within the United Kingdom (UK) Official Development Assistance (ODA) programme, to support effective responses to development and disaster relief challenges in the Global South.

The main goal of this call was to fund cultural heritage research that can inform future research and policy on disaster preparedness, emergency response, loss and damage, and adaptation to current and expected global environmental changes such as climate change and natural disasters.

This report comprises results from individual projects funded by AHRC and the DCMS and collaborative workshops organised by the PRAXIS and CRITICAL teams. The editorial team comprises Dr. Francesca Giliberto (PRAXIS) and Dr. Rowan Jackson (CRITICAL), who were responsible for organising workshops, leading report planning and writing, and editing the final report. Dr. Luba Pirgova-Morgan and Dr. Kate Donovan were involved in the planning and facilitation of the collaborative workshops, including a written contribution on COVID-19 by Dr. Pirgova-Morgan.

Contributions to writing and feedback on this report were also provided by Dr. Bernadette Devilat, Dr. Kate Donovan, Dr. William Megarry, Dr. Paul Heritage, Dr. Gustavo Möller, Prof. Nomalanga Mpofu Hamadziripi, Prof. Ashraf Osman, Prof. Hisham Elkadi, Dr. Alan Forrest, Prof. Mike Crang and Prof Stuart Taberner. Additional written contributions are recognised in each chapter of the report.

Context

The context for this workstream is the recognition that cultural heritage is increasingly exposed to climate and disaster risk, and that there is a need for effective preparedness and management strategies in response to global environmental change (Harrison et al., 2020; Harvey and Perry, 2015). There is growing demand from international heritage organisations, including the International Council on Monuments and Sites (ICOMOS) and United Nations Educational, Scientific and Cultural Organization (UNESCO) for mechanisms to assess, monitor and respond to disasters, whether they are caused by natural or human-induced hazards (ICOMOS, 2019).

In recognition of the growing risk to cultural heritage, a cultural heritage protection workstream was commissioned to understand the diverse impacts of natural disasters and climate change on different heritage assets in LMICs. Such diversity is not limited to physical sites and monuments. It includes cultural traditions, livelihoods, social networks and the environment. Loss and damage resulting from climate change will therefore be inevitable (e.g. what is at risk?), have political consequences (e.g. what is safeguarded?), and how can we adapt to change (e.g. how can we work with change?) (DeSilvey and Harrison, 2020).

Nine research projects were funded as part of this workstream and these are the so-called Cultural Heritage and Climate Change (CHCC) Cohort. Projects in the cohort span a range of cultural heritage forms – both tangible and intangible – as well as approaches to the assessment of risk. Heritage assets explored by the research projects include vernacular architecture, natural and cultural landscapes, UNESCO World Heritage sites, historic towns and villages, listed monuments, archaeological sites, indigenous rock paintings and ceramics, land management practices, cultural practices and community networks. All the projects explore ways to develop effective responses to challenges in anticipation of (and response to) climate change and disaster impacts. They also focus on the challenge of developing an effective community of practice between academics in the UK and LMICs. The funded projects cover much of the Middle East (Egypt, Turkey, Yemen), Sub-Saharan Africa (Nigeria, Tanzania, Zimbabwe), South East Asia (India, Himalaya region, Sri Lanka), and South America (Iron Quadrangle in Brazil).

The background, findings and recommendations of each project are described in the policy briefs included in **section 3**.

Report scope and methodology

This report has been prepared by the PRAXIS and CRITICAL project teams led by the University of Leeds and University of Edinburgh respectively. It discusses the results of a series of workshops organised by the research teams between February and September 2022 and project-specific policy briefs prepared by the nine research projects (**section 3**). We hope it will inform funding bodies, policymakers, academics, practitioners and other stakeholders about how to improve current practices tackling cultural heritage

PRAXIS: arts and humanities for global development

PRAXIS is a £1m research project funded by the AHRC and focused on arts and humanities (A&H) research across the GCRF and Newton Fund portfolios. Specifically, it aims to consolidate learning, amplify its impact and policy relevance and champion the distinctive contribution that A&H research can make to tackling urgent development challenges. PRAXIS has four main strands: Heritage, Conflict, Youth and COVID-19. In addressing a wide variety of global challenges and United Nations Sustainable Development Goals (SDGs), PRAXIS has paid special attention to climate change and disasters in relation to cultural heritage, human rights and the development of more environmentally sustainable research practices.

Old Nepalese woman manually braids the mat on an old homemade loom, in the city of Lo Mantang, the capital of the Upper Mustang. Nepal. Credit: Papava, Adobe stock

Making Tibetan Buddhist Mani Stone - stone with holy mantras. Credit: Vladimir Melnik, Adobe stock

CRITICAL: cultural heritage risk and impact tools for integrated and collaborative learning (Highlight)

CRITICAL is a £180,000 project funded by the AHRC and DCMS to assess the impacts of climate change and natural hazards on cultural heritage in LMICs. This project specifically aimed at facilitating knowledge exchange between heritage professionals in South Africa, Indonesia and Sri Lanka with the wider aim of assessing local-scale adaptive capacity and risk to cultural and natural heritage. As an output of this project, CRITICAL worked to facilitate knowledge synthesis and policy impact through the organisation of cross-portfolio workshops, and through collaboration with the PRAXIS team at the University of Leeds.

management in the face of climate change and disaster impacts. More specifically, we have drawn together the lessons learnt from international collaborations between academics, practitioners and research participants to make recommendations to UK research councils and policymakers.

From the start of the workstream in November 2020, the AHRC and DCMS organised quarterly meetings to provide updates on funding and to facilitate discussion between project Principal Investigators (PIs). The meetings were an opportunity for knowledge exchange and to discuss funding calls and the challenges associated with remote work during COVID-19. They also provided time for two online cross-portfolio workshops organised by the PRAXIS and CRITICAL teams to facilitate knowledge exchange and synthesis between the nine projects in the CHCC Cohort. The first of these, in February 2022, focused on core themes across the portfolio and project-specific findings, research challenges and recommendations to AHRC and the DCMS. We synthesised this information and cross-analysed it for this report (**see section 2**). Those findings have contributed to the definitions of recommendations for the cultural heritage protection workstream, including innovative and critical approaches to heritage conservation and management in a world affected by climate change and disasters (**see section 4**). The second workshop, in April 2022, facilitated knowledge exchange through structured project presentations that we have translated into the policy briefs included in **section 3**.

More on the first workshop – February 2022

In the first workshop we introduced the objectives of this collaborative work:

- to create a space for exchanging findings between projects;

- to develop a roadmap for policy impact through synthesis and communication via succinct issue briefs;

- to capture core themes, key findings, best practice in research and recommendations using Miro Discussion Boards and structured presentations.

For the workshop, we divided the cohort of projects into one group with four projects and a second group containing five, facilitated by the PRAXIS and CRITICAL teams respectively. Miro Discussion Boards were structured into four discussion themes:

- core themes and achievements – including background and key findings;

- research challenges – what worked and what did not;

- approaches and methods in heritage research;

- recommendations for funding bodies, policymakers and heritage researchers and practitioners.

The boards were used to facilitate conversation between groups about each of these four themes. Sticky notes allowed each project to contribute to the policy synthesis in their own words while discussions were underway.

Then, we synthesised the information from the two discussion boards into cross-cutting themes and circulated these within the cohort before workshop two.

More on the second workshop – April 2022

In the second workshop we wanted to communicate the projects' results in a format that could be translated into a two-page policy brief for the AHRC and DCMS. Presentations were limited to seven minutes, five slides, four photos and three recommendations. The structure shown in **figure 1** was provided as a guide for each presentation and the write-up of each policy brief. This allowed groups to add additional cross-cutting themes to the existing lists collected from workshop one. After the second workshop we circulated a policy brief template to allow an easy translation of project data into the policy brief format. The policy briefs prepared by the nine research projects are presented in **section 3** of this report.

Report structure

This report's structure corresponds with the aim of the AHRC GCRF Urgency Grant call and the outputs of the PRAXIS-CRITICAL workshops. **Section 2** provides a detailed introduction to the challenges associated with natural and human-made disaster and climate change impacts on cultural heritage. It also outlines the innovative research approaches and methods adopted by projects across the portfolio. It synthesises the core themes, achievements and results across projects. **Section 3** includes nine issue briefs, one prepared by each research project. **Section 4** provides lessons and recommendations to funding bodies (e.g. AHRC), policymakers (e.g. DCMS), researchers in cultural heritage studies, archaeology, global change research and the arts and humanities, and practitioners safeguarding cultural heritage sites. Finally, **section 5** presents some conclusive remarks and areas for future research.

"**Heritage is much more than the preservation of old buildings and sites. What we eat, how we dance, how we mourn the dead, what we sing and how we love are practices that can sustain us despite all sorts of onslaughts. How this is represented and who represents it become key in any conversation after catastrophe.**"

Dominique Niemand, Research Associate, University of Pretoria, South Africa. Project: CRITICAL

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Figure 1. Scope of the two workshops and approach to policy synthesis
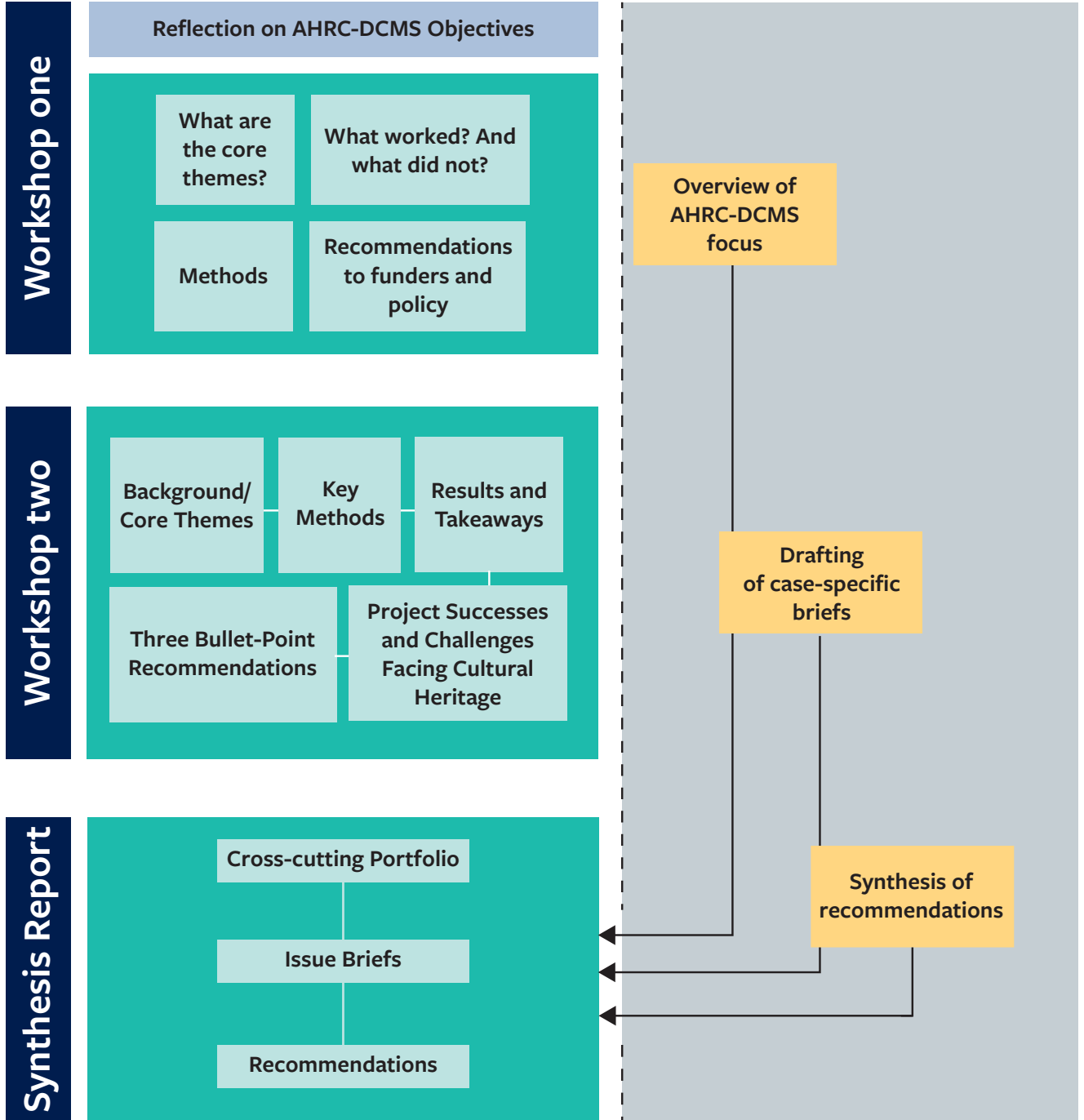
Cross-portfolio synthesis: challenges, methodologies and projects achievements

Chitral valley, Hindukush, Pakistan - September 2021: Portrait daily life activity of Kalash people in ramburet-bamburet village show an ethicnity costume of kalash tribe. Credit: Анастасия Смирнова, Adobe Stock

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Challenges for cultural heritage resulting from natural disasters and climate change

Defining heritage

"Heritage is a living and dynamic concept, interwoven with peoples and places, an expression of cultural diversity and of different modalities of 'artistic creation, production, dissemination, distribution and enjoyment, whatever the means and technologies used' (UNESCO 2005, Art. 1). Heritage encompasses tangible objects, such as monuments and historic buildings, movable and immovable sculpture and paintings, cave dwellings, underwater heritage; and also cultural landscapes in rural and urban contexts, natural areas, ecosystems, and biodiversity (UNESCO 1972, Art. 1; 2008, Annex 3). It further consists of intangible attributes, including: 'oral traditions and expressions, language as a vehicle of the intangible cultural heritage, performing arts, social practices, rituals and festive events, knowledge and practices concerning nature and the universe, traditional craftsmanship' (UNESCO 2003, Art. 2; 2005, Art. 4-5)." *Extract from "Giliberto, F. (2021).* **Heritage for Global Challenges**, *Leeds: University of Leeds."*

The nine projects of the DCMS/AHRC CHCC Cohort address a variety of challenges faced by cultural heritage and their associated communities in the context of climate change and disasters – two factors that often intersect.

Challenges posed by climate change include extreme heat, drought and lack of water, melting glaciers, volatile and extreme precipitation, cyclones, landslides and rising sea levels (Sesana et al., 2021). On the other hand, the projects investigate the impacts of disasters on cultural heritage, in particular earthquakes, volcanic eruptions, land exploitation due to industrial mining and large-scale development projects, which are often exacerbated by climate change. In this context, cultural heritage is not given sufficient consideration in planning for disaster risk management, and cultural heritage protection is still not sufficiently integrated into national, regional and local risk management strategies (Romão and Bertolin, 2022). The projects propose innovative solutions and possible ways forward.

Issue 1. 3D scanner, Bela, India. Credit: M. Mane.

