INTERGOVERNMENTAL PANEL ON climate change

SIXTIETH SESSION OF THE IPCC
Istanbul, Türkiye, 16 – 19 January 2024

IPCC-LX/INF. 13
(15.I.2024)
Agenda Item: 12
ENGLISH ONLY

ANY OTHER BUSINESS

Progress Report of the International Co-Sponsored Meeting on Culture, Heritage and Climate Change

(Prepared by the Co-Chairs of the Scientific Steering Committee)

(Submitted by the Secretary of the IPCC)

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Progress Report of the International Co-Sponsored Meeting on Culture, Heritage and Climate Change
Virtual Meeting

6-10 December 2021

1 Introduction

In June 2020, the IPCC Working Group Co-Chairs agreed to, and the Executive Committee endorsed, a proposal submitted by ICOMOS to co-sponsor an international meeting on culture, heritage and climate change. UNESCO confirmed its participation in July 2020. The resulting International Co-Sponsored Meeting on Culture, Heritage and Climate Change (hereinafter referred to as the "Co-Sponsored Meeting") was co-sponsored by the IPCC, UNESCO and ICOMOS, in partnership with the International Union for the Conservation of Nature (IUCN) and Local Governments for Sustainability (ICLEI). The Co-Sponsored Meeting was held virtually over five days from 6–10 December 2021.

The proposal for the Co-Sponsored Meeting highlighted the need to address culture and heritage gaps in global climate science and climate change response and sought to advance the contributions of culture and heritage to climate change mitigation and adaptation.

The proposal built on growing calls for international attention to culture, heritage and climate change. For example, in 2016, at its 40th session (Istanbul/UNESCO, 2016), the World Heritage Committee (the body responsible for the implementation of the World Heritage Convention), recommended that

> the World Heritage Centre strengthen its relations with other organizations working on Climate Change, particularly with the UNFCCC and the Intergovernmental Panel on Climate Change (IPCC) secretariats, and specifically with regard to the effect of Climate Change on World Heritage properties, and also request[ed] the States Parties, the World Heritage Centre and the Advisory Bodies [IUCN, ICOMOS, ICCROM] to work with IPCC with the objective of including a specific chapter on natural and cultural World Heritage in future IPCC assessment reports.(Decision **40 COM 7**, para 15).

2 Conference Objectives

The Co-Sponsored Meeting took stock of the state of knowledge regarding connections of culture and heritage with human induced climate change and to establish gaps in knowledge regarding these connections.

The overall objectives of the Co-Sponsored Meeting on Culture, Heritage and Climate Change have been to:

- Consider the state of knowledge and practice in connecting culture, heritage and climate change;
- Identify key research and knowledge gaps with regard to connections between culture, heritage and climate change;
- Catalyse research and collaborations that will lead to peer-reviewed scientific publications and other appropriate literature and documentation including on local and Indigenous ways of knowing; and
- Expand global capacity in connecting culture, heritage and climate over the course of and beyond the AR7 cycle.

More specifically, the Co-Sponsored Meeting aims to:

1. Consider the diverse range of connections between culture, heritage, and climate change, with attention to developments in the field of culture, heritage and climate change since the IPCC Fifth Assessment Report (AR5). This will include an assessment of the range of issues related to culture and heritage that have been presented in IPCC products to date, how they have been presented, and issues known to the fields of culture and heritage that have not yet been fully incorporated into IPCC products to date;
2. Take stock of the scientific literature regarding culture, heritage and climate change, including literature related to climate impacts on cultural heritage and the creative economy; approaches to adapting culture and heritage to climate impacts; integrating culture and heritage into climate change responses; and the role of culture, heritage and creativity as a resource to support climate adaptation, mitigation, and climate action;
3. Engage and continue to develop new ways to bring culture, including Indigenous and traditional knowledge and ways of knowing, into dialogue with other areas of climate science and response, with particular attention to building respectful, effective, and sustainable means of "two-eyed seeing" that engage equally traditional and Indigenous ways of knowing and scientific ways of knowing, while maintaining the free, prior, and informed consent of traditional and Indigenous knowledge holders;
4. Identify gaps related to culture and heritage in climate knowledge, practices, and publications, with the goal of fostering new research, methods and relevant literature that will support the reports of the IPCC Seventh Assessment cycle (AR7), the forthcoming Special Report on Cities and Climate Change, and potentially a special report on culture, heritage and climate change;
5. Take stock of methods and gaps in translating knowledge from and about culture and heritage for climate science and policy, with the goal of stimulating new approaches and literature that will support the reports of the IPCC Seventh Assessment cycle (AR7), the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change;
6. Foster new partnerships between the fields of culture, heritage, and climate change to generate new research and applications to climate issues that will support the AR7, the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change; and
7. Expand institutional capacity to coordinate and further develop standards, knowledge, and practice at the intersections of culture, heritage, and climate change. Such capacity will support the AR7, the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change.

3 Conference Overview

3.1 High level committees

The Co-Sponsored Meeting was organised by two central committees, the Scientific Steering Committee and the Organising Committee.

The Scientific Steering Committee (SSC) was composed of experts from culture, cultural heritage, biodiversity, natural heritage, climate science, and cities. The SSC was charged with supporting the organization of the Co-Sponsored Meeting and providing recommendations regarding its focus, programme, and outcomes; ensuring global representation through the identification and selection of participants of the Co-Sponsored Meeting; ensuring the peer review of papers commissioned in connection with the Co-Sponsored Meeting and other key documents prepared for the Co-Sponsored Meeting; reviewing the final research and action agenda produced after the Co-Sponsored Meeting; and ensuring follow-up for advocacy on culture and climate change in the SSC's respective fields of competency.

The SSC had three Co-Chairs, one representative from each of the three co-sponsoring organisations. The SSC Co-Chairs were: from UNESCO, initially Dr Mechtild Rössler and then Dr Jyoti Hosagrahar; from ICOMOS, initially Dr Marcy Rockman and then Dr Will Megarry; from the IPCC, Dr Debra Roberts.

SSC members were nominated by individual SSC Co-Chairs and selected by the three SSC Co-Chairs jointly. SSC members served in their personal capacity and their contribution was considered voluntary, although their involvement in major international organisations was taken into account, as well as their capacity to represent the main constituencies of the conference partners. The initial SSC Meeting was held on 29 September 2020 and the SSC met periodically thereafter. In addition to Dr Roberts, IPCC Working Group II was represented on the SSC by Dr Hans-Otto Pörtner, Co-Chair, IPCC Working Group II. IPCC Working Group I was represented on the SSC through its Co-Chair, Dr Valérie Masson-Delmotte and Vice Chair, Dr Greg Flato. Annex B provides further details on the SSC including the SSC Membership, SSC Terms of Reference, sample SSC selection letter, and the report of the organisational meeting of the SSC (in which can be found the biographies of the SSC members).

The work of the SSC was supported by the Co-Sponsored Meeting's Scientific Coordinator, Dr Hana Morel, and heritage specialist, Sarah Forgesson, as well as by Melinda M.B. Tignor, Head, IPCC Working Group II Technical Support Unit.

The Organizing Committee was composed primarily of ICOMOS and UNESCO staff and worked to ensure the coordination of the Co-Sponsored Meeting. In addition, ICOMOS was responsible for managing the finances, accounting, and other administrative matters of the Co-Sponsored Meeting and coordination with key partners. The work of the Organizing Committee was also supported by Ms Tignor. The membership of the Organizing Committee can also be found in Annex B.

3.2 Conference structure

To fulfil its aims, the Co-Sponsored Meeting was organized around three overarching Scientific Questions and two cross-cutting issues, as follows:

Scientific Questions:

Knowledge Systems: Systemic connections of culture, heritage and climate change

- Nature and scope of representation of diverse forms and scales of culture and heritage in climate literature and assessments
- Integration of diverse knowledge systems, including Indigenous knowledge systems, across areas of climate research and response
- The history of climate change and its alignment with the history of all communities; nature and scope of historical, social and cultural contexts of the Anthropocene

Impacts: Loss, damage and adaptation for culture and heritage

- Climate impacts on culture and heritage, including methods of describing vulnerability of culture and heritage to climate impacts
- Adaptive/preservation methods for culture and heritage, including understandings of significance and approaches to prioritisation of/for action
- Understanding of and approaches to loss and change

Solutions: Roles of culture and heritage in transformative change and alternative sustainable futures

- Capacity of historic buildings/landscapes/traditional land use to hold carbon
- Cultural and natural heritage as sources of resilience or refuge in response to disasters
- Heritage as inspiration for art, connection, understanding and action on climate adaption and mitigation

Cross-cutting issues: a) Cultural governance; b) The capacity to learn from the past

- Who decides what heritage is?
- How is heritage knowledge managed?
- Intersections of heritage with conflict
- Use of data and knowledge from the past in climate models and policy
- Finding common ground between climate and heritage approaches to research question

The Conference Programme is outlined in Section 3.2.4 below.

3.2.1 Participants Selection

Approximately 103 individuals participated in the Co-Sponsored Meeting. Participants represented 40 countries across all six continents, with 40 per cent of participants coming from the Global South and 61 per cent of the participants being women. Researchers and practitioners were present, consisting of 13 Climate Scientists, 78 Culture/Heritage practitioners and seven Natural Science practitioners. Participants included members and representatives from Indigenous Peoples and local communities.

In order to develop a large and diverse pool of potential participants, the following steps were taken:

- Each SSC member was invited to suggest individuals for consideration as participants in the Co-Sponsored Meeting by means of an online Participant Suggestion Tool. For a copy of the Invitation to SSC members to suggest participants dated 8 April 2021, see Annex C-1.
- An open invitation to suggest participants was also issued by the SSC Co-Chairs on 20 April 2021. For a copy of this Open Invitation, see Annex C-2. This invitation letter was then transmitted by the IPCC Secretariat to all IPCC member government Focal Points in April 2021 with an (extended) deadline of 28 May 2021. IPCC National Focal Points who suggested participants were: Albania, Algeria; Australia; Azerbaijan; Chile; China; Greece; Hungary; Indonesia; Italy; Japan; Kenya; Libya; Namibia; Perú; Romania; Russian Federation; Saudi Arabia; Solomon Islands; Sweden; United Kingdom of Great Britain and Northern Ireland; and United States of America.
- The call was also circulated by UNESCO to its Member States and by ICOMOS within its extensive, global network.

More than 300 unique participant suggestions were received from these sources. Each suggested participant was then sent an invitation to apply to participate. Participants were selected from among those who returned applications. Ultimately, approximately 200 completed applications were received. The full list of all applications received was compiled into a workbook. Each SSC member was provided with a unique version of this workbook in order to indicate their selections from among the applications received. The selection criteria included scientific, technical and socio-economic expertise, including a range of views, geographical representation and gender balance.

Within the workbook, all applicants were sorted into lists according to the 3 overarching questions/2 cross-cutting issues they had indicated were most relevant to their experience. With a goal of selecting approximately 80 participants, SSC members were asked to vote yes on 20-30 applicants per scientific question, and to vote yes on 10-20 applicants per cross-cutting issue. SSC members were asked to:

- consider disciplinary and geographic/topographic breadth in making votes
- consider academic and practitioner diversity in making votes
- aim for equivalent balances between global North-global South, gender, with consideration for regional and sub-regional geographic representation

To assist with balancing across global North-global South and gender, counters were set at the top of each workbook list. SSC votes were then tabulated. SSC selections were then compiled and reviewed, and small adjustments were made to, among other things, include additional representation

from under-represented geographic regions. A final list of potential participants was then circulated to all SSC Members for final review. Applicants were generally notified in August 2021 of their acceptance. For a sample of the acceptance notification, see Annex C-3.

For more information on the participants, please see Annex C-4. The regional distribution of conference participants and their breakdown by gender and areas of expertise is summarised in Table C-4(1) and the full list of conference participants follows in Table C-4(2). Figure C-4(1) depicts overall attendance by region and Figure C-4(2) depicts overall attendance by gender.

3.2.2 White Papers and Webinars

Three White Papers were commissioned as conversation starters and resources in support of the Co-Sponsored Meeting. The White Papers were also used to develop the topics and considerations discussed during the Co-Sponsored Meeting. Each White Paper included a review of literature that addresses one of the Meeting's three Scientific Questions.

White Papers did not bear the IPCC logo. In addition, each White Paper included the following disclaimer:

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>
> IPCC co-sponsorship does not imply IPCC endorsement or approval of these proceedings or any recommendations or conclusions contained herein. Neither the papers presented at the Workshop nor the report of its proceedings have been subject to IPCC review.