After disasters, priority actions focus on providing shelter, relocating affected communities and humanitarian measures, rather than preserving cultural heritage assets (Spennemann and Graham, 2007). Some of the CHCC Cohort projects investigate effective ways to **document, inventory and record both tangible and intangible cultural heritage at risk of irreversible damage or disappearance in the disaster aftermath**. For example, the project **A sustainable *re-construction* method for seismic-prone heritage areas of India based on advanced recording technologies** focuses on the challenges faced by vernacular architecture, including housing and non-monumental heritage, in a post-earthquake situation. This particular type of heritage can provide affordable solutions to cope with local environmental and climatic conditions for local residents. However, it is also particularly vulnerable to substantial damage and destruction in the context of seismic hazards, and repair, reuse, retrofit and adaptation are frequently neglected in favour of new constructions that are not sensitive to local contexts. Focusing on intangible aspects, the project **Inventorying intangible cultural heritage assets affected by Cyclone Idai in Chimanimani, Chipinge and Buhera districts in Zimbabwe** addresses the urgent need to provide evidence-based databases on oral traditions, performing arts, social practices, indigenous rituals and food systems, which are often marginalised in favour of more tangible assets (e.g. buildings, monuments and archaeological sites).

Two other projects concentrate on the **pressing need to address structural, cultural and socio-economic damage caused by increasing climate change and disasters**. **Developing a novel climate change Risk Assessment Framework for cultural heritage in Turkey (CRAFT)** focuses on the consequences of intense rainfalls, floods and landslides on the cultural heritage of Istanbul, particularly in the historic centre, which is a UNESCO World Heritage site. **Conservation of climate change endangered cultural furniture industry heritage in Damietta, Egypt** examines the impacts of climate change and sea level rise on the long-term conservation of interconnected tangible and intangible attributes, with a particular focus on cultural values and practices and community social capital networks.

Two more projects, in Brazil and South Asia, show a **lack of community recognition and involvement in cultural heritage, climate**

change and disaster processes. **Roots of resilience** explores the dramatic threat that industrial mining poses for Brazilian cultural heritage in the Iron Quadrangle – including two UNESCO World Heritage sites and indigenous non-material culture – and on the lives of associated local communities. In another region characterised by significant political conflicts. **Fragile heritage ecologies: vernacular cultures and the at-risk landscapes of the Hindu-Kush-Himalaya mountain region** draws attention to how, in landscape-protected areas, the focus is on protecting and preserving the physical environment, flora and fauna rather than on local communities and their cultural heritage, which are often ignored by dominant policy narratives and discussions. A third project, **Mitigating climate change effects through traditional land management practices**, points out how the links between natural and cultural heritage – a separation that is not recognised by local people in Soqotra – have been ignored by conservation programmes that focus entirely on biodiversity.

Issue 5. Intangible Heritage ahnd Dance in Gilgit-Baltistan. Credit: Zahra Hussain.

"There is an urgent need for flooding and landslide susceptibility mapping of cultural heritage in Turkey, particularly in Istanbul. This project is a direct response to this urgent need. A multidisciplinary team of experts from Durham University (UK), Middle East Technical University and Yildiz Technical University in Turkey are working with the Turkish Prime Ministry Disaster and Emergency Management Authority (AFAD) and Istanbul Metropolitan Municipality on developing flood and landslide risk management plans for the UNESCO World Heritage areas of Istanbul. The timescale for the impact of this project has to be realised very quickly as a consequence of the urgency of the problem."

Ashraf Osman, Principal Investigator, Durham University. Project: CRAFT

Innovative research methodologies and approaches

> **"Heritage is fluid and complex, it is political in every sense. The work of heritage allows difficult conversations to take place in imaginative ways, allowing for history to be understood as being in the present."**
>
> *Prof Siona O'Connell, International Co-investigator, University of Pretoria, South Africa. Project: CRITICAL*

The projects from the CHCC Cohort **combine arts and humanities methodologies with more technical and environmental ones, as well as quantitative and qualitative ones**. The aim is to develop innovative interdisciplinary approaches to tackling the complex challenges facing cultural heritage in the context of disasters and climate change.

Some projects complemented the use of new digital technologies with more qualitative methodologies. The use of 3D laser scanning (or LiDAR) combined with interviews and social surveys, for example, proved successful in recording built heritage and associated ways of life after a disaster. In fact, this methodology enables a more comprehensive assessment of the state of the art and so it

Portrait of women in traditional tibetan clothes inside their house in Ladakh, Kashmir, India. Credit: klublu, Adobe Stock

supports innovative and culturally sensitive approaches for heritage conservation, post-disaster *re-construction*, risk management and risk mitigation (**see issue 1**).

Other projects used a Geographic Information System (GIS) to map cultural heritage according to its vulnerability to climate change, starting from the collection of hydro-geological, topographical and environmental data related to rainfall patterns, flood and landslide, topography and soil properties as well as graphical data (**see issue 4**), or to understand spatio-temporal patterns of social capital transactions in the furniture industry in Damietta (**see issue 2**).

A few projects used mostly creative and participatory methodologies, such as visual storytelling, visual ethnography, documentary film-making and arts-based approaches, to collect community perceptions and build narratives by engaging with the communities themselves, particularly in remote and rural environments (**see issue 3** and **issue 5**). Another project developed a participatory and co-created methodology to stimulate community engagement by empowering five arts-based organisations to co-define and carry out the research through quantitative and qualitative surveys (**see issue 8**). Creative methodologies proved to be particularly effective, recognising the plurality of cultural expressions related to the preservation and management of heritage assets (tangible and intangible) affected by complex challenges such as climate change and disasters.

In other projects, providing training courses through online webinars and hybrid workshops supported development of local abilities to use innovative tools, such as the climate vulnerability assessment of cultural heritage

sites, and the adaption of these tools to the peculiarities of different local contexts (**see issue 9**). Developing local skills and abilities will improve the assessment of vulnerabilities and risks associated with cultural heritage, and therefore its long-term preservation and management in an ever-changing environment. Moreover, this process has allowed the researchers, normally recognised as the 'experts', to learn from community knowledge and practices in a reciprocal and fruitful knowledge exchange process. Finally, the organisation of focus groups with stakeholders from different governmental departments helped to bridge the communication gap between different policy sectors, such as those related to cultural heritage and to natural hazards and risks (**see issue 4**).

> **"As we answered or filled in the questionnaires ourselves, we ended up learning or finding out several things that we had no idea existed. One of those things was the relevance of the organisations within societies and how they have been acting within their social range. So it was with great pleasure that we participated in this research because it is only then that we are able to find out what indeed is our cultural heritage, how it is inserted in our city, how it becomes part of the history of that city, and this could perhaps end up becoming a guideline for the future. Nowadays I consider cultural heritage as a precious asset that we have."**

Renata Vilaça, research participant from Banda São Sebastião, Brazil. Project: Roots of Resilience

Project achievements and research findings

Recognising the plurality of heritage interpretations and values

A core aspect identified by the nine projects is the need to recognise the variety of heritage attributes and values existing in a location affected by climate change and disasters, as well as their multiple interpretations by different stakeholders. Moving from a top-down to a bottom-up approach, a comprehensive and inclusive understanding and documentation of diverse heritage attributes (tangible and intangible) is the first crucial step for safeguarding that heritage in the aftermath of a disaster and during climate change adaptation.

The projects emphasised that it is important not only to document and inventory tangible heritage assets but also to provide evidence-based information on intangible cultural heritage (ICH), which is often neither recognised nor valued by local officials. ICH includes knowledge and practices concerning nature and the universe (e.g. sacred places and traditional and religious ceremonies), traditional artisanship, oral traditions and expressions, performing arts, social practices, rituals and festive events, among others (UNESCO, 2003). One particular project gave emphasis to the significance of inventory ICH to support the resilience, reconstruction and relocation of communities affected by Cyclone Idai in Zimbabwe (**see issue 6**). Another project built the case for UNESCO recognising craft-making methods in Damietta as ICH (**see Issue 2**).

Recognising multiple heritage attributes and values is also relevant for the development of effective preparedness and management strategies, including tools to assess the vulnerability of heritage sites against potential

"This multi-disciplinary network of academic researchers, designers, policymakers and international agencies aims to examine and promote the cultural and economic resilience of Damietta, which is under threat from climate change and contemporary decision-making that is insensitive to its socio-cultural heritage. By documenting and highlighting the intangible cultural heritage of this craft industry and its social networks, a strong case is made to protect these practices and save the economic livelihood of the city's inhabitants."

Anonymous quote. Project: Conservation of climate change-endangered cultural furniture industry heritage in Damietta

hazards and protect cultural heritage facing climate change and disasters. Another project, in Istanbul, Turkey, drew attention to how a qualitative societal approach is crucial during the identification of the consequences of hazards. In fact, this recognition process is strongly interrelated with the different value judgements and interpretations (social, cultural, economic, environmental, psychological, etc.) associated with cultural heritage by multiple groups (**see issue 4**). Finally, the CRITICAL project provided additional insights into the dynamic aspects of heritage, which are constantly changing, and how these influence local livelihoods and social cohesion over time (**see issue 3**). It also outlined how these different perceptions of heritage are useful in opening up conversations about vulnerability and adaptive capacity and avoiding assumptions when developing risk assessments by building on diverse narratives and understanding.

Bridging cultural and natural heritage approaches and decolonising knowledge

Cultural and natural heritage are often considered separately and regulated and managed by different governmental departments (Larsen and Wijesuriya, 2015). But they are inseparable and interdependent, and recognising this is key to ensuring sustainable and integrated approaches to tackling the impacts of climate change and managing disaster responses and risk preparedness (Giliberto and Maclagan, 2021). The artificial separation between cultural and natural heritage (and related approaches) is found more frequently in western legislations, processes and practices than in local and indigenous knowledge, practices and management systems, which focus on more holistic and integrated concepts that

exemplify the interdependency between humanity and nature. Two projects highlighted how the cultural heritage of the mountain communities in the Hindu-Kush-Himalaya region is often ignored in favour of natural landscape and remarkable flora and fauna (**see issue 5**) and how large-scale development and conservation programmes in the Soqotra Archipelago have mainly focused on biodiversity and natural heritage (**see issue 7**).

A key outcome from the CHCC Cohort was therefore to bridge the gap between cultural and natural approaches to climate change and disasters and to provide more holistic and integrated solutions. In doing so, it has been crucial to engage with the plurality of knowledge systems (not only the dominant western ones) and to learn from local and indigenous knowledge and practices for climate adaptation and management of sites to complement the dominant scientific narrative on climate science and climate responses. Local communities need to be primary stakeholders in the interpretation and significance of their heritage (**issue 5**), and their knowledge must be incorporated into the development of new approaches, tools and frameworks for climate and disaster responses.

"The research team went into the communities to learn from the people; they got their context, knowledge, concepts and viewpoints from the communities that experienced the disaster. Therefore, the findings are evidence-based, collective and co-created."

Permanent Secretary, Ministry of Youth, Sports, Arts and Recreation. Project: Inventory ICH

For example, one project explained how the traditional knowledge of Soqotra people has continuously evolved to cope with extreme and unpredictable weather. This constitutes an incredible source of understanding and provides contemporary solutions to adapt to climate change locally (**see issue 7**). Finally, the cohort emphasised how this knowledge exchange between researchers, policymakers and local and indigenous peoples must always to be consensual and beneficial for the communities involved.

Developing people-centred, community-based and participatory approaches using arts and culture

The projects highlighted the importance of implementing people-centred, community-based and participatory approaches to recognise the plurality of heritage values, bridge the gap between cultural and natural heritage approaches and decolonise knowledge.

These approaches can also stimulate a community's resilience when climate change and disasters affect it, and support more comprehensive risk and vulnerability assessments. Engaging directly with local people, the projects have collected first-hand narratives from marginalised groups like women, children, the elderly and people with disabilities about the impact of climate change and disasters on local communities (**see, for example, issue 6**). They have also accessed expert knowledge (including indigenous and community knowledge) on the ground via participatory approaches that have facilitated intergenerational and intersectoral knowledge transfer in different geographical locations (**see issue 3** and **issue 9**).

The nine projects delivered compelling case studies showing how arts and culture can be used to promote local engagement and active participation in the development of community-based research practices. For instance, a project used data visualisation and exhibitions to engage a local community in India. This approach increased risk awareness and opened up discussions about how to repair vernacular architectures after an earthquake incorporating local knowledge (**see issue 1**). Another project focused on co-creating and co-conducting the research with communities living in the Brazilian Iron Quadrangle, working in partnership with local arts organisations (**see issue 8**). Through

"**Climate change is already resulting in the loss and damage of cultural heritage sites across Africa. This loss is not limited to historical and archaeological buildings and places; it is also affecting communities and their cultural traditions. How those who care for Africa's cultural heritage respond to the threat of climate change has profound implications for the resilience of the broader community. The CVI-Africa project has worked closely with heritage professionals and researchers from across the continent to better understand this ongoing challenge by identifying the degree of vulnerability and building a foundation for future adaptation and conservation strategies.**"

Dr Will Megarry, Principal Investigator, Queen's University Belfast, and Climate Change Focal Point at the International Council on Monuments and Sites. Project: CVI Africa

immersive arts workshops and training sessions, local communities co-created inventories of cultural practices and assets that were important to them. This process also helped to establish a dialogue with policymakers and local authorities about the role that cultural heritage can have in promoting resilience and sustainable processes of transformation and regeneration.

Supporting local capacities and developing a community of practice

Working in partnership between UK institutions and local organisations has proved to be a decisive element in the achievement of the projects' goals. In most cases project partners, with previous experience and the ability to speak local languages, have engaged directly with the communities, for example when collecting research data on the ground. The COVID-19 pandemic has encouraged a process of transferring more ownership and responsibilities to local partners in conducting part of the research because UK researchers could not carry out fieldwork. Instead, local partners were trained in data collection and obtaining quality data. Some also had access to specific tools (e.g. laser scanners) and received

ad-hoc training in how to use them (**see issue 1**). The result is stronger local abilities and newly acquired local skills in research and in practices to address cultural heritage preservation. According to project PIs, the process of conducting the research itself has become as important as the production of specific research outputs and findings. It has also created more actively involved local partners in the co-design of the data collection strategy to make it more aligned with local needs and expectations (**see issue 8**). Furthermore, the projects from this cohort have contributed to the development of a community of practice around various aspects related to cultural heritage, climate change and disasters and a multidisciplinary research network by organising training courses, capacity building activities, joint drafting of research outputs, webinars, workshops and other knowledge exchange events.

"The proposed framework could improve the chances of a rapid and effective response in case of an earthquake, enhance the possibilities of reusing existing structures, and increase preparedness and resilience in local communities while virtually preserving its culture embedded as the record of a 'living heritage'. To achieve this, the project tests a strategic partnership between academia, governmental institutions, and NGOs to inform actions in conserving at-risk built heritage. This involves planning and building local capacity, relevant for its potential scalability and applicability in other similar seismic-prone heritage settlements."

Dr Bernadette Devilat, Principal Investigator, Nottingham Trent University. Project: A sustainable re-construction method for seismic-prone heritage areas of India

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Improving ways to assess heritage vulnerabilities and risks and increase projects' transferability and scalability

Sustained disaster risk and vulnerability research have demonstrated the importance of understanding the local contextual factors that shape vulnerability and expose given groups and structures to natural and human-made hazards. Each project in this report illustrates how on-the-ground knowledge of vulnerability and hazards exposure underpins the development of effective risk assessment tools. Assumptions cannot be made as to the greatest risk facing heritage assets and the local groups that value them. Projects such as Values-based climate change risk assessment: piloting the climate vulnerability index (CVI) for cultural heritage in Africa (CVI Africa), show how significant resourcing – financial and human – are required to co-develop suitable risk assessments (**see issue 9**). Local engagement and buy-in are essential when providing suitable risk tools and methodologies where financing extends to stakeholders who hold knowledge of their communities, cultural heritage and local environments.