Each White Paper was prepared by a set of external "Collaborators." Collaborators included one or more lead authors, multiple contributing authors, and in some cases staff associate/chapter scientists. SSC members were invited to suggest Collaborators. Collaborators were selected by the SSC Co-Chairs with the advice of the Scientific Coordinator. A full list of White Paper Collaborators (i.e., author teams) can be found at Annex D.

A substantial draft of each White Paper was received and reviewed by the SSC Co-Chairs. These drafts were also made available to SSC members for review. Revised substantial drafts were provided to all participants in advance of the Co-Sponsored Meeting.

Prior to completion of their substantial drafts, each White Paper team was asked to introduce their work to date to Co-Sponsored Meeting participants through a webinar. Webinars were held online and a recording of each was made available to participants to watch on demand. The three webinars were: Impacts White Paper, 23 September 2021; Knowledge Systems White Paper, 30 September 2021; Solutions Paper, 14 October 2021.

3.2.3 Posters

Each participant was invited to submit abstracts for virtual posters via a call for abstracts which ran from 3 to 30 September 2021. It was requested that poster abstracts respond to one of the five Co-Sponsored Meeting Scientific Questions or cross-cutting topics. Photos or other visual outlines were encouraged, including links to short videos. All posters that met the requirements of this Poster Call were entitled to be shared virtually in connection with the Co-Sponsored Meeting. In addition, authors were invited to make short virtual poster presentations during the Co-Sponsored Meeting. Ultimately, 40 posters were received.

3.2.4 Conference Program

The Co-Sponsored Meeting was held over five days from 6-10 December. In total, it consisted of three public-facing panel discussions/plenaries, 15 workshop sessions and corresponding breakout room. Forty (40) posters were exhibited online, 29 of which were presented live during these poster sessions. All sessions were held virtually. These sessions were complemented by online website discussions prior to, during and following the Meeting on a dedicated discussion board set up for participants.

An opening ceremony was held on 6 December featuring remarks from Dr Hoesung Lee (IPCC Chair), Ernesto Ottone R. (UNESCO Assistant Director-General for Culture), Prof Dr Teresa Patricio (ICOMOS President), Dr Pasang Dolma Sherpa, (ED, Center for Indigenous Peoples' Research and Development), Dr Will Megarry (SSC Co-Chair), and Dr Hana Morel (Scientific Coordinator). The remarks of Dr Lee and Ms Patricio can be found at Annex E.

6, 8 and 10 December were devoted to the Co-Sponsored Meeting's three Scientific Questions, with each Question as the focus of a different day as follows: 6 December, Knowledge Systems; 8 December, Impacts; 10 December, Solutions. On each of these three days, five workshop sessions and one panel discussion (i.e., plenary) were held regarding the applicable Scientific Question. The panels acted as plenary sessions for the Co-Sponsored Meeting and were also livestreamed to the public. A short summary of each panel can be found in the Conference Proceedings (see *infra*, Section 3.5). Each workshop session included multiple corresponding breakout rooms. Poster presentations were held on 7 and 9 December. The detailed programme, including all workshop themes, can be found at Annex F.

The overall organisation of the Co-Sponsored Meeting is depicted in this diagram:

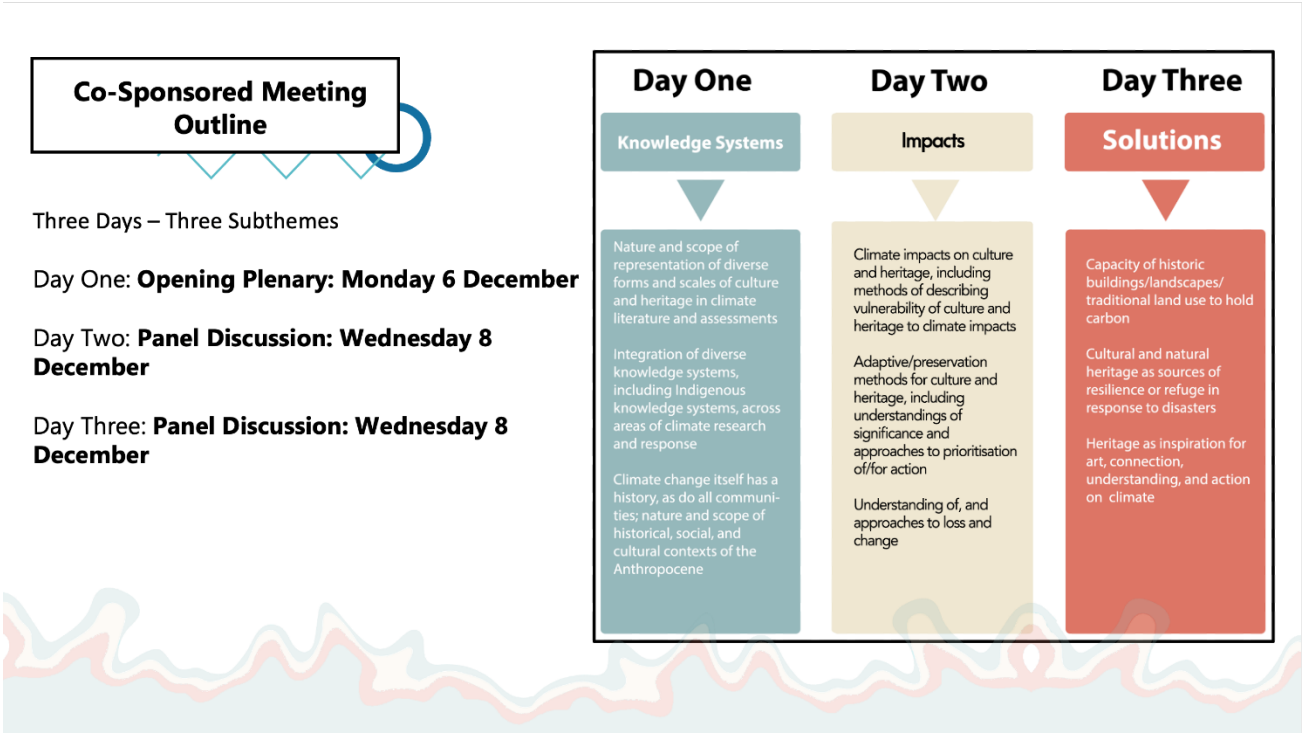

Figure 3.2.4. Outline of the International Co-Sponsored Meeting on Culture, Heritage and Climate Change

3.3 Budget

Table 3.3.1 shows the breakdown of the Co-Sponsored Meeting budget.

3.3.1 Table 3.3.1. Budget figures for the Conference

Category	Funded by	Amount (Euros)
Labour costs with overhead (ICOMOS Staff)	ICOMOS with support*	42 000
Scientific consultants fees	ICOMOS with support*	90 000
Webpage design, software and related licenses	ICOMOS with support*	9 000
Commissioned White Papers	ICOMOS with support*	45 000
Technical support for online meetings	ICOMOS with support*	37 750
Interpretation	UNESCO	7 250
Production of meeting reports	ICOMOS with support*	24 000
Total Spent		255 000

* Funding was provided to ICOMOS by The German Federal Environmental Foundation with additional support from the Swiss Federal Office of Culture and The National Cultural Heritage Administration of China.

3.4 Communications

The Co-Sponsored Meeting website (https://www.cultureclimatemeeting.org) was the main communications tool for the Co-Sponsored Meeting. Each of the three panel plenary sessions were livestreamed via a dedicated viewing platform in English, French, and Spanish languages. The website remains active, and the panel sessions can still be viewed there, as well as the Co-Sponsored Meeting's YouTube channel (https://www.youtube.com/@icsmcultureheritageandclim8204/videos). The website also included a password-protected participant's session where participants could share a short biography, uploading useful documents, post messages and chat with other participants. A page on the IPCC's website was also devoted to the Co-Sponsored Meeting (https://www.ipcc.ch/event/ipcc-icomos-unesco-co-sponsored-meeting-on-culture-heritage-and-climate-science/). The Co-Sponsored Meeting was widely discussed on social media, including via hashtag #ICSMCHC and was extensively featured on Twitter and Facebook, including via the Climate Heritage Network, a civil society network (@ClimateHeritage).

3.5 Co-Sponsored Meeting Outcomes

The primary scientific outcome of the Co-Sponsored Meeting is the *Global Research and Action Agenda on Culture, Heritage and Climate Change* (GRAA), which can be found in Annex A. The document has been published as follows:

- Morel, Hana, Megarry, William, Potts, Andrew, Hosagrahar, Jyoti, Roberts, Debra, Arikan, Yunus, Brondizio, Eduardo, Cassar, May, Flato, Greg, Forgesson, Sarah, Masson-Delmotte, Valérie, Jigyasu, Rohit, Oumarou Ibrahim, Hindou, Pörtner, Hans-Otto, Sengupta, Sandeep, Sherpa, Pasang Dolma and Veillon, Richard (2022) Global research and action agenda on culture, heritage and climate change. Project Report. ICOMOS & ISCM CHC, Charenton-le-Pont, France & Paris, France, 69p. ISBN 978-2-918086-69-7 (PDF) - 978-2-918086-70-3 (print). (https://openarchive.icomos.org/id/eprint/2716/)

For details on the process by which the information in the GRAA was collected, see Annex G. For information on the input from Co-Sponsored Meeting participants to the GRAA, see Annex H.

The final White Papers have been published as follows:

- Orlove, Ben, Dawson, Neil, Sherpa, Pasang, Adelekan, Ibidun, Alangui, Wilfredo, Carmona, Rosario, Coen, Deborah, Nelson, Melissa, Reyes-García, Victoria, Rubis, Jennifer, Sanago, Gideon and Wilson, Andrew (2022) ICSM CHC White Paper I: Intangible cultural heritage, diverse knowledge systems and climate change. Contribution of Knowledge Systems Group I to the International Co-Sponsored Meeting on Culture, Heritage and Climate Change. Discussion Paper. ICOMOS & ISCM CHC, Charenton-le-Pont, France & Paris, France, 103p. ISBN 978-2-918086-71-0. (https://openarchive.icomos.org/id/eprint/2717/)

- Simpson, Nicholas P., Orr, Scott Allan, Sabour, Salma, Clarke, Joanne, Ishizawa, Maya, Feener, R. Michael, Ballard, Christopher, Mascarenhas, Poonam Verma, Pinho, Patricia, Bosson, Jean-Baptiste, Morrison, Tiffany and Zvobogo, Luckson (2022) ICSM CHC White Paper II: Impacts, vulnerability, and understanding risks of climate change for culture and heritage: Contribution of Impacts Group II to the International Co-Sponsored Meeting on Culture, Heritage and Climate Change. Discussion Paper. ICOMOS & ISCM CHC, Charenton-le-Pont, France & Paris, France, 109p. ISBN 978-2-918086-72-7. (https://openarchive.icomos.org/id/eprint/2718/)

- Shepherd, Nick, Cohen, Joshua Benjamin, Carmen, William, Chundu, Moses, Ernsten, Christian, Guevara, Oscar, Haas, Franziska, Hussain, Shumon T., Riede, Felix, Siders, A. R., Singh, Chandni, Sithole, Pindai and Troi, Alexandra (2022) ICSM CHC White Paper III: The role of cultural and natural heritage for climate action: Contribution of Impacts Group III to the International Co-Sponsored Meeting on Culture, Heritage and Climate Change. Discussion Paper. ICOMOS & ISCM CHC, Charenton-le-Pont, France & Paris, France, 91p. ISBN 978-2-918086-73-4. (https://openarchive.icomos.org/id/eprint/2719/)

In parallel to the preparation of this Progress Report, Proceedings of the Co-Sponsored Meeting have been compiled. The Proceedings may be found here: https://www.cultureclimatemeeting.org/wp-content/uploads/2023/01/ICSM-CHC-Procedings-31Jan23.pdf. These proceeding include important detailed information generated as a result of the Co-Sponsored Meeting, including summaries of the three thematic plenary sessions, lists of Co-Sponsored Meeting posters, and descriptions of each workshop and breakout rooms. This information was provided by Co-Sponsored Meeting participants with the knowledge that it would be published as part of the conference proceedings. Additionally, it includes a full list of Co-Sponsored Meeting participants as well as participation in the various sessions. The content of the proceedings is a representative record of Co-Sponsored Meeting discussions.

The GRAA, the White Papers and the Proceedings each bear the following notion:

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In the months following the Co-Sponsored Meeting, several initiatives informed and catalysed by the Co-Sponsored Meeting and its outcomes were begun. These initiatives have been organised by SSC members, Organising Committee partner organisations, and by other organisations to further the

discussions between the research, practice and policy communities on culture, heritage and climate change science. For a partial list of these initiatives, see Annex I.

3.6 Recommendations for the consideration of the IPCC Panel

The proposal for the Co-Sponsored Meeting was a response to growing calls for international attention to culture, heritage, and climate change, including by the Intergovernmental Committee established under the UNESCO 1972 Convention concerning the protection of the World Cultural and Natural Heritage. These calls were a recognition that there exist significant gaps in understanding the many connections between culture, the human past and climate change, as well as a need to advance the contributions of culture and heritage to climate change mitigation and adaptation.

The enthusiasm around the Co-Sponsored Meeting and the level of engagement by participants underscores the significance of those calls. The message that emerged from the Co-Sponsored Meeting panels and plenaries is clear: culture and heritage play an indispensable role as enablers of transformative climate action and climate resilient sustainable development, but knowledge gaps are significant across sectors and regions.

Building on these discussions and inputs, the members of the SSC propose the following recommendations/reflection points be taken note of at the 58th Plenary session of the IPCC. That the Panel:

- Consider deciding that an IPCC Expert Meeting on Culture, Heritage and Climate Change should take place during the AR7 cycle. This Expert Meeting would serve to clarify the role of culture and heritage as enabling conditions to transformative climate action and climate resilient sustainable development, including how attention to culture and heritage can help avoid maladaptation and mal-mitigation. The Expert Meeting should include within its scope an examination of the roles of culture and heritage in mitigation ambitions and pathways.

- Invite those scoping the reports in the AR7 cycle to consider including culture and heritage as a crosscutting topic across products in the cycle, including chapters in WGI, WGII and WGIII products, as well as the Special Report on Cities. Co-Sponsored Meeting participants expressed overwhelming support for the IPCC's increased focus on culture and heritage during the AR7 cycle. In addition to advancing a crosscutting approach to culture and heritage across all Working Groups, invite those scoping the WGII contribution to AR7 products to include a specific chapter on culture and heritage, including a focus on Indigenous and traditional knowledge. This chapter would look at how these areas inform narratives of change and evolution and are enablers or barriers to change. The chapter would assess how culture and heritage inform understandings of risk, vulnerability, and loss as well as the acceptability of systems change. It could also assess impacts on culture and heritage and how these impacts in turn affect the resilience of affected communities.

- Consider targeted and enhanced efforts to invite nominations for participation in scoping meetings and for positions in the preparation of AR7 reports (e.g., Coordinating Lead Authors, Lead Authors, and Review Editors) of individuals with culture or heritage-related expertise, relevant social science disciplines and diverse knowledge systems, including Indigenous and traditional knowledge holders, and, in that regard, (1) encourage IPCC member states to nominate experts for scoping meetings and as authors with such expertise, (2) encourage existing networks (such as within IPBES, UN-CBD, among others); Indigenous Peoples organisations; and social science, culture, and heritage organisations to apply for IPCC observer status and to nominate experts. Traditional and Indigenous knowledge bearers should be included, preferably at all levels, as lead and contributing authors.

- Build upon and scale-up existing initiatives within the IPCC to develop a concerted plan on how the IPCC can best include Indigenous Knowledge and the knowledge of local communities in its assessments. Consider holding an expert meeting early in the AR7 cycle, with the goal of developing new guidelines for accessing and incorporating such knowledge throughout the AR7 cycles. This expert meeting could also consider the current emphasis of the IPCC on English language research and look at ways to expand efforts to assess non-English literature and practice, including “grey” and Indigenous and non-traditional knowledge.

- Consider increasing the frequency of dialogue between IPCC bodies, UNESCO and other intergovernmental bodies, as well as civil society networks such as ICOMOS and the Climate Heritage Network on the topic of Culture, Heritage and Climate Science in order to better tie these communities together in a meaningful way. This could include, for instance, a concerted effort to invite these and other organizations to play a role during the scoping and review process of AR7 as well as Special Reports. Encourage national IPCC Focal Points to circulate drafts of forthcoming and future IPCC draft reports to culture and heritage networks.

4 Concluding remarks

The Co-Sponsored Meeting was successful in bringing together to take stock of the knowledge and identify current research gaps in culture, heritage and climate change not only researchers and scientists (e.g. archaeologists, anthropologists, geographers, geologists, architects, heritage conservationists, paleoclimatologists and other researchers from the social and natural sciences and the humanities) but also knowledge holders (such as members of Indigenous Peoples and local communities), practitioners, and youth. It encompassed members of the culture, heritage (natural and cultural), planning, creative and design communities in addition to professionals and academics (e.g., from private and public sector enterprises, international and/or national organisations, professional bodies, networks and site and historic house museum managers, civil society and policymakers in culture and heritage).

The SSC and the Organising Committee would like to take this opportunity to thank the IPCC for their leadership in bringing these actors together to discuss culture, heritage and climate change science.

As discussed in Annex I, in the months following the Co-Sponsored Meeting, several initiatives informed or catalysed by the Co-Sponsored Meeting have begun, initiated by SSC members, Organising Committee members, and other organisations to further strengthen the work at the interface of science, practice and policy on cities and climate change. These developments highlight the importance of bringing a variety of actors together and fostering dialogue, collaboration and exchange of knowledge around a specific issue to accelerate knowledge co-generation.

Moving forward, we are hopeful that both the climate and culture research, practice and policy communities will build further fruitful collaborations together that will address some of the gaps in knowledge and research identified in the *Global Research and Action Agenda on Culture, Heritage and Climate Change*, producing new knowledge and generating additional peer reviewed literature and other relevant inputs for consideration during the AR7 and AR8 cycles, and particularly the Special Report on Cities and Climate Change.

Annex A

Global Research and Action Agenda on Culture, Heritage and Climate Change

Global Research and Action Agenda on Culture, Heritage, and Climate Change

Scientific Outcome of the International
Co-Sponsored Meeting on Culture, Heritage and Climate Change

INTERNATIONAL CO-SPONSORED MEETING ON
CULTURE, HERITAGE & CLIMATE CHANGE

Disclaimer

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Format: Printed and Online
ISBN: 978-2-918086-69-7 (digital) and 978-2-918086-70-3 (print)

URL: https://openarchive.icomos.org/id/eprint/2716/

Co-sponsored:

ICOMOS international council on monuments and sites

unesco

Partners:

IUCN

ICLEI

Funded by the German Environmental Foundation

DBU Deutsche Bundesstiftung Umwelt

Additional support from:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Eidgenössisches Departement des Innern EDI
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Suggested citation:

Morel H., Megarry W., Potts A., Hosagrahar J., Roberts D.C., Arikan Y., Brondizio E., Cassar M., Flato G., Forgesson S., Jigyasu R., Masson-Delmotte V., Oumarou Ibrahim H., Pörtner H. O., Sengupta S., Sherpa P.-D., Veillon R. *Global Research and Action Agenda on Culture, Heritage and Climate Change*. Charenton-le-Pont & Paris, France: ICOMOS & ICSM CHC, 2022

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Global Research and Action Agenda on Culture, Heritage and Climate Change

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Culture and heritage have a key role in understanding the causes and impacts of climate change and in designing responses, including low-carbon, climate- resilient pathways consistent with the aims of the 2015 Paris Agreement and other international agreements relevant to climate change. The design, conception, acceptability, feasibility and effectiveness of mitigation, adaptation and measures to promote resilience measures are dependent on how well culture and heritage are understood and change across communities, regions and nation-states. The role of culture and heritage in addressing climate change is especially important within the context of human and ecosystem (including biodiversity) inter-connectedness; cities and urbanisation; land and water use and management practices; and governance, including climate justice, capacity building, equity and wellbeing. Acknowledging and enhancing work that recognises the contributions of culture and heritage to understanding and responding to climate change is of critical importance to climate action efforts at all levels.

This paper addresses culture as well as heritage. The term 'heritage' is used and should be read to mean both natural and cultural heritage, intangible and tangible. This is to overcome existing methodologies that draw distinctions between heritage; such differentiation is complex if not problematic. Natural heritage here is understood as components of the natural environment, including fauna and flora, ecosystems, natural features, geological and physiographical formations or structures. It includes natural sites of value from the point of view of communities, through scientific, spiritual, historic, aesthetic, or other social significances. Natural heritage supports biodiversity and human systems, and may include natural resources. .

Cultural heritage is understood as tangible and intangible expressions of ways of living developed by a community or society, inherited from past generations. It is 'in its broadest sense, both a product and a process [of human communities/societies], which provides [them] with a wealth of resources that are inherited from the past, created in the present and bestowed for the benefit of future generations' (UNESCO, 2014). Tangible cultural heritage includes archaeological sites, buildings, structures and monuments, landscapes, museum collections and archives. Intangible cultural heritage includes the practices, representations, expressions, knowledge, skills and ways of knowing – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognise as part of their cultural heritage. Examples include performances, ceremonies, music, dance, art, designs, symbols and other artistic and cultural expressions. Intangible cultural heritage is sometimes referred to as 'living heritage', in that it is transmitted yet constantly re-created. Knowledge and skills are considered as dynamic. They are constantly re-created by communities and groups in response to the environment and to interact with the rest of nature and people, past and present. Some elements of heritage have been landmarked, listed or otherwise included in inventories by governmental or professional actors; others are simply recognised as such by associated groups and communities.

Culture and heritage can hold evidence of paleoclimatic change, social evolution and past human responses to environmental change and environmental stress. It can also reflect and embody contemporary knowledge of environments, land and water use and resource stewardship developed over generations from societies, groups and communities. Furthermore, it can reflect patterns and events impacting the development of the peoples of the world, including historical patterns of social and political organisation (including injustices) as well as practices relating to agriculture, production of other goods and services, and the consequences of extractive histories through the extraction of resources. The notion of intergenerational transmission of heritage is key.

As the outcome of the International Co-Sponsored Meeting on Culture, Heritage, and Climate Change, this Global Research and Action Agenda on Culture, Heritage and Climate Change proposes that these heritage and cultural practices act as a bridge between different ways of knowing, embody inherited knowledge accumulated over generations, and serve as entry points for climate action. To do so requires acknowledging, respecting and implementing a plurality of knowledge systems inherent in culture, heritage and creative practices.

In this Agenda, 'those involved in culture and heritage, including understanding the past' includes, but is not limited nor restricted to researchers and scientists (e.g. archaeologists, anthropologists, geographers, geologists, architects, heritage conservationists, paleoclimatologists and other researchers from the social and natural sciences and the humanities), knowledge holders (such as members of Indigenous Peoples and local communities), practitioners, women and youth, as well as those living in informal settlements and other marginalised and/or vulnerable diverse actors. It encompasses members of the culture, heritage, planning, creative and design communities in addition to professionals and academics (e.g. from private and public sector enterprises, international and/or national organisations, professional bodies, networks and site and historic house museum managers, civil society and policy-makers in culture and heritage).

Part I: The International Co-Sponsored Meeting on Culture, Heritage and Climate Change: Background and Summary

The proposal to hold an International Co-Sponsored Meeting on Culture, Heritage and Climate Change was a response to growing calls for international attention to culture, heritage and climate change including by the Intergovernmental Committee -established under the UNESCO 1972 Convention concerning the protection of the World Cultural and Natural Heritage-, which requested, already in 2016, the UNESCO World Heritage Centre and the Advisory Bodies to the World Heritage Committee to work with the Intergovernmental Panel on Climate Change (IPCC) with the objective of including a specific chapter on natural and cultural World Heritage in future IPCC assessment reports. These calls were a recognition that significant gaps exist in understanding the role of culture and heritage in global climate science and climate change responses.

An earlier call was a roundtable held in 2015 at the United Nations Framework Convention on Climate Change (UNFCCC) COP21 in Paris. Here the treatment of cultural heritage in the IPCC's 5th Assessment cycle was discussed. That event was sponsored by the International Council on Monuments and Sites (ICOMOS) and included the Vice Chair of the Intergovernmental Panel on Climate Change (IPCC), Dr Youba Sokona, and representatives of IPCC Working Group II. It was prompted by the statement included in the Fifth Assessment Synthesis Report that 'loss of … cultural heritage and ecosystem services are difficult to value and monetize, and thus they are poorly reflected in estimates of losses'.

The UNESCO World Heritage Convention is one of the world's best recognised cultural heritage instruments. The Convention, whose full title is 'The Convention Concerning the Protection of the World Cultural and Natural Heritage', was adopted by UNESCO in 1972 and with almost 200 countries party to it, is one of the most widely ratified international Conventions. The Convention provides a permanent framework for international co-operation in safeguarding cultural and natural heritage, and introduces the specific notion of 'world heritage', that is, heritage that is of value to humanity across the world beyond its local or national specificity. The Convention is governed by the World Heritage Committee, and the General Assembly of States Parties. Subsequently, the UNESCO Convention for Safeguarding the Intangible Heritage was adopted by UNESCO in 2003.