A significant example is the CRAFT project, which aims to evaluate the landslides and flash flooding impacts on World Heritage sites in Istanbul via a multidisciplinary approach (**see issue 4**). The project has developed a vulnerability assessment model, built on a vulnerability index, to identify and provide effective measures to mitigate current and future hazards. This model was designed in a way that can be replicated or adapted for other cultural heritage sites in Turkey. The CVI Africa project focuses on Sub-Saharan Africa instead, examining the scalability and replicability of assessment methodologies in diverse contexts. In particular, it centred on training heritage professionals to pilot the CVI, which evaluates the physical and ecological impacts of current and projected climate change on cultural heritage, and its utility and long-term value in multiple sites in Africa (Tanzania and Nigeria). This project filled a gap, because many techniques and assessments of this kind have been only tested in places like Western Europe, Australia and North America.

Slum houses located in. Accra, Ghana. Credit: Nataly Reinch, Adobe Stock

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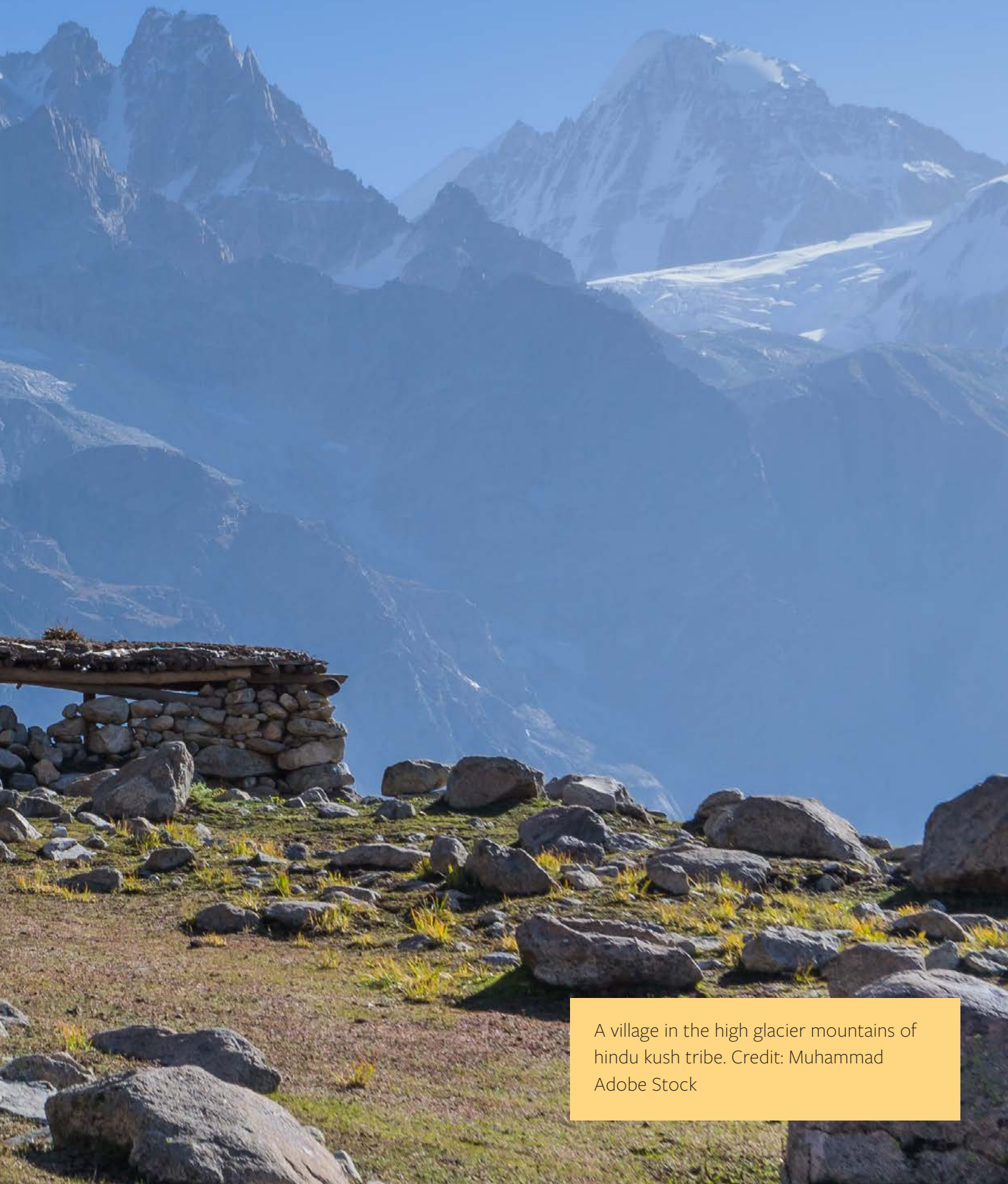
A village in the high glacier mountains of hindu kush tribe. Credit: Muhammad Adobe Stock

Issue 1.

Introducing technology to break the unsustainable cycle of building replacement after earthquakes towards a culture of reuse and risk mitigation

A ↓

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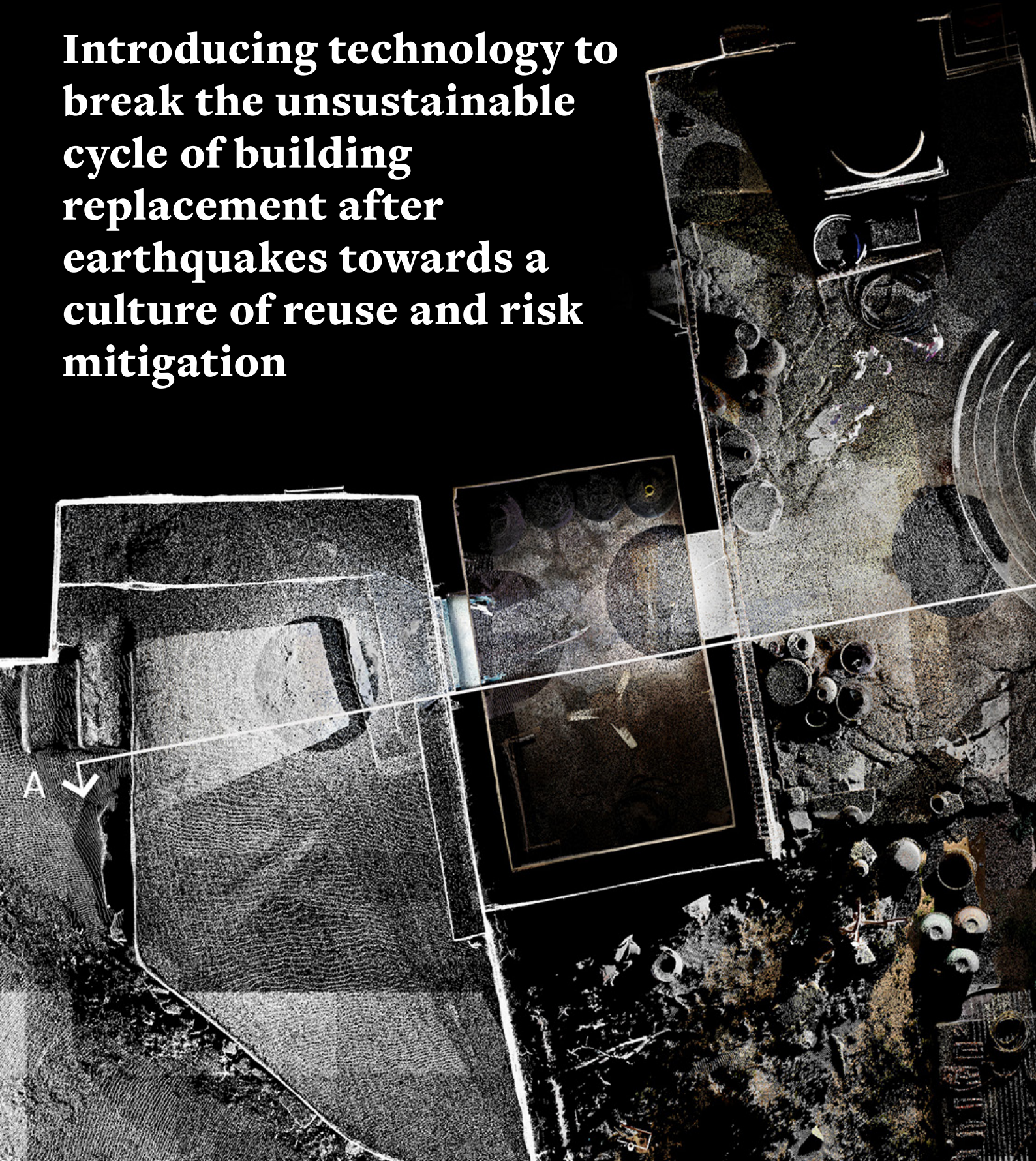
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Plan of a family temple in Bela with damage identification that is still visible from the 2001 earthquake (7.7. Mw magnitude). Deviations in plinths and walls identified in the 3D laser scan data reveal underlying structural problems that put at risk the entire building.

Project:

A sustainable *re-construction* method for seismic-prone heritage areas of India based on advanced recording technologies, Nottingham Trent University (PI: Bernadette Devilat)

Partners:

Center for Heritage Conservation (CHC), CEPT Research and Development Foundation (CRDF), Ahmedabad, India; Hunnarshala Foundation (Bhuj, India); Gujarat Institute of Disaster Management (GIDM), Gandhinagar, India; International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), Rome, Italy.

Duration:
November 2020 – July 2022

Problem statement and aims

Vernacular housing in heritage settlements is liable to deterioration, damage and destruction due to disasters and human-induced hazards. This non-monumental heritage is mainly built by inhabitants as an economical and affordable response to local climatic and environmental conditions. When located in seismic areas, this built heritage is at greater risk due to earthquakes posing a destructive and recurrent threat. Despite this, responses are usually triggered afterwards, because people lack mitigation strategies to diminish destruction. The fastest and most common post-earthquake approach is to build anew, yet the most sustainable is to reuse, considering the building's embedded energy and heritage significance. However, there is a lack of relevant documentation for culturally sensitive recovery and preparedness, repairs

are usually costly and slow, and large numbers of affected constructions make damage assessment difficult. Thus, we exploit advanced documentation technologies aiming towards a new approach to *re-construction* (Devilat, 2013), towards a culture of repair, reuse, adaptation and risk mitigation.

Methodology

We used advanced recording technologies and social surveys to develop a sustainable *re-construction* framework for seismic-prone heritage settlements of the Kutch region in Gujarat, India. It is a fast, affordable and scalable approach to break the unsustainable cycle of buildings' replacement and subsequent heritage loss using a combination of tools to capture social and built environment data, such as interviews, mapping, drone capture, photography and 3D laser scanning in the pilot case study of Bela. With them, we have assessed the context environment and understood how it supports people's ways of living to enhance the number and quality of conserved historical buildings and create risk mitigation strategies.

Core themes, project achievements and research findings

The proposed framework enhances the possibilities to repair existing structures, risk preparedness, planning and design in non-monumental heritage and disaster mitigation and presents a key institutional framework for its potential implementation in similar seismic areas. It considers *re-construction* as the repair, reinforcement and risk management of buildings instead of their complete replacement, a more sustainable alternative than building anew after each seismic event, defining four strategic guidelines:

1. For immediate post-earthquake action: to inform damage assessment at two different scales simultaneously, the village and the individual buildings. The data obtained can help governing bodies and other concerned authorities assess the affected areas from macro to micro levels, an invaluable resource for planning new, effective measures. The information resources it offers make it faster and easier to understand the characteristics of a site after an earthquake, accelerating the response of the authorities.

2. Mid and long-term study: including evaluation of previous earthquake responses, risk assessment and insertion of technology to enhance preparedness and risk mitigation processes.

3. Community engagement and participation: critical for adequately contextualising the information obtained, validating it and getting local support for further actions. By sharing and discussing the work with the inhabitants, it is possible to incorporate local knowledge for the communities' risk preparedness and engage with the visual representations of their village to value their traditional environment.

4. Applicability via institutional and academic partnerships: implementation of the proposed framework requires active participation and coordination of multiple departments and agencies of the state, with technology introduction via training, resources and documentation accessibility. For this, a partnership is recommended between academia, local NGOs, and

Workshop and exhibition "Digital Bela: architectural heritage in a new light" (Bela, 17–18th November 2021), including images, videos and architectural projections obtained from the captured data presented to community members to understand its potential for earthquake-related prevention and recovery. Copyright: © 3D for Heritage India NTU. 2021. Credit: Bernadette Devilat.

governmental institutions. Academia can help with the technical aspect of 3D surveying and NGOs with building and local implementation, while governments can coordinate the introduction of technology in their methods and procedures.

Lessons learnt and study limitations

- The framework proposed is for the seismic risk management of heritage settlements and structures, covering digital documentation, structural evaluation and rapid post-earthquake damage assessment.

- It informs community-driven disaster risk reduction measures, aiming towards building resilience.

- Adopting the methodology would also improve the chances of rapid post-disaster damage assessment and effective response in case of an earthquake, potentially leading to sustainable *re-construction* and recovery.

- Specific knowledge and expensive equipment for documenting are required. A partnership with academic institutions is proposed to

tackle these limitations. Also, a practical guide on using 3D laser scanning in post-earthquake contexts will be available for free in different languages on the **project's website**.

Recommendations

### For heritage and academic institutions

This framework could be scalable and replicable to other settlements of heritage value at risk of disasters and conflicts, provided that a local level contextualisation is implemented in terms of language, terminology, local skills, administrative structure and social acceptance.

For NGOs, academia and institutions involved in post-disaster situations

As critical mediators in reaching the community in greater depth and transferring technical knowledge that might have been lost over the years, this can be extrapolated to bridge to external and governmental agencies for broader applicability considering existing links and trust, in line with recommended bottom-up post-earthquake *re-construction* approaches.

Analysis of the cross-section AA' from the LiDAR data of a small family temple in Bela, Gujarat. The possibility of generating this building profile is helpful for analysis using specific structural software.

Copyright: © 3D for Heritage India NTU. 2022. Credit: Felipe Lanuza based on the data by B. Devilat, M. Mane and Z. Pithawalla, supported by J. Desai, A. Singh, T. Choudhari and S. Sen.
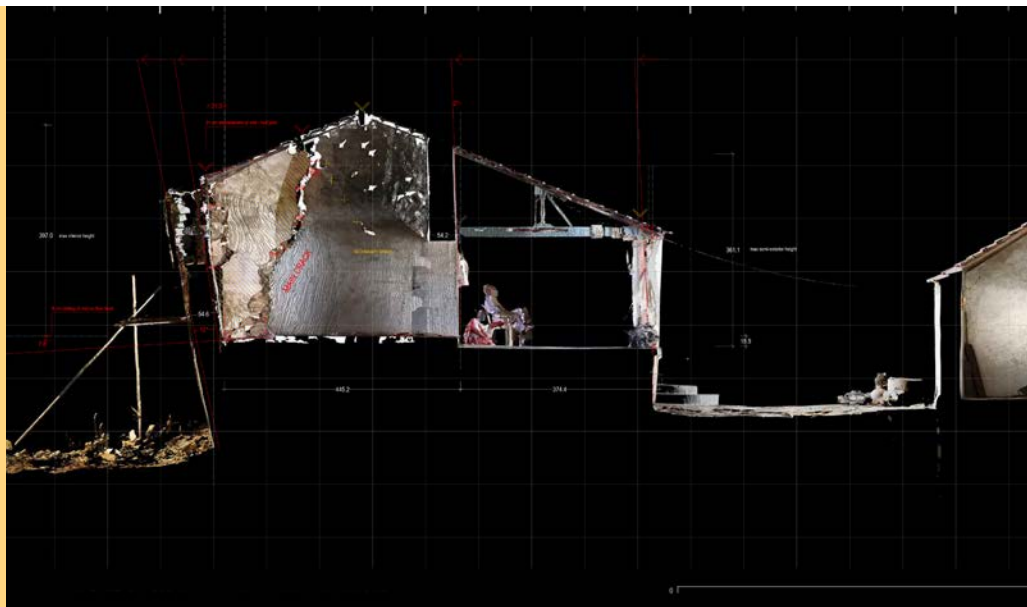
For Indian authorities and institutions

- The framework's successful implementation depends on institutional support and community engagement. Therefore, forging a network of key stakeholders is essential for its planning and execution in different contexts. This is why a Policy Brief was developed in English, Hindi and Gujarati, available on the **project's website**.