In 2016, at its 40th session (Istanbul/UNESCO, 2016), the World Heritage Committee recommended that:

> 'the World Heritage Centre strengthen its relations with other organizations working on Climate Change, particularly with the UNFCCC and the Intergovernmental Panel on Climate Change (IPCC) secretariats, and specifically with regard to the effect of Climate Change on World Heritage properties, and also request[ed] the States Parties, the World Heritage Centre and the Advisory Bodies [IUCN, ICOMOS, ICCROM] to work with IPCC with the objective of including a specific chapter on natural and cultural World Heritage in future IPCC assessment reports.
>
> (Decision 40 COM 7, para 15)

In 2017, ICOMOS and UNESCO submitted a proposal for IPCC co-sponsorship of a meeting on heritage and climate change. This led to the ***International Co-Sponsored Meeting on Culture, Heritage and Climate Change*** (the Meeting), herein referred to as 'the Meeting'. The proposal, first put forward by the International Council on Monuments and Sites (ICOMOS), was agreed by the Co-Chairs of the Working Groups of the Intergovernmental Panel on Climate Change (IPCC), endorsed by the IPCC Executive Committee in June 2020, and co-sponsorship confirmed by UNESCO in July 2020, following which a collaborative concept note for the meeting was finalized. The Meeting was held virtually over five days from 6–10 December 2021. The Meeting was co-sponsored by IPCC, UNESCO and ICOMOS, in partnership with the International Union for the Conservation of Nature (IUCN) and Local Governments for Sustainability (ICLEI).

The aim of this Meeting was to take stock of the state of knowledge regarding connections of culture and heritage with anthropogenic climate change and to establish gaps in knowledge regarding these connections. Approximately **100 participants** from a wide range of backgrounds attended. Meeting participants represented **40 countries** across all six continents, with 40 per cent of the participants coming from the **Global South** and **61 per cent of the participants being women.** Researchers and practitioners were present, consisting of **13 Climate Scientists, 78 Culture/Heritage practitioners and seven Natural Science** practitioners. Participants included members and representatives from Indigenous Peoples and Local Communities.

Detailed notes of the participants' contributions and insights have formed the basis of this co-edited Global Research and Action Agenda on Culture, Heritage and Climate Change, herein referred to as 'Climate Heritage Agenda'. The breadth of expertise and information presented at the Meeting highlighted the significant level of knowledge and work achieved, and continued, by Indigenous Peoples, local communities, scientific communities, practitioners and policy communities across the globe. Resources contributing to the Meeting include three White Papers each led by a dedicated international team of experts, which align to the Meeting's overarching scientific questions (see below), and three associated webinars. The Meeting itself consisted of **three public-facing panel discussions, 15 workshop sessions a**nd corresponding breakout room discussions and **two days of poster discussion sessions**, complemented by online website discussions prior to, during and following the Meeting.

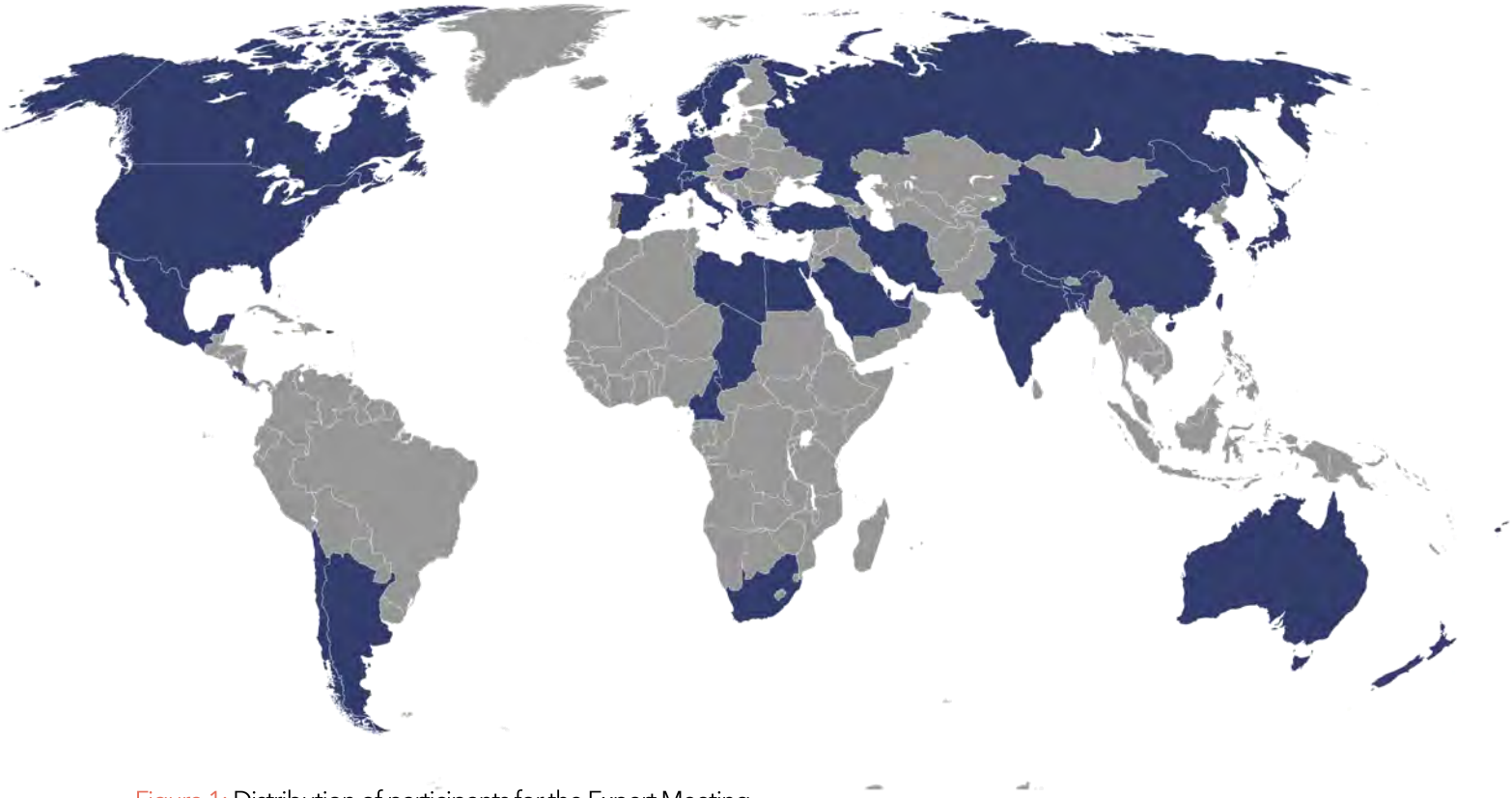

Figure 1: Distribution of participants for the Expert Meeting

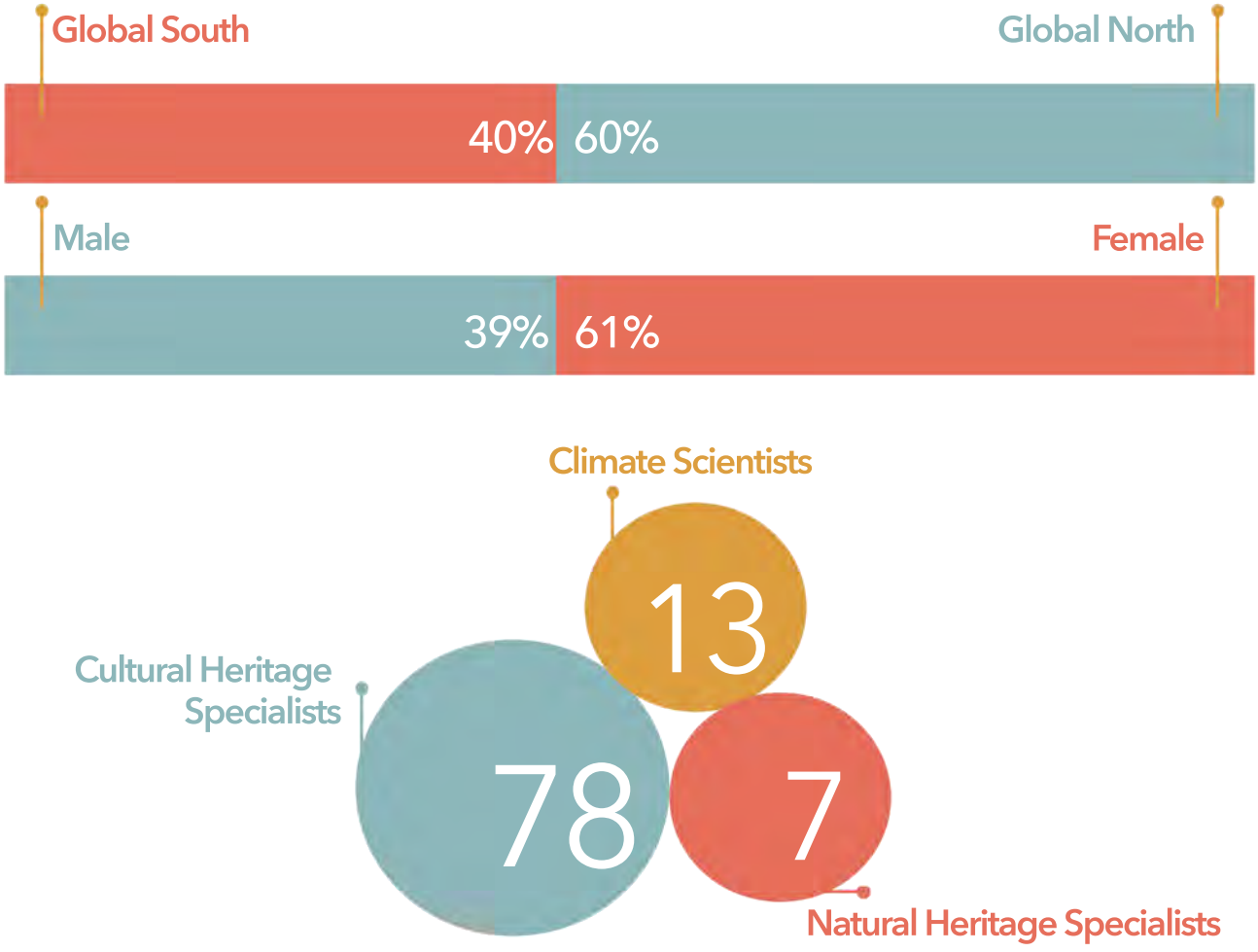

Figure 2: Visualisation of representation present at the Meeting

The **key messages (KMs)** set out in this Climate Heritage Agenda identify knowledge gaps and themes as well as action items designed to help expand global capacity by connecting culture, heritage and climate action. The Agenda has been compiled to serve and support relevant parties in developing blueprints, funding proposals and action plans to catalyse research and collaborations, and also to seed further outputs including peer-reviewed publications and other appropriate literature, training and capacity-building resources and further documentation, including those from Indigenous Peoples and local communities. It encourages co-production that brings together multiple knowledge systems and highlights the importance of other ways of knowing in our response to climate change.

This document is comprised of three parts:

1. A summary of the Meeting themes, schedule and discussions
2. Knowledge gaps and action items by the Meeting
3. Delivering on research and action agendas emerging from the Meeting

All case study boxes and examples presented in the Agenda were discussed in the Meeting and are used here with the consent of the Meeting participants involved in the work. They are included to illustrate key messages and to represent the importance of culture and heritage in understanding and addressing climate change.

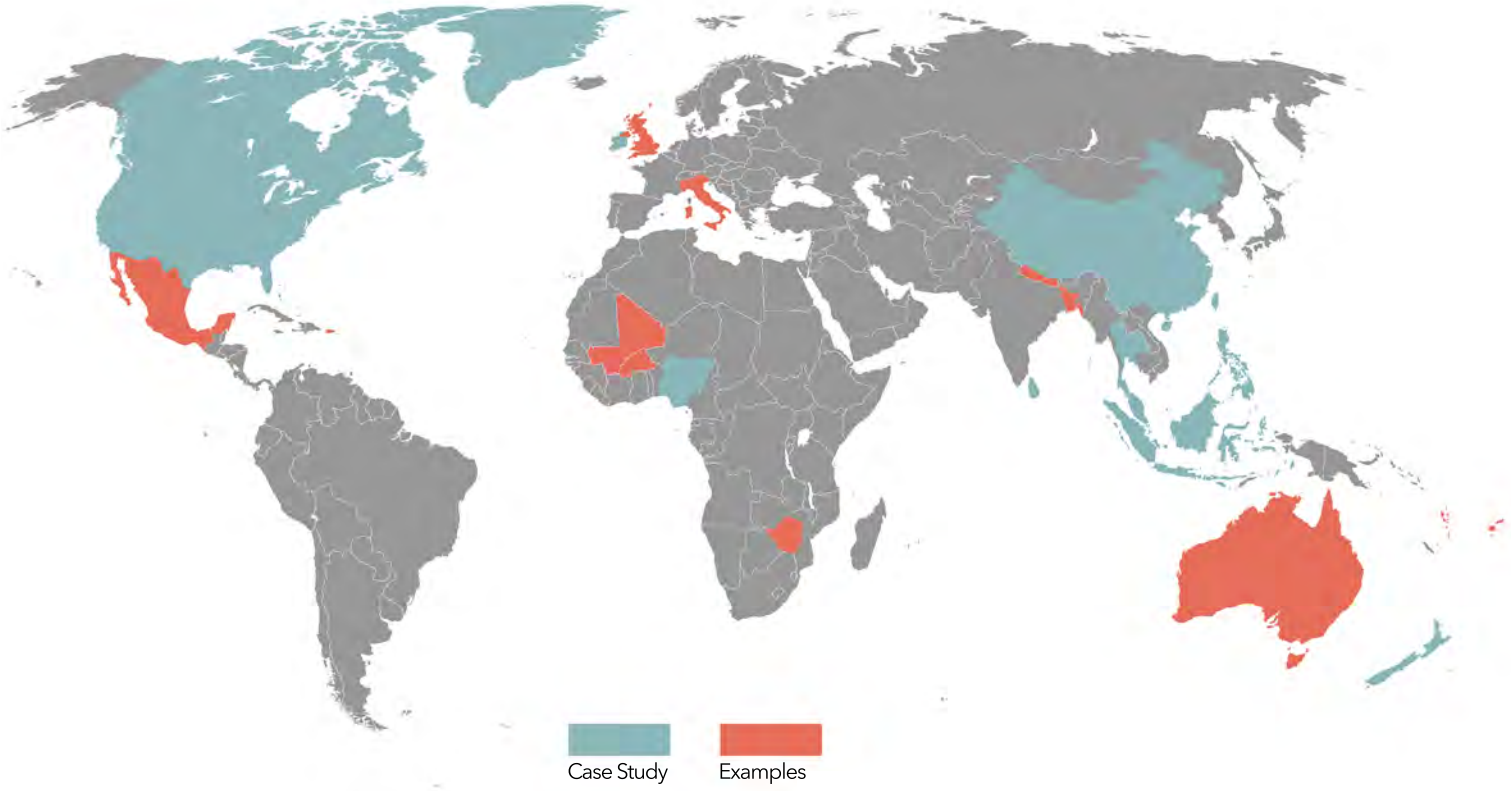

Figure 3: Global distribution of case studies and examples provided in the Agenda

SUMMARY OF SELECTED CASE STUDIES

A total of 13 case studies were selected from a number of countries and regions

Country	Case Study	Theme
Global	**Case Study One:** Building off work from IPCC Co-sponsored Internation Conference on Cities and climate change, presents role of cities in climate action and agenda	3
New Zealand Aotearoa	**Case Study Two:** Integration of Te Ao Māori (Indigenous Knowledge) into large city climate adaptation planning	1 3
Canada Inuit Nunangat	**Case Study Three:** Impact of climate change on Inuit heritage in Inuit Nunangat (Canadian Artic) and collaborations undertaken to address these collective issues	1 2 3
Ireland	**Case Study Four:** Outlines work done by Irish Government in better integrating climate change into the national Built and Archaeological Heritage Plan	2
Japan	**Case Study Five:** Use and retention of traditional ecological knowledge found in the use of stone tidal weirs	1 2 3
United States	**Case Study Six:** Role of traditional fire practices in the conservation of oak forests in South West US	1 2 3
China	**Case Study Seven:** Effective use of local knowledge in the adaptation of large and complex cultural landscapes of Honghe Hani Rice Terraces	1 3
Nepal	**Case Study Eight:** Describes collaborative work between Western institutions and Nepalese communities in addressing impact of natural disasters on Kathmandu	1 2 3
Nigeria	**Case Study Nine:** Impact of climate change on Ogun coastal communities and how local and traditional knowledge is being adapted and utilised to reduce severe impact	1 2 3
Sri Lanka	**Case Study Ten:** How the empowerment of women in climate action has strengthened local knowledge and climate resilience	1 3
Macau China	**Case Study Eleven:** Revitalisation of traditional skills to help counter the impact of climate change and rapid urbanisation on historic urban architecture	1 2 3
Philippines	**Case Study Twelve:** Utilisation of Indigenous stone walling technology in climate adaption and its transference to urban settings	1 3
South East Asia	**Case Study Thirteen:** Maladaptive use of traditional slash and burn farming and the need to better adapt traditional practices with controlled methods	1 2 3

1 Knowledge Systems 2 Impacts 3 Solutions

Figure 4: Breakdown of case studies with a brief summary

Summary of the Meeting Themes, Schedule and Discussions

To work towards this mandate, three overarching scientific questions and two cross-cutting issues were discussed at the Meeting. These were:

1. Systemic connections of culture, heritage and climate change (Knowledge Systems)

- Nature and scope of representation of diverse forms and scales of culture and heritage in climate literature and assessments
- Integration of diverse knowledge systems, including Indigenous knowledge systems, across areas of climate research and response
- The history of climate change and its alignment with the history of all communities; nature and scope of historical, social and cultural contexts of the Anthropocene

2. Loss, damage and adaptation for culture and heritage (Impacts)

- Climate impacts on culture and heritage, including methods of describing vulnerability of culture and heritage to climate impacts
- Adaptive/preservation methods for culture and heritage, including understandings of significance and approaches to prioritisation of/for action
- Understanding of and approaches to loss and change

3. Roles of culture and heritage in transformative change and alternative sustainable futures (Solutions)

- Capacity of historic buildings/landscapes/traditional land use to hold carbon
- Cultural and natural heritage as sources of resilience or refuge in response to disasters
- Heritage as inspiration for art, connection, understanding and action on climate adaption and mitigation

4. Cross-cutting issues: a) Cultural governance; b) The capacity to learn from the past

- Who decides what heritage is?
- How is heritage knowledge managed?
- Intersections of heritage with conflict
- Use of data and knowledge from the past in climate models and policy
- Finding common ground between climate and heritage approaches to research questions

To take stock of the state of knowledge regarding these overarching questions, and to stimulate discussion, three White Papers were commissioned in advance of the Meeting **(Annex B).** White Paper themes aligned with the agreed overarching scientific questions outlined above and were used to develop topics and considerations discussed during the Meeting. These themes are outlined below.

Theme 1: Systemic connections of culture, heritage and climate change (Knowledge Systems)

As outlined in the Knowledge Systems White Paper, knowledge systems can be 'defined as sets of interacting agents, practices and institutions that organise the production, transfer, and use of knowledge' and as 'complex ensembles of connected values, practices, institutions – as well as beliefs, worldviews, emotions and senses' (Orlove *et. al.* 2022). Opportunities exist to work across different systems of knowledge (e.g., Indigenous knowledge, local knowledge, practitioner, and scientific knowledge) and to support the willingness of individuals and groups coming from different knowledge systems to work together to address the widely acknowledged threat of climate change.

Theme 1 discussions explored these considerations with a focus on the following topics:

1) Knowledge systems, power and interpretation of climate change
2) New conditions, new knowledge
3) The challenges and opportunities of integrating knowledge systems

Theme 2: Loss, Damage and Adaptation for Culture and Heritage (Impacts)

The Impacts White Paper identified a global imbalance in the understanding of impacts resulting from an incomplete picture of how climate change is impacting culture and heritage around the world. It stressed the importance of losses and damages[1] to climate action and how this imbalance in the understanding of impacts is resulting in unequal and incomplete recognition of non-economic losses. This dynamic is further exacerbated by current literature, which predominantly evaluates exposure in a data-driven or data-informed way; this in turn causes a bias towards listed and protected heritage, and towards areas in which heritage is well documented and well described. Overall, the White Paper noted that the implications of climate change for culture and heritage are diverse and complex. This is due to the variety of global climate and environmental change, compounded with local anthropogenic factors stressing the 'urgent need to promote a collective understanding and use of representations of uncertainty and likelihood, within both IPCC and heritage related fields, in line with the relevant broader communities to foster cross-disciplinary collaboration and impact.' (Simpson *et. al.* 2022).

Theme 2 discussions explored all these considerations with a particular focus on the following topics:

1) Collective understanding of uncertainty
2) Identifying common factors for vulnerability and resilience
3) Impacts, power and interpretations of climate change

[1] This report utilises the definitions of 'Loss and Damage' and 'losses and damages' used in the Glossary to the 2022 IPCC WGII report, namely, 'Loss and Damage (capitalised letters)' refers to the political debate while 'Lowercase letters (losses and damages) have been taken to refer broadly to harm from (observed) impacts and (projected) risks and can be economic or noneconomic'. See IPCC, 2022: Annex II: Glossary [Möller, V., J.B.R. Matthews, R. van Diemen, C. Méndez, S. Semenov, J.S. Fuglestvedt and A. Reisinger (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem and B. Rama (eds.)]. Cambridge University Press.

Theme 3: Roles of Culture and Heritage in Transformative Change and Alternative Sustainable Futures (Solutions)

The Solutions White Paper suggested that science-based solutions are likely to be socially, economically, politically and culturally interwoven. As such 'mobilising the affective power of heritage becomes a potentially powerful tool in organising for climate action – although this involves emphasising a different version of heritage, less concerned with national pasts and more with collective human endeavour' (Shepherd et. al. 2022)

Prioritising change requires an understanding of the things people value, what they are willing to change and what they are not. Values are often implicit or unstated; explicitly identifying values can improve mitigation and adaptation outcomes. This theme explored how culture and heritage can help people and communities to imagine and realise low carbon, just and climate-resilient futures. The past can be a key resource in these

Theme 3 discussions explored all these considerations with a particular focus on the following topics:

1) Climate justice
2) Impacts and capacity building
3) The power of heritage in climate thinking

Within the Meeting, participants were asked to consider how we might: enhance resilience, adaptation and mitigation action and support; enhance understanding of methodologies, indicators and data, different forms of data and evidence and what type of support is needed in this pursuit; rethink national climate action planning and implementation; and enhance understanding of reporting instruments and communications.

Suggested points of entry included: terrestrial and freshwater systems; cities and settlements; the ocean, coasts and intertidal zones; water heritage and security; food security and agriculture; health and wellbeing; and economies and livelihoods. Particular emphasis was placed on cities and urban areas and their governance due to urban areas' complex culture and heritage and the 'high proportion of global greenhouse gas emissions … generated by urban-based activities' (Revi et al., 2014), and corresponding potential to support transformative change. The IPCC WGIII Summary for Policymakers report stated, 'The global share of emissions that can be attributed to urban areas is increasing' and that the 'drivers of urban GHG emissions are complex and include population size, income, state of urbanisation and urban form'. **Case Study Box one** outlines some synergies and gaps in knowledge about the relationship between culture and heritage and transformative urban climate adaptation, mitigation and climate-resilient sustainable development.

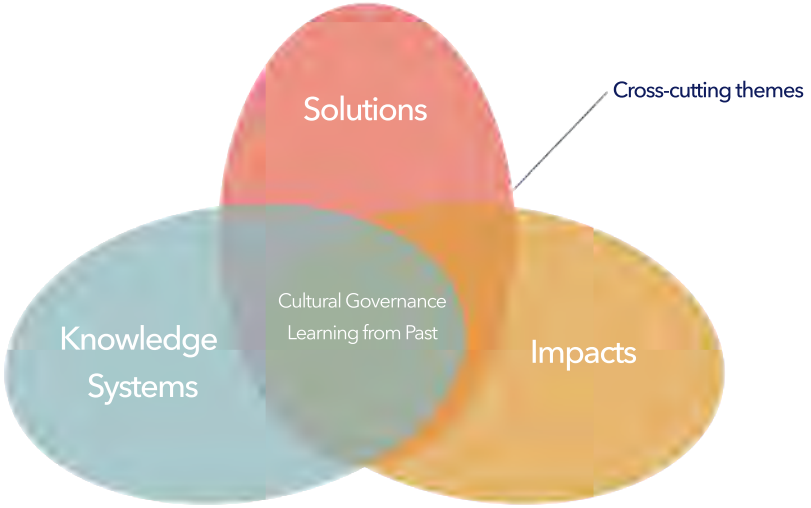

Figure 5: Visualising the relationship between the different sub-themes

Case Study Box 1

Cities as Engines of Transformation for Global Sustainability in the Urban World of the 21st Century

Author: Yunus Arikan, ICLEI /Andrew Potts, Climate Heritage Network

At the **43rd Session in 2016,** the IPCC agreed to prepare a special report on cities as part of the IPCC 7th Assessment Report and to convene a special meeting as part of the preparatory process. The IPCC Co-Sponsored International Conference on Cities and Climate Change was convened in March 2018 and concluded with the Global Research and Action Agenda on Cities and Climate Change. The IPCC took note of this report and the full version was published by the World Climate Research Programme in 2019.