- Include heritage conservation/management as a part of the local governance mandate.

- Support local authorities in developing post-earthquake emergency, long-term and pre-earthquake risk management plans using the 3D data of specific settlements, including evacuation routes and safety measures based on the as-built conditions documented. This will help to improve the agility and pertinence of the actions.

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Issue 2.

Social capital network for the furniture industry in Damietta: Damietta's furniture networks: a heritage asset facing climate emergency

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Project:
Conservation of climate change-endangered cultural furniture industry heritage in Damietta, Egypt, University of Salford (PI: Hisham Elkadi)

Partners:
Centre of Environment and Development for the Arab Region and Europe (CEDARE), Egypt; Pinocchio wooden products, Member of the National Furniture Council, Egypt; Crafts Council, UK.

Duration:
December 2020 – April 2022

Ihab Mohammed, CC BY-SA 4.0, via Wikimedia Commons.

Problem statement and aims

In the Nile Delta region, 6.1M inhabitants are at risk of sea-level rise. The furniture industry also accounts for 2.1% of total production of goods in Egypt, with Damietta's furniture industry alone producing £300M of annual exports.

Climate change and sea-level rise in Damietta pose a major risk to the conservation and continuance of cultural values and practices that form irreplaceable layers of social capital networks in this community. Sea-level rise threatens to disrupt the spatial social capital networks that are central to the success of the furniture craft industry in Damietta. Critically, the interrelated tangible (including elaborately carved furniture) and intangible cultural heritage (including social networks) directly affect the city's resilience and economic growth.

The furniture industry in Damietta also finds itself at a crossroads between the inherited traditional crafts and the use of digital tools that are enabling more contemporary designs and products that are increasingly desirable to customers in both global and local markets. The uncoupling of design education and industry skills also adds to the magnitude of this dichotomy.

Methodology

This project employs interviews and an on-the-ground survey as tools to collate the opinions and understanding of individual workers and enterprise owners about their motivations and values in relation to their work, and the relationship of their work to place. The survey is also used for

Geographical Information System (GIS) mapping the spatio-temporal patterns of social capital transactions in the furniture industry in Damietta to understand:

- Predominant motivations and values, according to Schwartz's spectrum of human values;

- The relationship of the crafts to place;

- The relationship of the crafts to sustainability, practical benefits and their environmental impacts, social benefits, personal benefits and economic viability.

Core themes, project achievements and research findings

Enlisting in the UNESCO Intangible Cultural Heritage List

The project builds the case for UNESCO Intangible Cultural Heritage (ICH) recognition including:

- The socio-business capital networks that enable the success of the furniture industry;

- The unique designs and woodcarving being made and the continuation of a tradition of over one hundred years.

UNESCO ICH recognition would raise the profile while putting in place measures to ensure the crafts are passed on from one generation to the next. This will also enable:

- Maintaining social capital networks in the face of sea-level rise;

- Telling the stories of the histories, crafts and makers in Damietta;

- Developing up-to-date communication/ branding approaches that effectively communicate the crafts through films, documentaries, photography, articles etc;

- Developing a dedicated crafts museum with both a physical and a virtual presence;

- Work with universities to develop young designers, as well as apprenticeship programmes in the traditional craft;.

- In addition, the sustainability of the industry could be improved by considering the potential viability of localised tree planting and the development of expertise in sustainable practices related to the management of locally produced woods.

Reflections: values and place in Damietta's craft
The project provides a solid understanding of the nature, patterns and significance of Damietta's furniture industry as an economic and cultural hub.

- The social capital networks (trust, networks and norms) in Damietta are a significant asset providing an economic advantage that is under threat due to sea-level rise. Those networks are essential to preserving the community's livelihoods and work-live patterns, and thus the cultural values of the community.

- The traditional furniture-making production patterns and craftsmanship skills form a unique heritage value that is worthy of conservation and protection. There is a need to advocate for multiple variations that can be adopted within furniture-making, ranging from art-oriented product design to full commercial mass production.

- It is imperative to encourage entrepreneurial mentorship and professional art agency to have a prominent role in the Damietta furniture industry.

- Matching design-oriented education to the local makers is essential to the future development of the craft skills and industry production.

- Providing digital support and digital tools to makers in Damietta is imperative to counteract the community's pressure and fear of "new technologies".

Lessons learnt and study limitations
- The unpacking of threats from sea-level rise led to in-depth investigation not only of the values of the craft industry and its relationship to place and sustainability but also of the socio-economic roots of decline and loss of livelihood in the community.

- The gap between traditional craft makers and those who champion the digitalisation of craft could be bridged through development of contemporary design typologies that are attractive to the market together with contemporary business and marketing models.

- Sustainable and ethical design are imperative to the sustainability of the craft. University and industry partnerships are key to the survival of the industry.

Recommendations

For United Nations' agencies

- Protect the social capital networks of Damietta's craft heritage from climate change adversaries through inclusion in the UNESCO Intangible Cultural Heritage List.

For local authorities and decision makers

- Utilise Damietta's Furniture City as a strong logistics body and facilitation hub that primarily aims to connect local enterprises with the global market.

- Introduce sectors to the industry that are currently lacking, such as marketing agencies, to specifically tackle the introduction and management of, for example, high-end products to elite art communities.

For civil society and the private sector

- There is a need for a spectrum of development directions rather than a dichotomy between traditional vs digitised approaches. These include:

  - Production of singular pieces that exhibit full traditional skills and craft;

  - A limit on mass production, where merchandise handcraft is valued for its bespoke relationship with specific clientele;

  - Hybrid digitised production with traditional handcraft finishing.

- Empowering the local industry bodies within Damietta to:

  - Maintain a continuous link between micro-, small- and medium-size enterprises (MSMEs) and decision makers, to advocate for positive updates to critical laws and regulations;

- Advocate for establishing funding strategies and programmes that ensure the inclusive supported shift to new digitised production;

- Provide business plan support to MSMEs to ensure all price points in the market are covered.

- Establish ongoing links between education providers and industry MSMEs and introduce new educational requirements and standards based on what is needed in local and global markets.

- Establish a set of central standards of production which take into account the traditional craft of the city as well as global tastes and demand.

Social Networks and mitigation against climate change. The Cultural Furniture Industry Heritage – Damietta, Egypt. Credit: H. Elkadi.

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Issue 3.

Heritage is a dynamic tool for climate change adaptation and resilience building

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Key stakeholders were interviewed in Yogyakarta City about the heritage of the River Code.

Project:
CRITICAL: Cultural heritage risk and impact tools for integrated and collaborative learning (Highlight), University of Edinburgh (PI: Katherine Crowley)

Partners:
University of Pretoria, Pretoria, South Africa; Centre for Asia-Pacific Initiatives, University of Victoria, Victoria, BC, Canada; Center of Excellence of Technological Innovation for Disaster Mitigation (GAMA-InaTEK); Universitas Gadjah Mada, Yogyakarta, Indonesia.

Duration:
December 2020 – June 2022

Problem statement and aims

There can be no sustainable development without disaster risk reduction (DRR) including climate change adaptation (CCA). Yet these rely on a foundation of understanding risk in all its complexity. Heritage is a missing component of conventional risk approaches, despite its ability to shape our identity, deliver capacities and expose vulnerabilities. The CRITICAL project aimed to better understand the role of heritage within risk assessment through the investigation of three case study sites and developing a community of practice across three Low-Middle Income Countries (LMICs). The case study sites were of different sizes: the small-scale settlement of Elandskloof in South Africa, the city region of Yogyakarta, Indonesia and a national approach across Sri Lanka. Exploring these three scales, we were able to capture a narrative-based risk assessment for heritage

and found that heritage opens avenues for dialogue on livelihoods, gender, local-level capacity and vulnerability.

Methodology

At a national scale, Dr Karunarthna carried out multiple interviews and facilitated two workshops in rural settlements across Sri Lanka. Furthermore, her work included a review of historical literature exploring the role of women in traditional rural practices. At city-scale, Dr Retnowati and Ms Anantasari carried out a series of interviews with key stakeholders along the River Code in Yogyakarta region. In South Africa, Prof O'Connell and Ms Niemand led two workshops, a household survey and a series of interviews in Elandskloof. In addition, a review of climate data for each site and a systematic synthesis of literature related to heritage, risk and value was undertaken (Crowley et al., 2022).

Core themes, project achievements and research findings

Local risk narratives have challenged conventional top-down approaches to understanding the threats to heritage from climate change. We find that our case studies identified how local communities value place and how heritage can be a mechanism for engagement with adaptation. Conventional risk assessments for heritage sites rarely take into account local-level values and are currently largely lacking in LMICs (Crowley et al., 2022). Heritage is considered a resource in the three case study sites. In Yogyakarta, the river is a heritage asset and forms a cultural axis through the city. In Elandskloof, we uncovered a narrative of loss in terms of inter-generational knowledge due to forced

removal and climate change. The capacity of women and their traditional environmental knowledge for climate adaptation was captured across Sri Lanka. The research findings were discussed at a final stakeholder workshop in March 2022, resulting in the identification of three areas of critical thinking:

- **Heritage as procedural** – heritage should not necessarily be preserved in a static state without understanding its influence in local and regional level resilience-building and how it is influenced by socio-economic change as well as environmental stressors.

- **Heritage as a research and engagement tool** – there is a need for more creative and local-level methods for discussing vulnerability and capacity. Our research has found that using heritage as a lens opens a dialogue on place-based issues vital for adaptation and wider resilience.

- **Heritage as adaptation and vulnerability influencers** – heritage is part of a local people's vulnerability and capacity for CCA and a crucial component in resilience-building. Heritage can be a critical asset for people living with environmental change and how heritage is 'protected' can have significant impact on people's vulnerability. For example, the designation of UNESCO World Heritage (WH) status can exclude the needs of local people, while embracing local environmental expertise can open up space for hybrid knowledge production that leads to improved adaptation.

The research team reflected on their cross-disciplinary work during this project at a time of global pandemic. A learning approach was central to this project and the interdisciplinary team has captured and shared a diversity of voice on heritage through a freely available e-learning course, a series of videos and ArcGIS story maps.

Workshop participants in rural Sri Lanka. Credit: Dulma Karunarthna, 2021.

Lessons learnt and study limitations

- Local-led, flexible research design (fully supported by international co-investigators) enabled a deeper investigation.

- The COVID pandemic not only led to challenges in continuity for the research teams due to illness and problems in accessing isolated settlements, but it also caused a loss of elder-held knowledge within those settlements.

- Full team face-to-face meetings were not possible during the project. Virtual meetings worked well and enabled attendance, but a full team meeting would have improved team discussions, refinement of final outputs and the future roadmap.

Recommendations

There are three core recommendations that speak across different audiences:

- Examine and support the role of heritage for adaptive capacity and resilience-building.

- Enable access to, and dialogue around, climate change information for people living in isolated and marginalised settlements.

- Expand the resources for local-level adaptation through heritage-driven risk assessments.

Specifically, we ask funders and policy makers at international and local levels to:

- Move away from viewing heritage solely as a built asset that needs preserving or protection. Consider instead a narrative of heritage as a capacity for adaptation and resilience-building.

- Ensure that UNESCO WH Outstanding Universal Value is balanced with local-level understanding of value for heritage.

- Invest in adaptation funds that are driven by the local-level needs and aim to move beyond assessment into implementation, monitoring and learning.

- Ensure all funds enable local meaningful participation and target forgotten or marginalised voices.

- Support interdisciplinary and women-led applied research projects that test new ways of thinking and doing with local people rather than for local people.

Future research should incorporate an evaluation of heritage hotspots to capture a diversity of case studies demonstrating value and influence for climate change adaptation and disaster management. This should be underpinned by locally designed and led, flexible research. Finally, future research should share findings and tools back to the local people and enable access and dialogue around climate change information, especially for those living in isolated and marginalised settlements.

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Issue 4.

Combination of climate change and human activities endangering cultural heritage in Istanbul
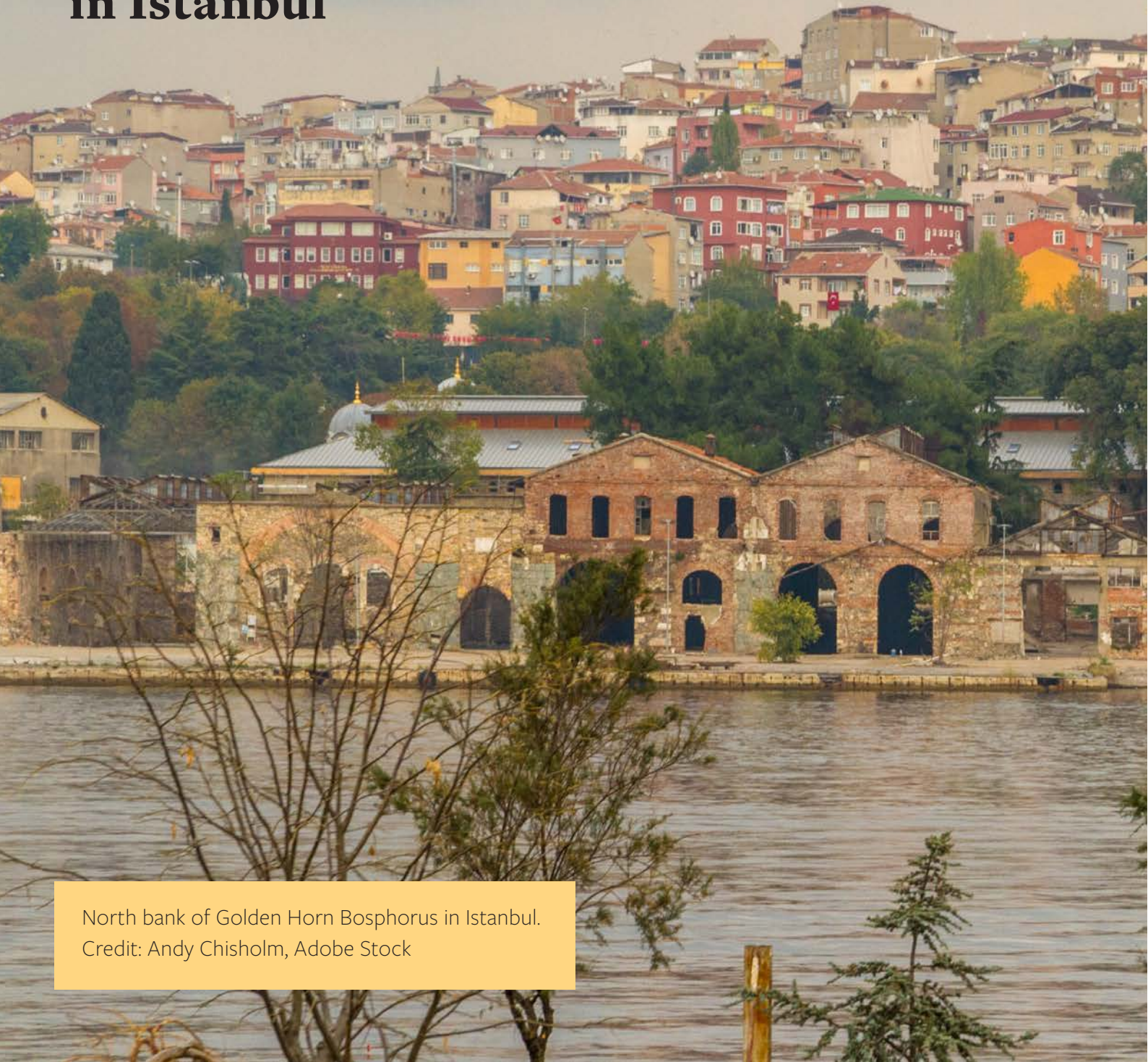
North bank of Golden Horn Bosphorus in Istanbul.
Credit: Andy Chisholm, Adobe Stock

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Project:
Developing a novel climate change risk assessment framework for cultural heritage in Turkey (CRAFT), Durham University (PI: Ashraf Osman)

Partners:
Middle East Technical University (METU); Yıldız Technical University (YTU); AFAD, The Disaster and Emergency Management Presidency of Turkey; Istanbul Metropolitan Municipality; Bogazici University Kandilli Observatory and Earthquake Research Institute.