The Global Research and Action Agenda on Cities and Climate Change notes that actions to address climate change through adaptation and mitigation at the city level will make crucial contributions to the national efforts aimed at fulfilling international commitments. It is built on three pillars: cross-cutting issues and knowledge gaps, key topical research areas and suggested implemented approaches. In 2021 'History and Cultural Heritage' was added as a new topical area at the **Innovate4Cities 2021 Conference** and several gaps for future research were listed.

The urban context presents steep challenges as cities are on the frontlines of issues such as inequality and the need for transparent institutions. As socially constructed entities, cities are also arguably one of humanity's greatest inventions for crafting solutions for the future. From the ancient cities of Mesopotamia to the metropolises of today, cities bring creative and productive people together.

With consideration of the evidence base that exists concerning the role of culture and heritage for climate change in urban areas, some of the synergies and gaps noted at the Meeting (2022) include:

- The potential of heritage methodologies and culturally sensitive approaches to achieve more equitable inclusion of diverse individuals and communities in adaptation and mitigation decision-making processes at urban scales.

- The layers of the urban built environment, including archaeology and heritage sites, as sources of insights as to how humans in agglomerated settlements have coped with environmental changes throughout history. Not only do these scientific data need to be better assembled, but the non-use of existing data also suggests the existence of 'implementation gaps'.

- Culture and heritage are keys to understanding: the spatial dimensions of cities and the interplay of this with circular economies; mobility and walkability; local self-sufficiency; gastronomy and healthy living. Better connections are needed between:

a) these cultural dimensions of urban planning and design
b) climate change mitigation and adaptation action

- Research indicates that changes to underlying cultural norms are more difficult to accomplish than transitory behavioural changes. Once established, however, they are likely to be more durable and to support a wider range of low-carbon lifestyles. More knowledge and implementation are needed to show how the cultural and heritage dimensions of urban living – both the physical form and social relations – affect consumption, influence adaptive capacity and intersect with the possibility of climate-resilient development.

Towards COP26, 'circular culture'[2] emerged as an innovative concept and potentially a powerful approach to address climate emergency. Overall, the evidence considered pointed to the need for new partnerships, connections and research supporting a larger role for culture and heritage in climate change science of cities. It will be essential that this larger role be realised in the next phases of implementation of the Paris Agreement with the recognition of multilevel and co-operative action in the Glasgow Climate Pact and in the scoping and delivery of the forthcoming special report on **Cities and Climate Change in 7th Assessment Report (AR7).**

Figure 5: Visualisation of the circular culture that has developed out of Eurocities. The vision of circular culture is based on four pillars: **Harmony with nature, harmony with change, harmony with each other and harmony with the past.**

[2] The concept of "circular culture" was first presented by the Tunç Soyer, Mayor of Izmir Metropolitan Municipality and member of ICLEI Global Executive Committee at the UCLG Culture Summit in Izmir (Soyer, 2021). The concept is further advanced by Izmir Planning Agency (IZPA, 2022) in collaboration with a broad diversity of partners..

Part II: Knowledge Gaps and Action Items identified through the Meeting

1. Cross-Cutting Knowledge Gaps and Actions Items

The Meeting identified a range of cross-cutting issues that need to be addressed in all stages of climate action. These include the recognition and inclusion of the diversity, role, function and value of all knowledge systems; the co-production of research and policy design and its implementation; and evaluation and learning. Diverse ways of knowing and measuring climate change are essential in understanding the scale and scope of climate change impacts, loss and damage, including on culture and heritage, as well as the role that culture and heritage can play in alternative sustainable futures.

a. Holistic and Inclusive Approaches to Culture, Heritage and Climate

To explore alternative, sustainable responses to climate change, there is an urgent need to enable holistic and inclusive approaches to culture and heritage that unlock its potential to help people imagine and realise climate-resilient futures. This process can be facilitated through the acknowledgement and recognition of diverse knowledge systems (i.e. ways of knowing, measuring and recording) and of how each of these ways of knowing understands the relationship and inter-connectedness between human and natural systems. Enabling real participation in decision-making and capacity building in ways that promote diversity, inclusion and justice benefits from collaboration between climate scientists, Indigenous Peoples and local communities, governments, private sectors, culture/heritage practitioners, and professionals, and policy makers across human and natural systems. Specifically, real participation addresses the need to avoid silos and to acknowledge plurality and inclusiveness of knowledge systems, removing any need to give precedence to one over another. Those involved in culture and heritage, including understanding the past, can help to address opportunities and barriers within governance frameworks and legal frameworks.

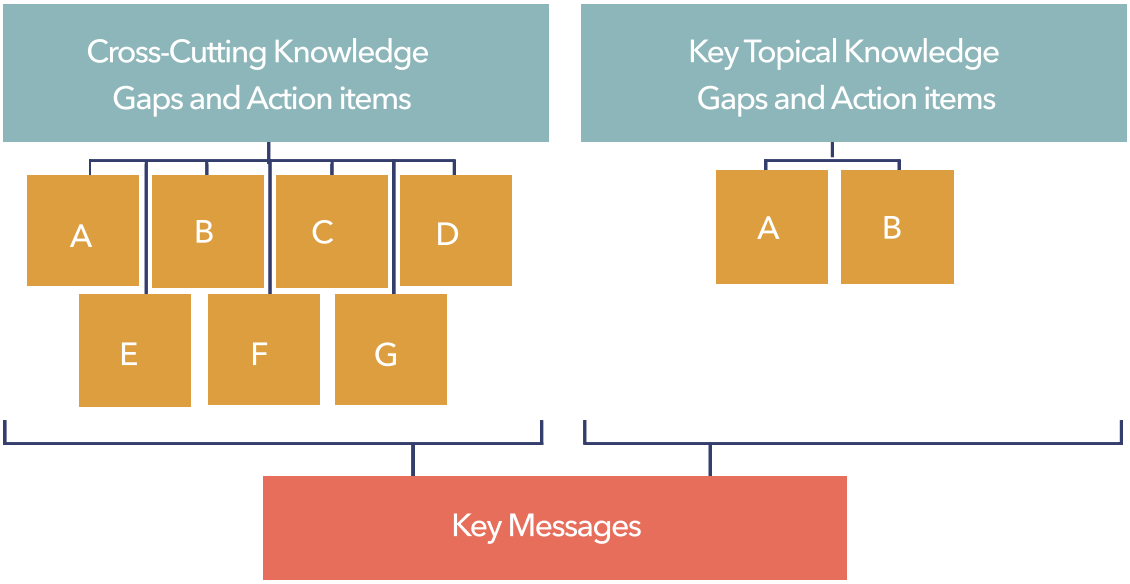

Figure 6: Relationship of the different wider themes and issues that were brought up in the Meeting, and how they were condensed into Key Messages

Key Message (hereafter KM) 1:

Climate and culture collaborations should start with the premise that all voices and knowledge systems are equally valuable in terms of the role, function, distinctiveness and contribution to addressing climate change and emerging problems

Indigenous Peoples and Local Communities have long been undermined in their rights and ability to participate in actions on equal terms and on equal footing with other stakeholders, an imbalance that must be appreciated more fully when planning collective climate action. Protocols for protecting, promoting and collaborating across diverse knowledge systems (including Indigenous Peoples' and Local Communities' ways of knowing and practices) are available and can be advanced through participatory and collaborative approaches. A paradigm shift would involve moving from a model where Indigenous Peoples' knowledge and concerns are objectively presented and reinterpreted to one in which space is made for them to share their knowledge and experience from their own world-views on an equal footing.

New approaches to the design of management and decision-making systems (including calls for tenders and contracts) can reinforce and support diverse knowledge systems e.g. through co-production approaches. This requires the continuous and critical review of existing approaches and how they consider issues (such as free, prior and informed consent; intellectual property rights; tenure rights; recognition of customary law; acknowledgment of Indigenous sovereignty), as well as in what ways they can continue to develop to address emerging issues effectively and inclusively. During the Meeting, Chrissy Grant (Aboriginal Kuku Yalanji from the Jalun-Warra clan and Torres Strait Islander (Mualgal from Kubin on Moa Island Elder) spoke of work in the Great Barrier Reef that prioritises and ensures consent is requested and accepted upfront – **a)** to make sure that Indigenous Peoples are not disadvantaged in any way by giving or having their knowledge used in wayswithout their consent, and **b)** to ensure they benefit from the work and their sharing of knowledge through capacity building and sharing information into their systems as well (pers. comms., Grant 2021).

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KM2:

National, sub-national and local governments' climate policy decision-makers need to work collaboratively with researchers, practitioners and local knowledge holders to proactively to acknowledge, translate and incorporate data on social, cultural, spiritual, and natural dimensions to avoid silo-style understandings and analysis of climate action and practice, and to improve and dvelop holistic, equitable and inclusive evidence-based policy.

Diverse data sources from diverse knowledge systems generate insights on past and present human and natural systems regarding the implications of actions, such as synergies and trade-offs, as well as the role that culture and heritage actors can have towards these outcomes. National and local government actors in fields

such as climate planning, nature conservation, culture or the environment are often siloed, which obstructs issues from being addressed in an integrated manner, including geographies, social and cultural dimensions, ecological, economic, technical and development factors. This is particularly evident between governing, legal and management structures that artificially separate nature and culture and that further divide culture into tangible and intangible. In Nepal, for example, work done following the 2015 Gorkha earthquake faced challenges due to plural Indigenous knowledge systems being recorded in ways that were incompatible with government and academic systems; this led to great difficulty in the sharing and dissemination of information and project scaling (pers. comms. Coningham, 2021). Intersectoral, integrative and landscape approaches can look more holistically at areas to support climate planning and responses better. These approaches can help develop how effectively to apply successes and effective practices from one locality with its peculiarities to another, as well as how to evaluate the ways in which actions might potentially impact local cultures. **Case Study Box Two** provides an example of how different sectoral plans were considered within heritage planning to facilitate consistency and strategic vision across different sector policies. It is an empowering initiative in which New Zealand's first peoples, Māori (tangata whenua), are working alongside local government to develop adaptation plans with a shared vision.

KM3:

Scientists and researchers in the social and natural sciences need to collaborate proactively with Indigenous Peoples and local communities through co-production approaches and to acknowledge the value of traditional research practices as contributing to an understanding of climate-related heritage issues equal to scientific approaches.

This requires recognising the integrity of knowledge systems as having a wide range of components, including spiritual dimensions, which provide a holistic framework to address climate-related challenges to heritage. Ongoing evidence of inequality and a lack of recognition of local communities and local knowledge is seen across the world. For example, in the Caribbean in Puerto Rico, the knowledge of local communities is often not yet recognised or incorporated in management planning. As such, these voices, experiences and situations are largely ignored or absent – most notably after disasters and emergencies such as devastating hurricanes (pers. comms., Flores Román 2021). On the other hand, an example of how projects can be co-designed with Indigenous groups or local communities is demonstrated through **Case Study Box Three.**

Case Study Box 2

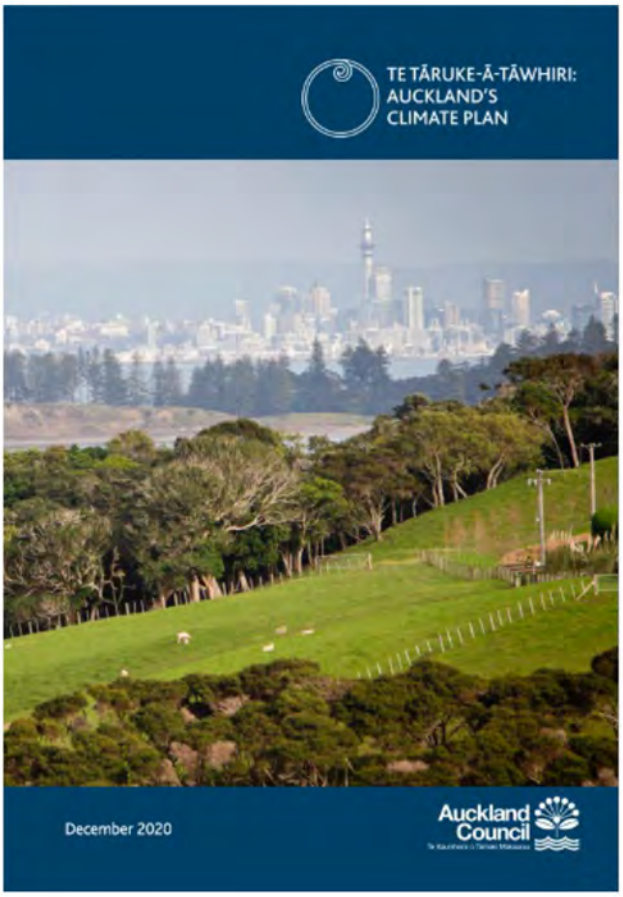
Co-produced Climate Action Planning, Aotearoa/New Zealand

Case Study Region: New Zealand, South Pacific

Authors: Sarah Forgesson, University College London/ Helen McCracken, JSC-ANZCORP

In New Zealand work is continually being done, with various levels of success, to identify and incorporate local iwi (tribes) into adaptation plans. Most notable is that of New Zealand's largest city, Auckland, in which its inhabitants are engaging with a remit of differing understandings but a shared vision. Utilising and adapting the Dynamic Adaptive Pathways Planning (DAPP), first developed in the Netherlands, Auckland Council in collaboration with Tāmaki Makaurau iwi have developed the 'Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan' (Auckland Council 2020).

The Plan acknowledges the importance of Indigenous knowledge and 'mana whenua as the first peoples of Tāmaki Makaurau (Indigenous name for Auckland), and an intimate part of the ecological and cultural fabric of the region'. In response to the Plan, mana whenua have developed a Te Ao Māori wellbeing framework called **Te Ora ō Tāmaki Makaurau, to be used together with Te Tāruke-ā-Tāwhiri.**



Cover Page of Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan © Auckland Coucil

From a Te Ao Māori perspective, we need to consider equity and fairness from the perspective of nature, place and people. Recognising the rights and interests of nature, place and people from a whole living systems perspective is critical.

Excerpt from Plan, pg 12

b. Governance and Institutional Frameworks

Governance and institutional frameworks are multi-layered in that they span across hierarchical or horizontal levels, involve a range of actors and relate to a variety of issues and aspects. Those involved in culture and heritage, including understanding of the past, can contextualise tensions across governance and frameworks related to legitimacy, ownership and inclusivity issues. This includes investigating historic and ongoing distributions of power, exploring why and how this has been enabled through existing forms of path-dependencies and considering what consequences these inequalities have had – and continue to have – on the capacity for diverse actors to respond to decisions. Governance and institutional frameworks are further complicated by geographical scale (i.e. through how culture and heritage might be recognised internationally, regionally, nationally and locally) and what that might mean in terms of limitations on, for example: agency, jurisdiction and authority; participation in decision-making; access to finance and funding; or representation, due to alternative (and unrecognised) forms of governance structures. Such governance and frameworks can actively marginalise diverse actors through perpetuating power imbalances within processes.

Figure 7: Visual demonstration of how governmental and institutional frameworks are complicated by geographical scale (i.e. through how culture and heritage might be recognised internationally, regionally and locally)

KM4:

Drivers that disempower and deprive some actors, and detach groups and individuals from culture, heritage and climate change planning, must be addressed with a view to enhancing diversity.

Different experiences apply to different actors and groups across different regions, and as such governance and institutional frameworks must respond to this, and require meaningful inclusion of diverse cultures, interests and voices in planning, decision-making, monitoring and revised actions. In the context of heritage, many methodologies for identifying and documenting heritage acknowledge that contested identities and diverse values form an integral part of that process, although practice in some places needs to be improved. Moreover, these practices will need to expand to focus on values that support climate action and to improve support for traditional and associated communities as they prepare for losses and damage, making use of culturally appropriate documentation tools. These tools are used by those involved in culture and heritage, including understanding the past, to help critically address systemic inequality and exclusion, and their causes, in the governance of climate response.

Case Study Box 3

Impact of Climate Change on Inuit heritage

Case Study Region: Canada / Inuit Nunangat (the Canadian Arctic), North America

Author: Max Friesen, University of Toronto

Two separate Indigenous organisations in Inuit Nunangat (Canadian Arctic) and Arctic archaeologist Max Friesen (University of Toronto) have worked in collaboration for over 20 years. The first project, in the Mackenzie Delta, was performed in collaboration with the Inuvialuit Cultural Centre, who co-designed the research and supported the work throughout. The second, in Nunavut, was initiated and led by the active, Elder-run organisation **Pitquhirnikkut Ilihautiniq / Kitikmeot Heritage Society (PI/KHS)** of Cambridge Bay; Max became involved naturally, having worked in collaboration with PI/KHS since 1999.

The Arctic is experiencing high rates of climate warming, causing serious concerns in the day-to-day world of circumpolar Indigenous peoples related to housing (melting permafrost leads to slumping of buildings), erosion (many coastal villages are actively eroding) and travel (winter routes over sea ice are no longer safe). Coupled with these issues is the awareness that northern heritage is also being impacted.

For the first project, in the Mackenzie Delta region, the Inuvialuit Cultural Centre partnered with the University of Toronto to study and address the destruction of ancestral Inuvialuit archaeological sites due to coastal erosion. Over five years they surveyed hundreds of kilometres of coastline and rescue-excavated two large pit houses in danger of imminent destruction.

The second project was organised by the Pitquhirnikkut Ilihautiniq / Kitikmeot Heritage Society (PI/KHS). The PI/KHS first evaluated why working with archaeologists might benefit their activities. Following a meeting to see if personalities and visions aligned, the parties committed to work together. PI/KHS and the University of Toronto have since shared decision-making at all stages, as well as research, to the benefit of both groups.

Today PI/KHS are concerned about the impacts of climate change on ancestral sites. They have initiated a programme to monitor erosion in key regions and have future plans to research the impact of thawing permafrost on archaeological sites. In addition, the organisation is at the forefront of applying Inuit knowledge in solving climate-related problems. They are currently designing and building a prototype net-zero building for Arctic communities. Based on Inuit principles of flexibility and sustainability, the building uses modern materials adapted from traditional architectural forms based on snow, stone, driftwood, and animal skins.

Elders and researchers discuss an ancestral Thule house during its excavation. Aspects of the region's Traditional Knowledge and archaeology are being used to design sustainable buildings in the warming North. Photo ©Max Friesen

Researchers examine the floor of a 400-year-old Inuvialuit sod house slumping down an eroding bluff. Two years later, nothing remained of this house. Photo ©Max Friesen

KM5:

Cultural and social sciences' methods and methodologies involving forms of monitoring, observing and interpreting need to be acknowledged as robust evidence within the scientific fields predominantly used in the study of climate change and in deliberative processes surrounding climate action decision-making.

The social science value of understanding and responding to climate change is rooted in human, social, political and cultural behaviours, dimensions and contexts, which in turn highlight the interconnections between people and ecosystems, and the dependency of people on ecosystems. Yet these behaviours, as well as social and cultural dimensions and contexts are multi-faceted and complex; they cannot be easily quantified, if at all. Awareness across the natural and climate change sciences is needed to recognise that culture and heritage relate to past and present human interventions, land use and management practices, as well as power dynamics and inequalities, consumption and production patterns, and (un)sustainable practices and behaviours. Social sciences focus on the how and why of the what and where, in terms of climate change impact and action. It also facilitates the amplification of diverse voices. Cultural and social sciences' methods and methodologies, involving forms of monitoring, observing and interpreting, need to be acknowledged as robust evidence within the scientific fields predominantly used in the study of climate change and in deliberative processes surrounding climate action decision-making.

c. Integration of Natural and Cultural Heritage

Heritage is often categorised in silos (i.e. natural, cultural, intangible, tangible) for governance purposes, making the implementation of holistic management approaches (that acknowledge the connection, inseparability and importance of multiple dimensions of heritage) challenging. Indigenous Peoples and local communities' roles in designing, managing and implementing positive change are critical drivers for sustainable ecosystem management; many different Indigenous Peoples and local communities are deeply connected with nature and conceive the human nature relationship as equal and interconnected. The relationship between cultural and natural environments has only recently been increasingly recognised by, for example, organisations such as UNESCO, ICOMOS, IUCN and IPBES, who are addressing this in their work.

More crucial is the missed opportunity in addressing the environment holistically alongside other national priorities: culture and heritage should be an element of decision-making on sustainable building and infrastructure priorities and developments; land use management and governance; agriculture and food security resource efficiency and carbon sequestration; ruralisation/urbanisation; Ecosystem-based Adaptation (EbA)[3]. Barriers to recognise cultural and natural heritage as inseparable are due not to scientific uncertainty, but rather to a lack of political understanding. Diverse actors and groups need more self-determnation and local autonomy in these processes. Those involved in culture and heritage, including those understanding the past and the role of diverse actors and groups, can better inform the role and function of traditional practices and management for green and blue infrastructure.

[3] Note that 'Nature Based Solutions' has been challenged as a term during the WGII approval, leading to the following footnote, "Ecosystem based Adaptation (EbA) is recognised internationally under the Convention on Biological Diversity (CBD14/5). A related concept is Nature-based Solutions (NbS), which includes a broader range of approaches with safeguards, including those that contribute to adaptation and mitigation. The term ' Nature-based Solutions' is widely but not universally used in the scientific literature. The term is the subject of ongoing debate, with concerns that it may lead to the misunderstanding that NbS on its own can provide a global solution to climate change."

KM6:

Knowledge is needed on ways to enhance the culture and heritage sectors' current capacity to contribute to climate change planning.

There is a consensus that cultural institutions and public bodies lack human capacity, training, financing and funding, not to mention the organisational flexibility required to participate in climate change programmes and policies and to incorporate climate change planning explicitly into their existing frameworks and work programmes. The methodological, organisational psychology and other root causes of the non-inclusion of culture and heritage bodies in the formal climate planning needs to be understood better so these roadblocks may be dismantled. **Case Study Box Four** provides an example of how heritage, including built heritage and archaeological sites, was robustly included in national, multi-sectoral climate adaptation planning. The issues around integrating attention to cultural dimensions into institutional climate planning finds a parallel in the incorporation of social sciences in climate science. It also provides an example of how different sectoral plans were considered within heritage planning to facilitate consistency and strategic vision across different sector policies.

KM7:

Future climate management and planning need to incorporate approaches that integrate both natural and cultural heritage (tangible and intangible), which must in turn be informed and incorporated by a range of expertise, particularly from Indigenous Peoples and local communities.

Diverse forms of heritage need to be taken account of across climate and disaster response governance levels, including in political discourse and processes. For example, in Vanuatu, many see cyclones as constituents of their culture, rather than as disasters. As such, categorisations of cyclones and consequential disaster response frameworks become decisions that are imposed from a top-down structure. Interesting conversations are taking place between local communities and disaster managers as local communities continue to insist that they are being forced into a disaster response framework in ways that are not necessarily culturally appropriate, making them feel that their own response mechanisms are ignored (pers. comm., Ballard 2021).

KM8:

Existing knowledge and methods for sustainable ecosystem management are embedded in Indigenous Peoples' and local communities' knowledge systems and practices.

Indigenous Peoples and local communities hold knowledge, expertise and evidence of mutual and equal importance to natural science evidence. Indigenous Peoples and local communities, through generations of understanding and observing natural cycles and patterns, practising independent mechanisms and forms of conservation and protecting ecosystems, are well equipped to produce meaningful and effective options and solutions for transformative change, including social-ecological systems thinking and biocultural approaches. For example, in North Canada the caribou co-management board added previously marginalised voices from caribou-hunting communities; it now comprises individuals representing various Indigenous groups (Inuit, Dene, the First Nation) as majority alongside government agencies, scientists and

Case Study Box 4

Ireland's National Climate Adaptation Framework

Case Study Region: Ireland, Europe

Author: Dr Cathy Daly, Carrig Conservation and University of Lincoln

Ireland's National Climate Adaptation Framework (NAF) is composed of nine sectoral plans, all of which were written using a six-step framework stipulated by the Department of Communications, Climate Action and Environment (2019) – the government department charged with coordinating the NAF. The Built and Archaeological Heritage plan was informed by existing research and incorporated expert stakeholder and public consultation. It also closely considered the other sectoral plans to aid consistency within the NAF and to ensure that cross-cutting issues were highlighted. Of the many potential impacts of climate change, those identified as priorities were flooding (inland and coastal), storm damage, coastal erosion, soil movement (landslip or erosion), changing burial preservation conditions, pests and mould, wildfires and maladaptation.

Goals, objectives and an action plan were developed commensurate with the five-year term of the plan, but also initiating a long-term strategic vision. While the focus of the adaptation action plan was on addressing priority impacts, many capacity building measures address a broader range of effects – an advantage given the uncertainty of climate change. A monitoring strategy was developed to monitor progress, identify problems and inform improvements to the adaptation plan as part of an iterative process. The process of writing the NAP illustrated that climate change adaptation may offer the opportunity to initiate a more holistic approach to heritage policy and governance, including options for inter-sectoral policy alignment.

All images © Carrig Conservation International Ltd.