Duration:
December 2020 – October 2022

Problem statement and aims

Turkey is one of the most archaeologically and culturally rich places in the world, with 18 UNESCO World Heritage (WH) sites and an additional 78 locations on the tentative list. Istanbul and its UNESCO WH historical areas have recently suffered from frequent floods as a result of intense rainfalls caused by a changing climate. Floods, rainfall-triggered landslides and subsequent moisture problems have resulted in significant structural damage to cultural heritage.

Therefore, there is an urgent need to develop tools to understand the hazard landscape and the value (by social, psychological and economic means) of the heritage sites to assess their vulnerability against potential hazards, including climate change. Identification of risk involves the assessment of the hazard and the evaluation of the consequences of that hazard. Assessing the hazard is usually tackled using scientific methods based on climate models and quantitative approaches to flood and landslide assessment. However, identification of the consequences requires a qualitative societal approach, recognising the complexity of value judgements about cultural heritage.

Methodology

We carried out desk study/data collection and processing on rainfall patterns, flood and landslide, topography and soil properties. This is coupled with Geographic Information System (GIS) analysis to produce flooding and landslide susceptibility mapping for the cultural heritage in Istanbul. Heritage places at greater risk were identified, and a field survey was carried out to collect critical information about the physical condition of each structure and its surroundings, as well as past indicators of floods and landslides. Focus groups and meetings with stakeholders were held to inform contextualisation and understanding of the value of cultural heritage.

Core themes, project achievements and research findings

A vulnerability assessment concept has been developed for the cultural and historical assets of Istanbul. The model is built upon a vulnerability index and it gave insight into the potential loss that heritage assets can face. The CRAFT project has identified 150 cultural heritage places in the Historical Peninsula of Istanbul that could be endangered by floods and landslides. An index for damage assessment has been developed. We have recognised the inevitability of loss, where the impacts of climate and environmental change may lead to the conclusion that conservation of some monuments is unsustainable.

The CRAFT project found evidence of the change in rainfall patterns and climatic events. However, there is a disproportionate increase in flood events and flood-related damage in Istanbul's cultural heritage sites due to construction activities in historical sites.

CRAFT has delivered a number of knowledge transfer events successfully, including:

- An online short training course on disaster management and natural hazards for cultural heritage. It was delivered on 22 February 2022 with a total of 132 participants from the UK, Turkey, India, Germany, Japan, Algeria, Taiwan, Italy and Azerbaijan.

- An international online workshop on climate risk assessment for cultural heritage. It was held on 23 February 2022, attended by 113 participants.

Both events have attracted participants from universities, research institutes, government agencies, cultural heritage protection agencies and municipalities, members of other related international projects (PROCULTHER and PRAXIS) and NGOs. Discussion sessions were held to share experiences and encourage the rapid exploitation of the concepts developed in the study.

Early signs of the project influencing current policies are evident:

- Engagement with Istanbul Metropolitan Municipality Heritage Division Cooperation, an authority that is responsible for the management and maintenance of the historical heritage of Istanbul.

- An invitation to participate in a national cultural heritage policy-making discussion in Turkey. As an example, the Metropolitan Municipality of the City of Bursa and UNESCO Bursa Site Management Unit held a panel entitled "Cultural Heritage, Climate Change and Sustainability Panel" on 15 June 2022. Out of the four speakers, three were from the CRAFT project team.

Meeting with Istanbul Metrope Municipality Cultural Heritage Division. Credit: Nejan Huvaj.

Lessons learnt and study limitations

- More training and interaction are needed (especially among different agencies such as the national disaster agency and cultural heritage managers);

- The fieldwork data collection forms developed as part of this project can be used for other areas (the forms can be shared with stakeholders);

- The methodology is applied in a pilot area in Istanbul, and it seems to be promising in identifying critical areas. This methodology can be used for ranking/prioritisation/decision-making;

- There is difficulty in data collection as government agencies and local authorities have poor data collection and archiving systems.

Recommendations

- The data could better to be shared with all stakeholders, via an online platform where possible.

- There are many areas with drainage/surface water/flooding-related problems. Non-destructive remedial measures can be developed (keeping the integrity and heritage properties of the structures). Reconstruction strategies can be developed.

- Raising awareness: a significant portion of the public does not know about cultural heritage and associated risks.

- Green, sustainable urban infrastructure systems, such as rainwater harvesting, green roofs, flood control ponds and basins, currently do not exist in Istanbul and they should be explored and implemented.

- Evaluating the values of monuments may differ for different stakeholders and not simply align on one solution.

- More training and interaction are needed, especially among different agencies such as the national disaster agency and cultural heritage managers.

The Sultanahmet Mosque (Blue Mosque) - Istanbul, Turkey. Credit: muratart, Adobe Stock

Research fieldwork in the historical peninsula of Istanbul, Turkey. Credit: Nejan Huvaj.

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Issue 5.

Heritage is a resource for coping with climate change as well as being threatened by it

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Project:
Fragile heritage ecologies: vernacular
cultures and the at-risk landscapes of the
Hindu-Kush-Himalaya mountain region,
Durham University (PI: Michael Crang)

Partners:
Laajverd, University of Gilgit-Baltistan.

Duration:
September 2020 – November 2022

A woman wearing traditional dress sitting
on wall and looking at Hunza valley in
autumn season, Gilgit Baltistan in Pakistan,
Asia. Credit: Punnawit Suwattananun,
Shutterstock

Problem statement and aims

As the terrible heatwave and then catastrophic floods this year have made all too clear, Pakistan is very vulnerable to the effects of climate change. It is estimated to be the 7th most vulnerable country in the world. Partly this is because it hosts part of the Third Pole, the greatest expanse of ice at low latitudes (but high altitude) in the glaciers of the Hindu Kush Himalaya and this is melting rapidly, with a third to half likely to disappear this century. The warming of this region is ahead of the global and Northern Hemisphere averages. It will lead to a tripling of the risk of Glacial Lake Outburst Floods (GLOF) in the whole Himalayas – and the Karakoram, Pamir and western Himalaya ranges, which this project works across, will be the regions with the most substantial increase in GLOF hazard. This creates both sudden floods and lack of water in dry seasons. Indeed, changes in the seasons themselves are causing shifts, including lower rainfall that reduces grazing and fodder crop possibilities, while earlier springs are affecting fruit orchards and dominant tree types are moving from willow to juniper.

Amidst this, the vernacular heritage and folk culture of local peoples are largely overlooked. They are remote from political power, and indeed lack formal representation in democratic structures. With different languages and heritages of different folk religions from the majority in the country, they are not seen as positive agents to respond to change nor as bearers of heritage practices. Their concerns are often overlooked in favour of the dramatic landscape shifts and threats to charismatic megafauna.

Our research seeks to not only document the complex and differentiated local heritages but also to build capacity for local people to create their own records of their heritage, what it means and the legacies it shows.

Methodology

We have used a participatory method of community mapping and transects to explore local knowledge of heritage and local narratives and combined that with formal surveys and physical analysis of the environment, aerial surveys and analysis of the risks of climate change-related flooding. Local people identified key sites and were trained in cataloguing and recording their characteristics.

Core themes, project achievements and research findings

Increase heritage awareness and encourage recognition of both tangible and intangible heritages to promote inclusive and community-centred approaches to tourism. Local crafts and folklore form an asset that needs to be documented, reproduced and developed as a resource for tourism. We have provided templates for documenting the practices and processes of craft-making in textual/visual formats, and for training community organizations to do likewise. Likewise, conservation efforts and protection of material heritage need to focus beyond archaeological sites and celebrated heritage sites.

A network of community museums (open air and heritage parks included) can be established across the region where local communities get a platform to showcase and narrate their cultural practices and landscapes.

Authenticity of cultural heritage must be recognised and considered in any interventions and new projects developed in a locality. Local communities need to retain control of the interpretation and significance of their heritage. Developments in built form should work in sympathy with the local vernacular aesthetic but also ways of life and everyday practice. Many developments are poorly adapted to changing climate and the ways of living in the region.

Validate local heritages and different religious heritages.
Some religious heritage from pre-Muslim eras is not only neglected but under threat of vandalism. Local syncretic religious practices and beliefs in the supernatural are not confined to a few celebrated cultural sites but can be appreciated more widely.

Crafts are tied up with the whole agricultural system, which is altering due to climate change and new transport connections. Craft skills need developing to take advantage of new, relatively high value opportunities, or local producers risk being out-competed. Sustainable livelihoods depend on evolving the products in line with successful developments in other parts of the wider Himalayan mountain region.

Lessons learnt and study limitations

- There has thus far been very little or no official support for local vernacular heritage.

- Local bylaws on development need amending to include heritage conservation in urban developments.

- There are multiple layers of heritage and different values given to different heritages by different parts of the community in the region. Often, this means some are ignored or neglected, or at worst actively destroyed.

Kalasha woman living in the Hindu-Kush-Himalaya mountain region. Credit: Zahra Hussain.

Recommendations

For culture and tourism departments

- Regulate the influx of tourists in specific valleys throughout the year via tourist passes and permits.

- Develop outdoor heritage parks and trails to generate activities for tourists and exhibit the local landscape.

- Develop small marketplaces/ shops to exhibit local crafts and cuisine in main and side valleys. This must be operated in partnership with the local community who should derive the benefits from it.

- Conduct training for local communities, local support organisations (LSOs) and other stakeholders in sustainable heritage tourism practices.

For the Department of Archaeology

- Conserve/ protect material heritage apart from archaeological sites and celebrated heritage sites.

- Devise mechanisms for the documentation, protection and conservation of immaterial/ intangible heritage.

- The Fragile Heritage Economy (FHE) framework can be adopted to inventory tangible and intangible heritage assets.

- Convert vernacular houses/structures into guest houses/cultural centres through proper adaptive re-use strategies.

For local communities

- Use the FHE framework as a tool for documenting heritage assets and creating personalised inventories.

- Set up community-based heritage museums/centres.

- Showcase local crafts and cuisine at festivals.

- Document local cuisine.

- Conduct story-telling sessions with community elders for the awareness of young children.

- Conduct heritage walks with local children and tourists.

Image top: Kalasha street. Credit: Zahra Hussain.
Image left: Hindu-Kush-Himalays landscape and community members. Credit: Zahra Hussain.

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Issue 6.

Noteworthy lessons on the impact of climate change on intangible cultural heritage in Zimbabwe

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Project:
Inventorying intangible cultural heritage assets affected by Cyclone Idai in Chimanimani, Chipinge and Buhera districts in Zimbabwe, Marondera University (PI: Nomalanga Hamadziripi)

Partners:
Ministry of Youth, Arts, Sports and Recreation; Zimbabwe National Commission for UNESCO; Office of Secretary for Provincial Affairs and Devolution, Manicaland Province.

Duration:
February 2021 – May 2022

Aftermath Cyclone Idai and Cyclone Kenneth in Mozambique and Zimbabwe, pictures of affected villages taken from helicopter.
Credit: Miros, Adobe Stock

Problem statement and aims

Zimbabwe suffered the devastating effects of Cyclone Idai in 2019 when lives were lost, homes destroyed and livelihoods severely affected. The devastation and loss caused by Cyclone Idai in Zimbabwe also affected the intangible cultural heritage (ICH) assets of the communities in the Chimanimani, Chipinge and Buhera districts of Zimbabwe. These ICH assets include oral traditions, performing arts, social practices, indigenous rituals, kinship systems and indigenous food systems. The overall aim of the project was the recovery or restoration of the ICH of the Cyclone Idai-affected communities through inventorying the ICH assets. This study is of urgency to provide evidence-based information about the ICH of these affected communities that is useful for sustainable resilience, reconstruction and relocation of those communities. ICH is often damaged or destroyed in the aftermath of a disaster due to insensitive conservation, recovery and reconstruction, hence the project inventoried the affected ICH for safeguarding.

Methodology

The study used a mixed-methods approach. Semi-structured and structured tools were developed for the qualitative and quantitative methods. The research tools were discussed and pre-tested with the key stakeholders during the stakeholder sensitisation meetings. The interview guide was originally written in English then translated into Shona. The responses were given mostly in Shona or Ndau as Chipinge and Chimanimani are Ndau-speaking areas. The electronic questionnaire contained the following sections: domains of ICH; correlation between Cyclone Idai, ICH and climate change; impact of the cyclone on ICH, livelihoods and indigenous food systems; psycho-social impacts of Cyclone Idai on affected and non-affected communities. Quantitative data was captured on an android-based software called Kobo Toolbox, a free platform for collecting humanitarian and research data. With consent from the participants, all interviews were recorded and later transcribed.

Core themes, project achievements and research findings

Threat of climate change to intangible cultural heritage.

Climate change-induced disasters, such as Cyclone Idai, pose a severe threat to ICH including oral traditions, performing arts, social practices, indigenous rituals, kinship systems and indigenous food systems. The impact of climate change-induced disasters, such as cyclones, affects intangible cultural heritage assets including food production with subsequent impact on food security. Lack of maintenance and loss of traditional knowledge have increased the vulnerability of cultural heritage assets in many regions of the world.

Impact of Cyclone Idai on ICH

Cyclone Idai goes down in history as one of the foulest tropical cyclones on record to affect Africa and the Southern Hemisphere (Yuhas, 2019). It affected close to 2.2 million people in Mozambique, Zimbabwe and Malawi (World Vision, 2019). The findings reveal that Cyclone Idai caused considerable impact on ICH, including indigenous food systems and livelihoods. The other findings were that burial and mourning practices were breached, as well as the associated rituals and social relationships. The findings also revealed that while there was considerable impact on ICH, some practices were already waning before the cyclone and the cyclone simply accelerated their loss. Another interesting finding was that

Peacock area in Chimanimani, Zimbabwe. Cyclone Idai destroyed what was once a built-up and vibrant business centre where a number of traditional ceremonies were held by the local and traditional leadership. The ICH was destroyed with the place... the bricks are what remain. Credit: Dr Lesley Macheka.

the cyclone has caused some 'forgotten' practices to re-emerge, for example, the practice of performing traditional rituals before the onset of the rain. The latter finding was buttressed in the narratives where people strongly believe that the shunning of traditional practices can be the reason why the misfortune struck.

Lessons learnt and study limitations

Climate-induced natural disasters such as cyclones have an impact on ICH. In the case of Cyclone Idai, the following lessons were learnt:

- The impact of climate change on ICH is under-researched and, in most cases, undocumented, especially in Southern Africa. Moreover, there is little to no literature from Southern Africa on the impacts of climate-induced natural disasters on ICH.

- The impact of Cyclone Idai on ICH was multidimensional and all the UNESCO domains of ICH were affected. These domains include oral traditions, performing arts, social practices, indigenous rituals, kinship systems.

- There is a need to mainstream indigenous weather forecasting systems into risk reduction frameworks such as the United Nations Sendai Framework for Disaster Risk Reduction.

Recommendations

For government

- Mainstream ICH in disaster risk management and response protocols that focus on supporting culturally sensitive actions based on context-specific needs of communities. This means using indigenous knowledge and providing platforms for communities to collect, report and use local knowledge to mitigate and manage disasters.

- Strengthen the roles and responsibilities of local leaders in emergency response protocols – especially in contexts where national disasters are declared.

- Revise the mandatory moratorium on declaring death in emergency contexts. The current government stipulation/law of waiting for five years does not allow closure and healing for survivors.

- Increase awareness of ICH in disaster risk management institutions. More training is required for both government and non-government actors in the need to mainstream ICH in disaster risk management.

For departments of health and civic society
- Psychosocial support should be prioritised for different groups of people who were directly or indirectly affected by Cylcone Idai, i.e. victims, first responders, traditional leaders and host communities, so that they understand those being relocated in their spaces.

For civil protection and researchers
- Develop a resource manual on safeguarding and mobilising ICH in disaster contexts.

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Yuhas, A. (2019). Cyclone Idai May Be 'One of the Worst' Disasters in the Southern Hemisphere. Article from New York Times, 19 March 2019.

Cyclone Idai killed hundreds of people and destroyed infrastructure and crops in Chimanimani Zimbabwe. Credit: Steve Mathambo Ngoma, Shutterstock

Issue 7.

Multiple facets of traditional land management systems crucial to evaluate effects on a single issue such as adapting to a changing climate

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Project:
Mitigating climate change effects through traditional land management practices, Royal Botanic Gardens Edinburgh (PI: Alan Forrest)

Partners:
Royal Botanic Garden Edinburgh (RBGE); University of Edinburgh (UoE); General Organization for Antiquities and Museums, Yemen (GOAM); Arab Regional Centre for World Heritage (ARC-WH).

Duration:
October 2020 – December 2022

Diqelwel leem, Modified natural depression for water collection and storage in remote arid landscape on Soqotra.
Credit: Julian Jansen van Rensburg.

Problem statement and aims

The Soqotra Archipelago has long been renowned for its natural heritage and was inscribed in the World Heritage List in 2008 for its unique and rich biodiversity. The cultural heritage of Soqotra, however, has been little studied despite the demonstrated value placed by the Soqotri people on the links between natural and cultural heritage – links that have been almost totally ignored in formal conservation programmes.

Within living memory, the people of Soqotra have relied on their traditional knowledge systems to manage their livestock and survive in periods of extreme weather conditions – a traditional knowledge that is being lost as development proceeds and young people are less interested in their traditional ways of life. These traditional knowledge systems have evolved over millennia to cope with the extreme and unpredictable weather patterns and may hold some answers as to how climate change can be adapted to locally. The current practitioners are the last of a generation with the knowledge from which we can learn, lending an urgency to the collection of this knowledge.

The aim of the project is to better understand whether the linkages between climate and a traditional way of life have contemporary relevance, and to propose recommendations to a range of stakeholders as conservation practices on Soqotra are revised in the face of climate change.

Methodology

To capture contemporary views and practices and community perception of changing climate and land management, a series of questions we prepared for a diverse array of communities on Soqotra that could be compared with historical knowledge and similar interviews undertaken in the 1990s and 2000s.

Local climate station data has been compared to re-analysed regional ERA5 data to give a picture of changes in regional climate since the 1980s and to compare this with community perceptions of climate change and extreme weather events.

Following initial results further exploration of the value of animals, and how this may be adapted to bring about sustainable climate-proof systems, is ongoing.

Core themes, project achievements and research findings

The climate of Soqotra and the western Indian Ocean

The climate of Soqotra is complex and varies over short distances based upon a variety of local and regional influences. Little is known about the changing climate in the western Indian Ocean and its potential effects on Soqotra. ERA5 data was used to examine and address this in the light of (a) community perception of the changing climate, and (b) the detection of trends since 1980 and projection into the future. It was NOT the intention to apply broad scale regional data to topographically influenced modelling on a small island.

While a trend of increased precipitation can be seen, this is strongly influenced by a small number of extreme events in recent years that could have occurred by chance. Even so this has implications for water availability and storage in a complex island system dominated by a karstic landscape. It is also clear that a

full appreciation of water availability and recharge is still lacking, including the relevance of fog in terms of both plant growth and water availability.

Contemporary value of traditional land-use management practices

In the east of Soqotra, traditional herding and transhumance are still practised to a large extent. In this area, the largest family expense is food for the family, followed by animal feed. In the south, where these traditions are rarely practiced, the biggest expense is supplementary animal feed. In drought years, the cost of this supplementary feed can plunge families into debt. Moreover, in drought years these communities no longer know where to access traditional water sources or store/use it sustainably, which can result in great hardship. People are gathering less fodder and spend less time herding and managing animals. Those that are moving their animals to different areas are doing so primarily because they cannot afford supplementary feed in times of drought.

Until all facets of animal management are coordinated in a systematic approach it will not be possible to implement sustainable solutions to these connected issues.

The wall system of Soqotra. Soqotra is covered by a network of wall systems – no longer maintained – that are interpreted as land and water management systems in a karstic landscape.
Credit: Julian Jansen van Rensburg.

Re-evaluation of the drivers of traditional land-use scenarios

The main driver of traditional land-use practices was the management of animals, as these gave fundamental products such as meat, milk and wool. This is no longer the case: food and drink are purchased (as seen from this being the largest cost to families in many areas) and cloth is imported. Therefore, in order to manage animals in a way that is more sustainable and in tune with a varied and changing environment the animals must attain added value.

This is being addressed through more detailed interviews with a subset of communities to address animal value and associated sustainable land management. These will also consider societal impacts, such as long-term grazing, accommodation while herding, and the requirements of communities in a development scenario.

Lessons learnt and study limitations

- Study limitations: climate data. The island is so topographically diverse that accurately predicting future climate scenarios over extremely small spatial scales is methodologically problematic and potentially irrelevant: the likelihood of a range of small-scale local interventions being proposed, implemented and monitored is low due to a lack of resources and capacity. This is compounded by a lack of knowledge of certain components (water catchment and use, land tenure, etc). This is a result of cost/benefit considerations: it is hard to justify a large amount of resources to propose solutions for a small, isolated and potentially unique cultural and geographical system.

- It is clear that land management practices, animal husbandry, water storage and access solutions have changed over the last decades, but in different ways in different communities. There is a challenge to design and implement solutions island-wide in a sustainable way. Direct comparison with a range of additional island systems would be of value to share experiences.

- There are many external actors on Soqotra and it has become clear that (a) local community requirements are not being addressed systematically and (b) fundamental requirements such as Environmental Impact Assessments (EIAs) are not being applied. Systematic planning is not being undertaken and the application of sustainable resources is not being addressed. The voices of local communities and actors on Soqotra are not being heard: external actors and finances have a strong influence in both a political and a scientific context.

Recommendations

For United Nations member states

- Insist on long-term sustainable solutions that are resource-enabled and monitored while retaining flexibility across diverse
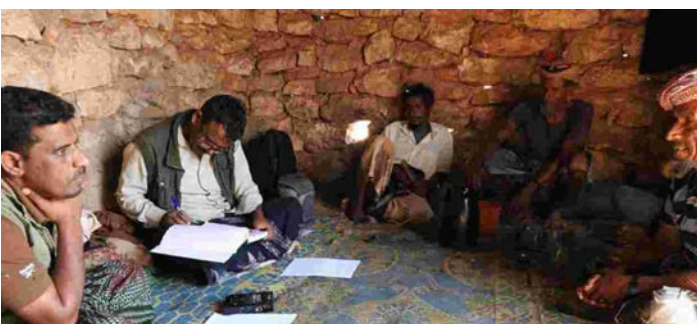
Soqotra Community Interviews. Members of the project team interviewing community members about their traditional land management practices and how it relates to their knowledge of local climate. Credit: Soqotra Heritage Project.

landscapes and in rapidly changing development scenarios;

- Listen to the voices and experiences of communities alongside – not instead of – reliance on externally funded and analysed scientific data.

For United Nations agencies
- Examine funding and support activities that take into account all sectors of society and subject areas, e.g. on Soqotra there has been an exclusive focus on biodiversity while ignoring cultural heritage, and of promoting humanitarian assistance without considering biodiversity or cultural heritage in implementation;

- Ensure all United Nations agency-funded activities follow best practice, e.g. when considering humanitarian responses consider EIA, heritage value and conservation,

sustainability rather than focusing on a single short-term solution;

- Even where external resources are required, ensure local direction, implementation and management with a focus on developing sustainable income streams decoupled from external sources.

For civil society and the private sector
- Civil society and private sector bodies based on Soqotra have little involvement in heritage conservation and planning – this requires examination prior to recommendations for a more inclusive approach;

- Demonstrate best practice in project implementation as an example to all actors and agencies.

Image left: Dragon Blood tree felled by recent cyclones on Soqotra, impacting livelihoods and the traditional knowledge used to manage natural resources. Credit: Soqotra Heritage Project.

Image right: Members of the Project Team in transit to community interviews, through an arid landscape resources. Credit: Soqotra Heritage Project.

References
None cited.

A participatory approach to mapping, measuring and mobilising cultural heritage in Brazil's Iron Quadrangle

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Project:
Roots of resilience (ROR), Queen Mary, University of London (PI: Paul Heritage)

Partners:
Inhotim Institute (Brazil); Corporação Musical Banda São Sebastião (Brazil); Casa Quilombê (Brazil); Fundação Cultural Carlos Drummond de Andrade (Brazil); Grupo Atrás do Pano (Brazil); and Associação Cultural Clube Osquindô (Brazil).

Duration:
July 2020 – December 2022

Young trombonist Letícia Rafaelli de Oliveira Fernandes playing in a deactivated mine in the city of Mariana, Minas Gerais, Brazil. Credit: People's Palace Projects.

Problem statement and aims

The roots of resilience (ROR) research project addresses an acute threat to Brazilian cultural heritage: the imminent risk in Brazil's Iron Quadrangle from catastrophic natural and humanitarian disasters resulting from industrial mining. The Iron Quadrangle is a region of rich cultural, environmental and historical value but also the site of Brazil's largest iron ore reserves. Despite the unique cultural significance of Brazil's Iron Quadrangle, there has been no systematic research to measure the impact of recent disasters on the region's cultural heritage or on the lives of local communities: two major landslip and flood events in 2015 and 2019 resulted in the loss of almost 300 lives and wreaked environmental devastation along a 1000km watershed. The project's aim is to contribute to the development of community-based research practices that will strengthen the integration of cultural heritage sustainability into national disaster and risk reduction strategies in Brazil.

Methodology

ROR used the 'Relative Values' (Arts and Humanities Research Council-funded research project) methodology, developed by People's Palace Projects (PPP) to evaluate the socio-economic impacts of cultural organisations in a participatory and co-created way. To understand the context of the participating organisations, their actions and impacts on their audience, and to develop a hazard perception diagnosis, we use secondary and primary data collected through 489 survey questionnaires administered with organisations' target audience, beneficiaries and local networks, and 15 semi-structured interviews conducted with two or three members from each organisation, all analysed combining quantitative and qualitative methods. Local partners were engaged at every stage of the research development, delivery and dissemination.

Core themes, project achievements and research findings

Socio-economic impacts of partner organisations

The data collected has demonstrated the role cultural organisations play in promoting well-being for their communities as well as their members and/or employees, especially in times of crisis. These organisations promote the development of interpersonal and professional skills and position the cultural and educational sectors as a means of employment and income generation, offering an alternative to the mining-dependent production chain that dominates opportunities for the inhabitants of the Iron Quadrangle. They also produce important connections between communities and territory, history, culture and local cultural heritage, all of which are considered fundamental to heritage preservation, in the transmission of practices and traditions as well as in generating investment.

Hazard perception diagnosis

Amongst the environmental threats noted by respondents, the rupture of new tailings dams is the most feared. However, survey respondents are also highly concerned about the exploitation of natural resources and other threats that are predominantly under the control and influence of public authorities. Dialogue between communities and public authorities was highlighted as critical in ensuring the implementation of policies to preserve cultural and environmental heritage and to contain climate change. The research has highlighted that mining, despite its

economic importance, should be managed according to the precautionary principle to reduce its negative impact on human lives and the environment.

Co-creating inventories of the Iron Quadrangle's heritage

Our partner organisations took part in immersive arts workshops and training sessions that allowed them to co-create inventories of their cultural practices and assets. This data, these stories and this cultural knowledge are now available to local teachers, policymakers and local authorities, to help establish what role cultural heritage can have as part of a process of transformation, resilience and regeneration.

Lessons learnt and study limitations

- Cultural heritage is a tool to build capacity and resilience in local communities facing environmental disasters and climate change.

- Disasters are not natural: it is essential to develop and strengthen a culture of risk reduction and disaster prevention.

- Climate change increases the existing risks that mineral exploitation places on communities and on cultural and natural heritage in the Iron Quadrangle.

Thiago SKP (right) – Rap artist from Itabira – performing his song Quanto vale? written as part of the research for Roots of Resilience. Thiago's performance was part of a public seminar at the theatre of the Carlos Drummond de Andrade Foundation. The graffiti by Derio Di Carvalho (left) represents the song's lyrics. Credit: People's Palace Projects.

Recommendations

For United Nations (UN) member states and international agencies

- Recognise culture as a human right, integrating a cultural dimension in risk prevention and impact mitigation planning.

- Support and expand research around the impact of disasters and climate change on local and regional cultural heritage.

- Include local cultural knowledge and practices in risk management and impact mitigation planning.

For regional and local stakeholders

- Support and expand research around the impact of disasters and climate change on local and regional cultural heritage.

- Value the knowledge and cultural practices of local communities to preserve cultural and natural heritage.

- Mobilise local and regional stakeholders, organisations and the creative sector to define priorities and seek collaborative solutions to the current natural and manmade challenges.

Mining landscape in the city of Itabira, place of origin of the Vale company. Credit: People's Palace Projects.

For Iron Quadrangle's public stakeholders

- Foster the region's creative economy through municipal and/or regional policies, recognising the socio-economic importance of local cultural heritage in the Iron Quadrangle and its potential to diversify the local economy.

- Strengthen participatory bodies, engaging local communities to support cultural management and governance in risk management.

- Establish an educational programme for young people that can help to raise awareness about the importance of cultural heritage in the region and the impact of climate and environmental disasters there.

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Issue 9.

Understanding climate vulnerability and promoting adaptation planning by improving preparedness measures for African cultural heritage sites and communities

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Project:
Values-based climate change risk assessment: piloting the Climate Vulnerability Index for cultural heritage in Africa (also cited as CVI Africa), Queen's University of Belfast (PI: William Megarry)

Partners:
Tanzanian Wildlife Authority (Tanzania), Union of Concerned Scientists (USA), International Council on Monuments and Sites (France), The Climate Heritage Network, Historic England (UK), International National Trusts Organisation (UK), ICOMOS Nigeria (Nigeria), American University of Yola (Nigeria), National Museums Tanzania (Tanzania).

Duration:
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World heritage site, the oldest Standing Mosque Kilwa Kisiwani. Credit: Mbwana, Adobe Stock.

Problem statement and aims

In many regions of Africa the risks from climate change are pronounced, as temperature increases in these regions are projected to be higher than the global mean increase. These risks have been starkly illustrated in numerous recent reports, which show that Africa – and its heritage – are particularly vulnerable. How those who care for cultural heritage respond to these threats has profound implications for the wider culture and development of many countries. The CVI Africa project has improved preparedness measures for African cultural heritage sites and communities by embedding vulnerability assessment into heritage practice, investing in the time-critical need to put cultural heritage onto a new pathway for longer-term resilience-building and change management processes. This has been particularly important in light of the current and anticipated impacts of climate change and natural disasters.

Methodology

The CVI Africa project has two key steps. First, it provided remotely delivered foundational training to a cohort of eight African heritage professionals in climate vulnerability assessment of cultural heritage sites. This course included modules on World Heritage, climate science, values mapping and vulnerability assessment techniques. Secondly, it embedded this learning by organising and running hands-on workshops at two World Heritage properties in Tanzania (The Ruins of Kilwa Kisiwani and Ruins of Songo Mnara) and Nigeria (The Sukur Cultural Landscape). These workshops use an established approach called the climate vulnerability index (Day et al., 2020). These workshops were science-driven and community-led, focusing on local concerns and assessing vulnerability based on input from local stakeholders on values and adaptive capacities. Hybrid formats also allowed for wider participation and engagement. These results provided an assessment of both

Table: CVI Consult rapid assessment of OUV Vulnerability to the identified three key climate stressors. Assessed values of exposure, sensitivity and adaptive capacity contribute to derived outcomes for potential impact and OUV Vulnerability. Colours refer to the elements of the CVI framework (Figure 4.1).

Key Climate Stressors:	Intense precipitation events	Sea level rise (trend)	Coastal erosion
Exposure	Very likely	Possible	Very likely
Sensitivity	Moderate	Moderate	High
Potential impact	High	Moderate	Extreme
Local management response	Low	Low	Low
Scientific/technical support	Low	Low	Moderate
Effectiveness	Moderate	Low	Low
Adaptive capacity	Moderate	Low	Low
OUV Vulnerability	Moderate	Moderate	High
Combined OUV Vulnerability	Moderate		

CVI Consult rapid assessment of OUV vulnerability table.

heritage and socio-economic vulnerability at both properties as well as an assessment of the utility of the technique within an African context (Day et al., 2022, Heron et al., 2022).

Core themes, project achievements and research findings

The need for increased training to boost the preparedness of heritage professionals in Africa and globally.

There is a time-critical need to improve preparedness measures for African cultural heritage sites and communities. Traditionally, the heritage sector has been reactive to global challenges; however, by putting cultural heritage onto a new pathway for longer-term resilience-building and change management processes, in the light of the current and anticipated impacts of climate change and natural disasters, there is an opportunity to be proactive in our response to climate change. Its impacts are increasing at an alarming rate and there is an urgent need to prepare heritage professionals to respond effectively, especially in worst-affected countries.

The need for standardised, replicable yet adaptable tools and methodologies to assess the vulnerability of heritage sites and their communities.

The International Council on Monuments and Sites (ICOMOS) has noted that, "…climate change has become one of the most significant and fastest-growing threats to people and their heritage worldwide…" (ICOMOS, 2017). Climate change will affect, directly or indirectly, all cultural heritage sites around the world. These impacts will disproportionately affect cultural heritage in the global south and in Africa in particular. There is a critical need to prepare sites and communities for this impending threat, yet the heritage sector lacks tools and methodologies to achieve this.

Vulnerability assessment tools are among the most important as they lay the framework for adaptation planning. The CVI Africa project assessed the utility of the CVI technique in an African context and illustrated the importance of malleability in challenging environments and contexts.

The importance of meaningful knowledge exchange and capacity-building

Climate change is a geopolitical issue, which will affect all heritage sites. From Stonetown in Zanzibar to Stonehenge in the UK, the experiences of heritage professionals with be both different and similar. There is huge benefit in sharing knowledge across borders and cultures. Traditional models of knowledge transfer have favoured top-down educational pedagogies rather than more meaningful and democratic knowledge exchange that benefits all. Locally developed solutions may be place-specific, but they may also be transferrable to other sites and contexts. This will be especially relevant in parts of the world with longer histories of climate action and adaption.

Lessons learnt and study limitations

- The utility of alternative educational pedagogies to increase inclusion in training, enabling participation from a wide range of people.

- The importance of taking a values-based approach to vulnerability, working with diverse stakeholders including the local community, to identify a plurality of values, which are not solely limited to built heritage.

- The value of transdisciplinary approaches that engage with climate science to use downscaled climate models to explore climate impacts on a local and site-specific scale.

- The equal importance of training local heritage professionals to interpret, understand and apply these models in practice.

- The importance of co-creation and dissemination (including translation, authorship, acknowledging and respecting other knowledge systems) when running and delivering projects.

Recommendations

For policy review bodies and research organisations

- To fund projects that lead to, or continue to build, meaningful and ongoing relationships with research partners, avoiding potentially exploitative short-term research.

- To focus on working internationally to develop new tools and methodologies that are malleable, transferrable and inclusive in their methodologies and application.

- To encourage projects that prioritise inclusion and accessibility, especially for minority groups. This might include online elements or adapting existing methods to promote greater involvement.
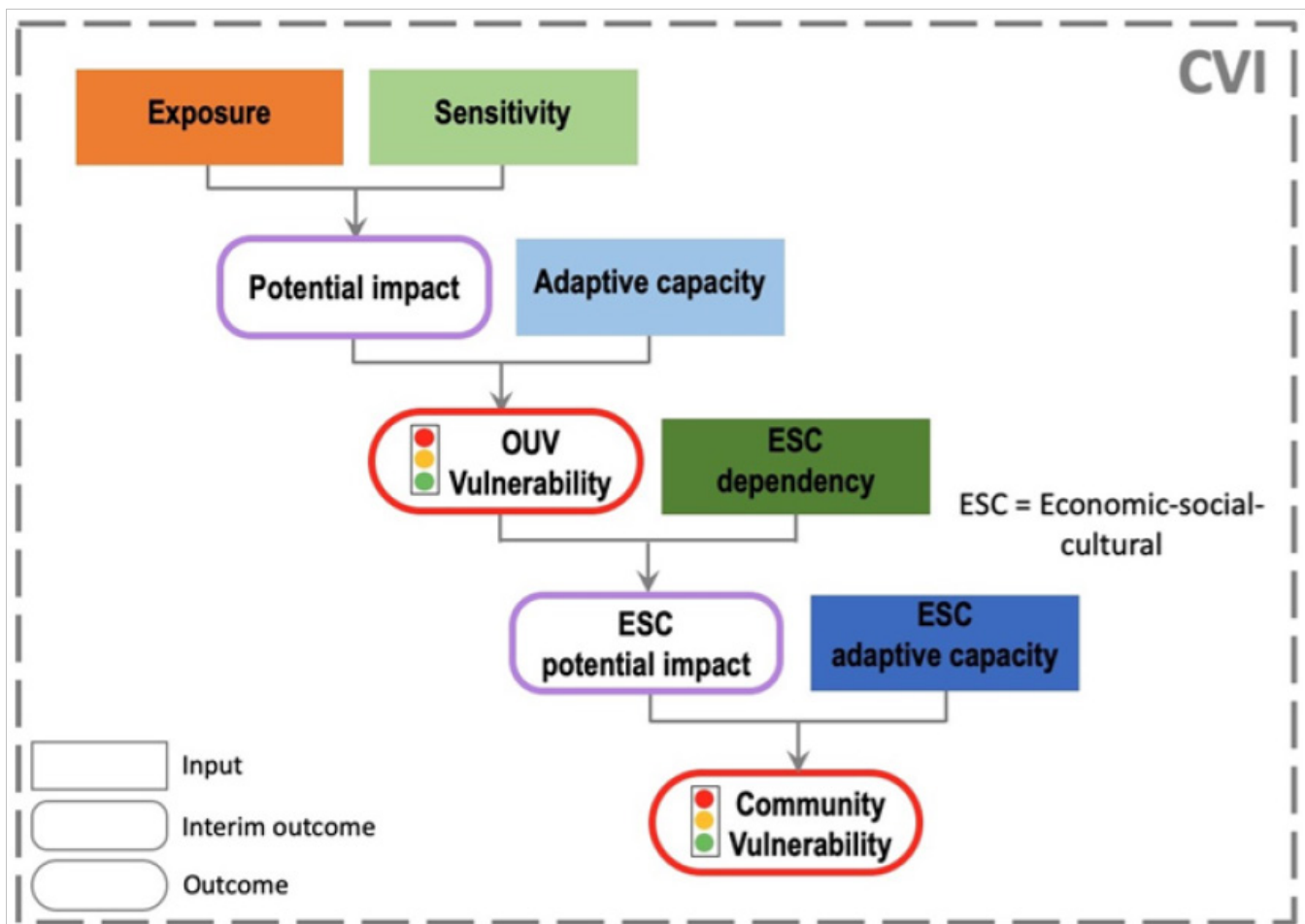
The Cultural Vulnerability Index (CVI) framework to undertake the assessment of climate change vulnerability of World Heritage property and associated communities. Credit: Day et al. 2019.

For funding bodies

- Research funding prioritises projects that follow empirical methodologies and deliverables representative of western scientific knowledge systems. There is a need to fund other approaches that respect a plurality of knowledge systems including local and indigenous knowledge. To achieve this, there is a need to expand review panels for funding calls to include a wider range of reviewers from diverse backgrounds.

- Money is power in research. This means that western researchers remain in control of research projects, making meaningful co-creation difficult. There is a need to include exceptions for international research to make financing in-country researchers easier, targeting less-represented countries with fewer post-colonial links.

For national and international heritage bodies

- To ensure that tools and methodologies are transferrable, scalable, adaptable and replicable at different site types and scales.

- To facilitate and fund continual professional development for staff to learn new tools and methodologies to prepare for climate impacts, and to build these mechanisms into job descriptions.

- To incorporate climate vulnerability assessment into periodic reporting mechanisms for all heritage sites and to incorporate results into management planning cycles.

- To promote the inclusion of cultural heritage into state and sectoral adaptation plans.

Sukur Cultural Landscape. DipoTayo, CC BY-SA 4.0, via Wikimedia Commons.

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Lessons learnt and recommendations

Flood affected village in Northern Bangladesh. Credit: Abdul Momin, Adobe Stock.

This final section outlines the lessons that have been learnt across the CHCC Cohort and the recommendations for policymakers, funding bodies in the arts and humanities, researchers and practitioners working on cultural heritage preservation, management and enhancement for current and future generations, as well as on climate change and disaster risk preparedness and management.

Lessons and recommendations are derived from best practices and challenges faced over the 18-month funding period across all nine projects, including new learnings and opportunities from the COVID-19 pandemic.

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Lessons learnt and recommendations for policymakers, funding bodies, researchers and practitioners

The following lessons and recommendations are covered in this section:

- Communicate to stakeholders through language translation and data access;

- Identify target audiences and stakeholders for research and policy impact;

- Promote holistic and integrated frameworks in heritage research;

- Develop active channels to co-design and incorporate learnings into national and local policymaking;

- Decolonise funding models to make research participants, particularly indigenous and local communities, empowered stakeholders;

- Encourage flexible financing to support investigators in collaborating countries;

- Foster continuity within research workstreams for more sustainable and impactful research projects;

- Learning from COVID-19 with respect to all stages of the research process.

Lessons learnt

1. Communicate to stakeholders with outputs that are translated into multiple languages and in accessible mediums.

The lack of translation of research outputs into local languages and into mediums that all stakeholders can gain access to is a consistent challenge across academic research in the UK. The literature on dissemination of research findings is dominated by the health sciences but literature in the humanities and social sciences remains limited. Projects in this workstream span a wide geographical area with multiple languages locally and nationally. Many of the communities covered, as well as local policymakers, have limited access to trusted information on issues such as climate change impacts and adaptation and disaster risk. Access to research outputs cannot be taken for granted and the ethical imperative to disseminate research findings could be considered a social contract for researchers in receipt of public funding (Castree, 2016). In this context, particular attention needs to be paid to bridging the 'digital divide' existing between different geographical areas (north/south, urban/rural) and communities as well as between UK institutions and overseas partners. This may include the distribution of physical resources (e.g. internet data, digital devices, etc.) if there is limited or no access to the internet, and collaboration and buy-in from individuals who can help translate (culturally and linguistically) for local stakeholders.

2. Identify relevant audiences and provide targeted, clear messages to achieve greater impact.

Researchers have a vital role in bridging between local groups, practitioners and policymakers. They can help to identify challenges facing local-scale cultural heritage and opportunities to enhance local-scale capacities in response to impacts of climate change and natural disasters. However, there is a tendency for academic researchers to produce outputs that appeal to a niche or a very general audience who can interpret and apply findings to common issues or (research) agendas (Barry and Born, 2013). As a result, this approach has a greater application to academic impact than impacts on policy and practice, for example as part of the Research Excellence Framework (REF). Identifying relevant policymakers and practitioners at the local and national levels, supporting their engagement at all stages of the research project, and communicating clear lessons based on project findings, are all crucial to promoting policy-relevant research. Moreover, the safeguarding of cultural heritage in its tangible and intangible forms requires the sustained participation of multiple local, national and – in many cases – international actors. This requires not only buy-in but also the recognition of ownership, particularly among local groups.

3. Promote holistic and integrated frameworks in heritage research.

This AHRC call highlighted the importance of 'integrated understandings of the local, cultural and historic contexts of cultural heritage' and the need to engage with 'local knowledges, expertise and communities' (AHRC, 2020: 7). In addition, the call encouraged exploration of the challenges and debates associated with cultural heritage (e.g. what cultural heritage means in different cultural contexts). Integrated frameworks that are built upon a critical study of cultural heritage in its local, placed context provided sufficient flexibility for each research project to challenge the conventions of normative (e.g. off-the-shelf) risk assessments that have a disproportionate focus on impacts on the material fabric of cultural heritage sites. Across the project groups, a diverse range of heritages emerged and a range of existing and new risk tools provide a novel – transferrable – means of studying climate change and disaster impacts and adaptation.

More holistic approaches to heritage and the development of vulnerability and risk assessments may include in-depth studies that focus on local cultural values and the entanglement of natural and cultural heritage (see for example Barnes et al., 2013). This in-depth approach was utilised for example in the CRITICAL project, which includes a study that questioned how we define risk in analyses of climate impacts on cultural heritage (Crowley et al., 2022). In this context, it is important to develop approaches able to overcome the nature-culture dichotomy, often not recognised by indigenous and local communities, in the understanding of the complex interface between climate impacts and adaptation. For this reason, a standard risk assessment tool would not adequately capture the interface

between local values, held by indigenous groups, and climate change impacts that pose risks to their lifeways. Moreover, institutional partnerships between academia, NGOs and governmental institutions will support a better integration of heritage research into climate change and disaster risk management policy frameworks and practical actions.

4. Develop flexible financing and research management to support investigators in collaborating countries outside the United Kingdom.

Flexible financing and resource management from funding councils, where collaborating countries outside the UK have greater autonomy over the direction of the research project, could support researchers in LMICs and provide new and insightful directions to research workstreams and policy. The findings discussed in this report have shown how giving more project ownership and data collection responsibility to local partners has positively influenced the projects' success. This process has also been boosted by the outbreak of the COVID-19 pandemic which, with international flight restrictions and national lockdowns, limited opportunities for UK researchers to conduct fieldwork and on-the-ground research. Additionally, the COVID-19 health crisis has encouraged the development of new or additional resources (e.g. long-term training materials), often with the purpose of sharing those with local partners. While the pandemic has supported the reallocation of research funds across projects to support local collaborators and provide them additional autonomy in the research direction at local levels, it is still urgent to redistribute research funding to give greater autonomy and responsibility to investigators in LMICs for the implementation of equitable partnerships.

5. Decolonise funding models to make research participants empowered stakeholders.

Funding models in the UK support dominant modes of thinking and research trends that are conducive to the Western academy. This could stifle originality and the ability of co-investigators and research participants in LMICs to direct the research agenda. Decolonising funding models and research practices should develop a participant-centred model that gives financial resources and control over the direction of funded projects. Such models should go beyond the hyperbole of transdisciplinary research, where research participants hold sway over the direction of the research project, to empower their own decisions about what the focus of the project should be and how theory is used to guide and frame research subjects.

Decolonising funding models should recognise the political and economic question underpinning all research: who gets what? This is an inherently challenging question that those who draft research calls and principal investigators have power to address. National funding councils will necessarily support research excellence in home institutions, but financial arrangements can be rigid and create barriers to funding that departs from western orthodoxy and forms of payment. For knowledge exchange to be equitable, research partners in LMICs need to hold equal power and control over research finances.

6. Continuity and flexibility within research workstreams for sustainable and impactful research on cultural heritage in the context of climate change and disasters.

Establishing trust relationships between UK institutions, researchers and local partners requires long-term engagement and a deep understanding of local realities. This process is only possible with sustained funding, which is a significant challenge for international research collaborations. Without sustained funding over multi-year funding cycles, there will be a lack of follow-through on the learnings from projects studying climate and disaster impacts on cultural heritage. Funding flexibility is another key aspect in this context. The AHRC's flexible approach to funding and project duration during the pandemic, for instance, has been of great support to the effective achievement of the projects' outcomes during these challenging times.

As highlighted in the 2019 Futures of Our Past report by ICOMOS, the safeguarding of cultural heritage – both tangible and intangible – necessitates ongoing monitoring and support at the local scale. For research funding, this means a continuity within workstreams that maintains focus on core priorities, such as risk assessment and supporting local capacities to adapt to change, while building in new research insights to inform new research and policy priorities.

An african carpenter during work takes a board of wood to be cut. Credit: Media Lens King, Adobe Stock.

7. Develop active channels to co-design and incorporate learnings into national policymaking.

Making space for active participation in, and delivery of, project recommendations could help shape more impactful recommendations on cultural heritage management in the context of climate change and disasters. In a review of 'how to' guides on policy impact, Cairney and Oliver (2020) warn of the bias towards 'heroic scientists' overcoming odds and highlight the uneven incentives, opportunities and payoffs at the science-policy interface, particularly for underrepresented groups. Opportunities to work with policymakers to communicate and incorporate learnings from local research participants (who are often not recognised as the experts they are) into policy would provide a more transparent and inclusive interface between academic research and policymaking.

Developing a strong community of practice between the diverse networks that make up the cultural heritage sector requires financial support to connect and sustain knowledge exchange and influence policymaking. The projects funded in this call comprise collaborations between academics from a range of disciplines, practitioners, arts organisations and policymakers with important contributions to, and stakes in, the safeguarding of cultural and natural heritage. All projects underline the importance of sustained funding to support multi- and transdisciplinary projects to understand diverse representations of heritage and develop novel methodological toolkits to address and address risks created by climate change and natural hazards.

8. Learning from COVID-19 with respect to all stages of the research process

The pandemic encouraged researchers to transform the research design of the projects. COVID-19, for many, presented as an opportunity to redefine the projects in a more flexible, adaptive manner that better corresponded to the changing pandemic context. New research designs were less rigid and encouraged additional knowledge exchange with local partners. COVID-19 brought about a change in perspective regarding contingency planning. With human and travel restrictions in place, contingency plans became essential to guarantee the effective use of research funding for the completion of projects' goals.

COVID-19 impacted research practices, including their methodologies. With a process of shifting the data collection into the hands of local partners, for example, additional training has constituted an essential part of research designs and should be taken into consideration in the definition of the new project methodologies.

Not all changes to project research designs, communications, and practice will remain after COVID. The cohort argued that, in some cases, COVID brought about the finding of 'clumsy solutions' rather than 'elegant failures'. These solutions are not ones that will remain as part of research practice, but they could contribute to a general change of perspectives as to how we approach research in the first place. Therefore, these nine projects and their experiences constitute important lessons we can learn from, not just in relation to COVID-19 but also for future pandemics, disasters or other challenging contexts.

Recommendations

This final section provides a selection of recommendations to policymakers engaged in safeguarding cultural heritage and supporting international development, including climate change adaptation and disaster relief.

1. Recognise the existence of multiple heritage assets and their significance for diverse communities, and mainstream them in disaster risk management, climate adaptation strategies and response protocols.
A comprehensive understanding of cultural heritage in all its components – tangible and intangible, cultural and natural – and their interconnections constitutes the first critical step for their effective safeguarding over time. In this context, local populations must be involved in the recognition and interpretation of heritage assets and values to promote inclusive approaches, while also increasing awareness of multiple heritage narratives.

2. International development funding should support local groups, especially minority groups, to make their own decisions.
Empowering communities to make decisions about their own heritage is essential to protecting the diverse and changing expressions of cultural and natural heritage that are threatened by climate change and natural disasters. Policymakers should prioritise inclusion and accessibility and allocate funding to support local-scale capacity building that is sensitive to local cultural traditions by putting decision-making in the hands of local stakeholders. A wider challenge is to roll out a sustainable financial model for engaging local stakeholders and developing a legacy through active and sustained engagement.

3. Open access datasets are needed to support local-scale capacity building.

Local heritage organisations and local and national governments in LMICs need access to datasets to assess risks to their cultural heritage assets. Making project data from UK research councils available to relevant stakeholders requires: (1) translation into local languages, (2) recognition of different cultures of knowledge production in professional, academic and government spaces, and (3) different levels of access to online and public information. Dissemination of research findings should therefore include active collaboration with relevant stakeholders to provide accessible and trustworthy datasets that can be used to conserve cultural heritage.

4. Constructing effective networks of stakeholders whose values influence the assessment and management of risks to cultural heritage should start from the bottom-up.

This will foster a more inclusive research and management culture for safeguarding cultural heritage in anticipation of (and in response to) the impacts of climate change and natural hazards. Breaking down the silos between different academic disciplines, policy departments and professional sectors is required to overcome the lack of communication across different actors and, therefore, the development of more integrated and interdisciplinary solutions.

Ruins of Mtoni palace in Zanzibar, Tanzania. Credit: olyasolodenko, Adobe Stock.

5. Understanding risk to cultural heritage requires an effective dialogue with relevant stakeholders.

To achieve this dialogue, local interest groups should be identified, included and empowered to make decisions about the research focus (i.e. what are the research questions?), the characterisation of cultural heritage (i.e. what is cultural heritage?) and what is at risk (i.e. what is of value to interest groups?). Moreover, the role of local leaders should also be strengthened in emergency response to make sure that policy measures and protocols are implemented on the ground by local communities.

6. Invest in education and outreach following cultural heritage research projects.

Impact through accessible education resources and public outreach should be a legacy of public funding. Financial resources should be allocated for online and in-person education and training resources about managing cultural heritage in the context of climate and natural hazard risks. Several projects in this report developed online platforms and in-person workshops to share diverse knowledge and skills relating to cultural heritage values and the impacts of climate and disaster impacts.

7. Support organisations that engage communities in creative arts, crafts and traditional practices to foster climate action.

Creative arts and cultural heritage organisations play an essential role in expression, identity and recognition, especially in disempowered groups who are vulnerable to climate change and natural hazards.

8. Fund successful projects over multi-year cycles to create impact.

Identify successful projects and continue to resource collaborations with partners in LMICs. This will create a more impactful legacy for the project and contribute to capacity-building through the identification of risks to – and continued monitoring of – cultural heritage. There is also further potential to work with governments and NGOs to develop appropriate adaptation action plans.

9. Design risk tools and methodologies that can be used by academics and heritage managers internationally.

Risk tools and methods need to be transferable, scalable and adaptable between national and cultural contexts to effectively identify and respond to climate and disaster impacts. This requires financial resources for the following: (1) language translation services, (2) engagement with local communities to build trust, (3) knowledge exchange between researchers and heritage managers, and (4) open access education and training resources that are available internationally.

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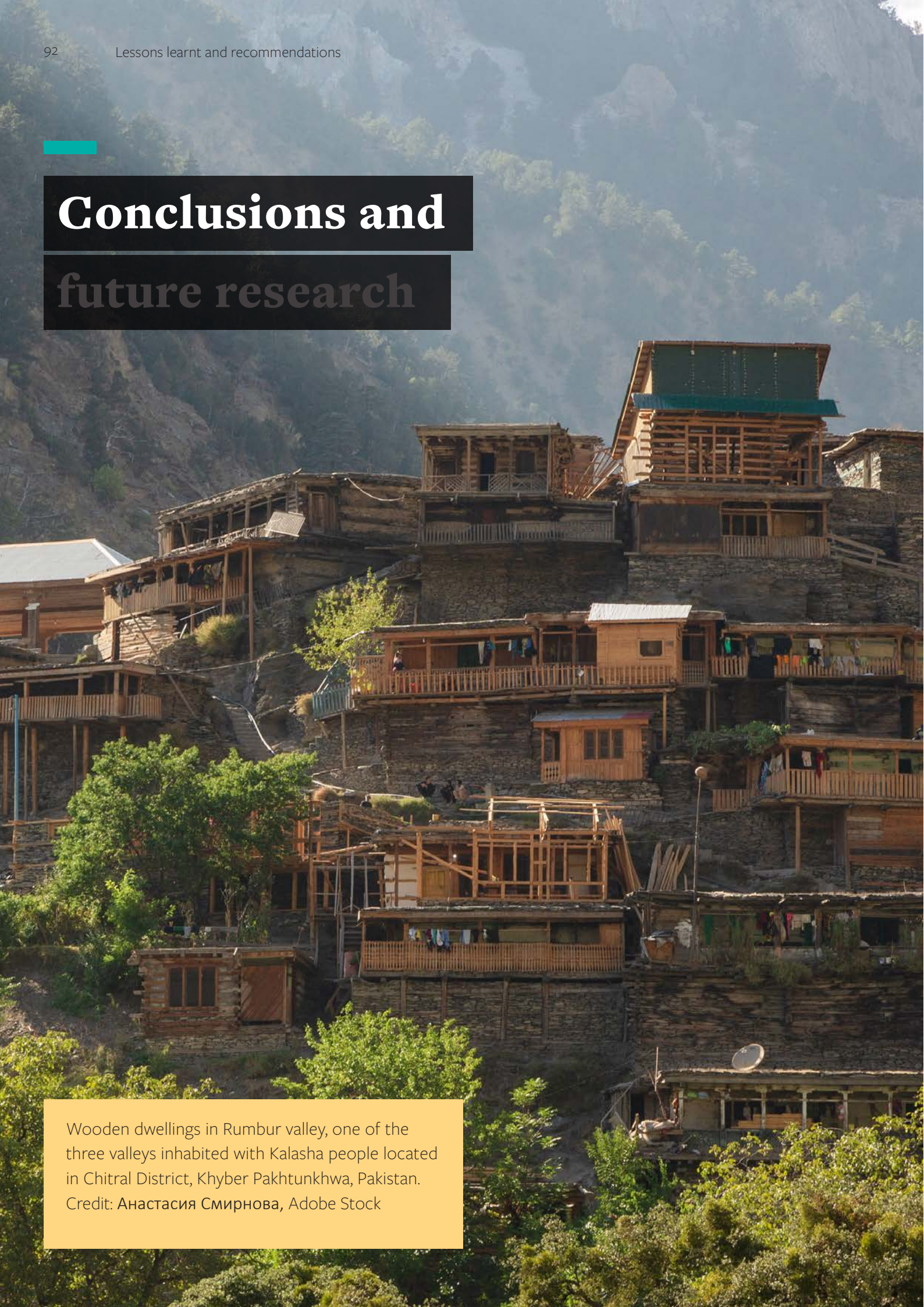
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Conclusions and
future research

Wooden dwellings in Rumbur valley, one of the three valleys inhabited with Kalasha people located in Chitral District, Khyber Pakhtunkhwa, Pakistan.
Credit: Анастасия Смирнова, Adobe Stock

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This report has provided a synthesis of the achievements of cultural heritage projects across LMICs in Asia, Africa and South America to provide recommendations for funders and policymakers in the UK. But it is also hoped that the report outlines a roadmap and steps towards wider synthesis and policy impact across publicly funded research.

The success of this synthesis has been possible through an active community of practice developed and supported by the AHRC and DCMS between 2020 and 2022, and a series of knowledge exchange activities organised by the PRAXIS and CRITICAL projects. The community of practice provided a space for research challenges and opportunities to be discussed during the COVID-19 public health emergency and international restrictions. This space also cultivated a venue for the two workshops described in this report and formed the basis for the nine issue briefs with key findings and recommendations that are relevant to a range of international policymakers and heritage organisations including the UK Government and research councils.

Despite the progress made by the projects of the CHCC Cohort, there is still extensive work needed to safeguard cultural heritage (both tangible and intangible) from the impacts of climate change and disasters. For example, a key point that emerged from the cohort discussions is the lack of younger generations' involvement in the continuation of traditional knowledge and cultural heritage practices, which have proved to be significant resources to tackle climate change. Future research could therefore explore both how to better utilise traditional heritage management knowledge and practices in the context of climate change and also how to enhance youth involvement in this context by using arts, culture and heritage.

Moreover, there is a further need to explore the potentialities and criticalities of using cultural heritage to adapt to climate change, prevent disasters and mitigate possible impacts. Future research can investigate the effectiveness of cultural strategies and practices implemented in different regions worldwide, particularly those developed by indigenous and local communities. In this context, particular attention needs to be paid to fill a gap between academic research and current practices, which are often disconnected, and to stimulate more collaborative work between researchers, practitioners and local communities to develop innovative solutions and maximise impacts. Additional research is also needed to highlight successful practices that can be transferred and scaled in different contexts, while respecting the peculiarities of specific cultures and locations. In this framework, the building of (online) platforms with data related to cultural heritage, climate change and disasters that are accessible to worldwide researchers, practitioners and policymakers could facilitate the sharing of information and knowledge development.

This report highlights the opportunities that cultural heritage research offers to understanding disaster risk and climate change impacts and adaptation. The hope is that cultural heritage perspectives can contribute to more equitable partnerships with LMICs that recognise everyone's stake in the future of our past.

Iranian women waving Persian rugs in the carpet workshop in Naein, Iran. Credit: MehmetOZB, Adobe Stock.