The process of writing the NAP illustrated that climate change adaptation may offer the opportunity to initiate a more holistic approach to heritage policy and governance, including options for inter-sectoral policy alignment

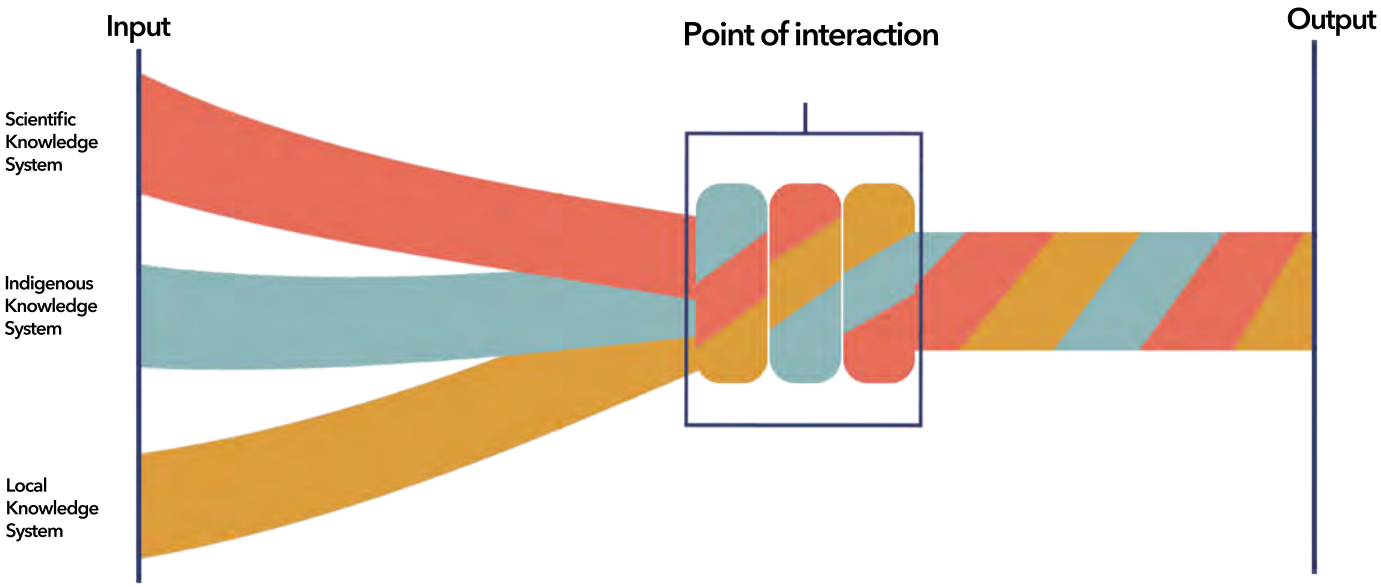


Figure 8: It is important to note that when seeking to utilise the three knowledge systems that the distinctivness of each is recognised, allowing for autonomy of different knowledge systems, rather than integrating them into a single hybrid knowledge system. This will enusre each is considered a complex, integrated whole. This figure represents the concept of 'braided knowledge,' which is commonly used by Indigenous Peoples and local communities, showing how each knowledge system is recognised as a separate entity, but at the same time is interwoven with the other strands to form a stronger whole that would not be possible without each of the strands (Orlove et. al. 2022, Snively and Williams, 2016)

academics. Through knowledge of caribou ecology and behaviours from resource-users with the common goal of safeguarding the caribou population, this co-management model has had successes in the provision of suitable approaches and support to complex systems (pers. comm., Friesen 2021).

KM9:

Advance knowledge of the impact of anthropogenic climate change on oceans and other aquatic environments and its intersection with communities and heritage.

The cultural heritage dimensions of the Ocean, water systems and other aquatic environments are often overlooked. 'The physical, biological and chemical impacts of climate change on cultural heritage located under water and related heritage remain poorly understood, putting heritage (sites) and traditional cultural lifeways (practices) at risk (pers. comm. Underwood, 2021). There is a need for more research into and across water systems, particularly as coastal communities are vulnerable to the impacts of climate change. 'People and communities have long exploited bodies of water such as rivers, lakes, and coasts for access to crucial resources and rich ecosystems, including water', and local knowledge encompasses ways in which existing communities understand their environments and enhance resilience (Morel et al., forthcoming). For example, in the UK, the Coastal and Intertidal Zone Archaeological Network (CITiZAN), CHERISH and SCAPE work with coastal communities across England, Scotland, Wales and Ireland. Working in collaboration, the three projects produced 14 climate heritage short videos to illustrate how understanding coastal communities and environments enhance an understanding of climate change and its impact on coastal and inland communities and settlements – including industries, biodiversity, ecosystems, landscapes and seascapes, building andinfrastructure, food security and more. Case Study Box Five also illustrates how heritage, or fish weirs, provide evidence of sustainable cultural practices and industries, developed through local knowledge of the environment and opportunities.

Case Study Box 5

Indigenous People, Traditional Ecological Knowledge and Climate Change: The Iconic Underwater Cultural Heritage of Stone Tidal Weirs

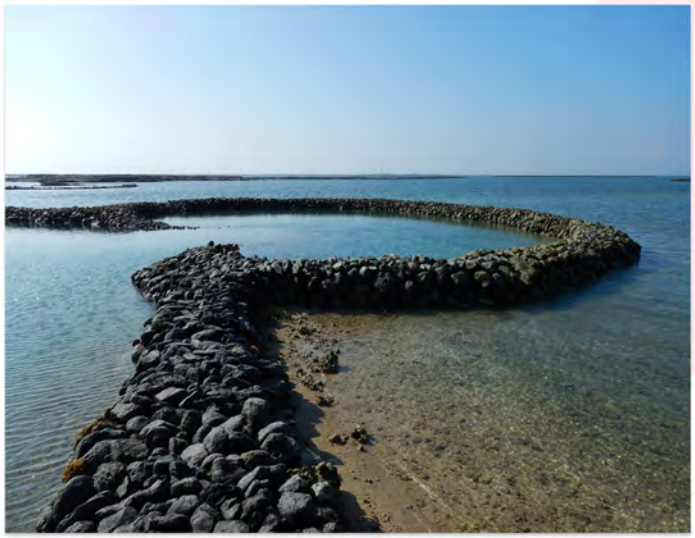
Case Study Region: Japan, East Asia

Author: Akifumi Iwabuchi – Tokyo University of Marine Science and Technology
[UNESCO UNITWIN Network for Underwater Archaeology]

The underwater cultural heritage of stone tidal weirs is incredibly vulnerable to the impacts of climate change. If the sea level rises more than one metre, these traditional pieces of architecture and a form of knowledge system no longer function as a viable fish trap. Furthermore, once they are damaged by destructive storms or high waves, now more frequent, most coastal communities are unable to mend or reconstruct them, leaving them abandoned. In certain communities, tidal weirs play an important role as eco-friendly fishing gear; they help to sustain marine biodiversity and cultural diversity, and also serve as a tourist attraction which in turn has led to revival movements. For example, Hainan Island used to have many stone tidal weirs. Despite their deterioration, the adaptation and utilisation of traditional ecological knowledge, expressed through traditional songs, illustrates how this heritage is still relevant. The lunar tidal calendar is still used for fishing inside stone tidal weirs, passed down through generations by islanders, and a few communities have taken advantage of the tide cycles which divert stone tidal weirs to fishponds. Such resilience and adaptation in coastal communities has also been observed in the Hawaiian Islands, which have similar stone tidal weirs and fishponds.

Despite their deterioration, the adaptation and utilisation of traditional ecological knowledge, expressed through traditional songs, illustrates how this heritage is still relevant.

Yet, through a combination of environmental changes and modern coastal developments, such weirs are on the verge of disappearing, often without being studied further nor safeguarded by local and central governments.



Stone tidal weirs in the Peng hu Islands © A. Iwabuchi

Local utilising tidal weirs in the Fujian Province © A. Iwabuchi

d. The Domain of Intellectual Property Rights

There is an ongoing movement to provide better protections under international systems for Intellectual Property Rights (IPR). Rules or provisions relating to IPRs must provide international legal instruments that recognise the rights of Indigenous Peoples and local communities to their knowledge, resources, expressions, creativity and innovation; they empower and enable all diverse actors to have sovereignty of their own intellectual property. Many established research organisations continue to use unethical and inappropriate methods of collaboration with diverse actors, including Indigenous Peoples and local communities. Trade-Related Aspects of Intellectual Property Rights, known as TRIPS, can also have negative impacts on the environment, food security, human health, biodiversity, livelihoods and other rights, and thus require equal and fair representation and deliberation.

KM10:

Effective approaches (e.g. access and benefit-sharing systems) are needed to ensure the recognition, contribution and rights of knowledge and resources, particularly from Indigenous Peoples and local communities, and to ensure that these are not misappropriated, misrepresented or used out of context nor appropriated in ways that they have not allowed (i.e. commercialisation or through private ownership).

It is important that free, prior and informed consent is given for access and use of knowledge systems, and that cultural and traditional intellectual property is properly protected to ensure self-determination, cultural integrity, respect and protection of rights, including cultural rights. This includes gathering, storing, patenting and using literary, performing and artistic works; languages; types of knowledge (including spiritual knowledge); cultural heritage (both tangible and intangible); ancestral remains and genetic material; culturally-relevant or environmental resources; heritage of significance; and other documentation. When in pursuit of collaborative research/work between knowledge systems, it is critical to be clear on data-sharing and benefit-sharing agreements so that IPRs are maintained, consent is transparent and groups (e.g. Indigenous Peoples and local communities) are not disadvantaged in any way by giving or having their knowledge used, misused or abused. Indigenous Peoples and local communities must benefit tangibly from it, including through capacity building/strengthening, development planning and sharing information into their systems. For example, in Australia, integration of knowledge systems for management of the Great Barrier Reef includes key discussions on data-sharing agreements and maintaining IPRs to disclosed knowledge. There is a requirement for meaningful consultation and to be upfront and transparent about consent. As an example of potential outcomes from this, work is being done in Australia to develop a standalone piece of legislation for Indigenous IPRs that is distinct from the general intellectual property (pers. comms. Grant, 2021).

When in pursuit of collaborative research/work between knowledge systems, it is critical to be clear on data-sharing and benefit-sharing agreements so that IPRs are maintained, consent is transparent and groups (e.g. Indigenous Peoples and local communities) are not disadvantaged in any way by giving or having their knowledge used, misused or abused.

KM11:

Mutual respect, synergies and collaboration between diverse actors from different knowledge systems, fields of study, perspectives and approaches are crucial elements of an urgent enabler of effective climate action.

Working across barriers will help to build trust and create a space for reconciliation between diverse actors, many of whom have been historically excluded from decision-making processes despite acting as effective stewards of ecosystems. Historical and institutional biases have limited, and continue to limit, the capacity of local institutions, diverse actors and different sectors, including in the areas of climate response and disaster preparedness. For example, currently in Australia, a collaborative project – Healthy Country Ai – is being undertaken between Aboriginal co-researchers and Indigenous rangers, the global corporation Microsoft, the UNESCO World Heritage site Kakadu Board of Management and Australia's national science agency CSIRO, featuring researchers from the Northern Australia National Environment Science Program (NESP), the University of Western Australia (UWA) and Charles Darwin University (CDU). The goal is to support better decision-making to care for significant species and habitats on Indigenous lands. Large quantities of drone data, collected by Aboriginal land managers, are combined with scientific research and Indigenous ecological knowledge. These data inputs are interpreted by artificial intelligence to provide real time insights for the Indigenous rangers who manage the park (pers. comms. Gorring, 2021).

e. Advancements in Action-Oriented Climate Heritage Practice and Research

Adaptation and mitigation policies, community development strategies and heritage research itself are better informed by knowledge and practices generated through collaborative interventions that also benefit communities. Those involved in culture and heritage, including understanding the past, are well positioned to help better collate a range of observations, data and approaches that can feed into modelling and responses. They can also help identify, address and overcome research and regional biases and issues of accessibility to data and knowledge, as well as highlighting alternative forms of evidence. Heritage-orientated climate action and research (see Part I) provide necessary forms of participation and collaboration which can open pathways towards new forms of mutual respect and new forms of governance. These changes will ensure that research and data are conducted through co-production rather than extractive and unethical methods.

KM12:

More work is needed to ensure that climate change research takes a broader view of evidence, including the need to acknowledge and integrate diverse methods of research.

This includes evidence of change and adaptability recorded in the deep past, accessible through archaeology and geoarchaeology. Through participatory approaches to research, the potential exists to explore whether existing knowledge systems are suitable and relevant to today's changing and evolving landscapes and seascapes, and how continuously adaptive traditional management systems, rooted in values and experiences, are responding to changing climate. There is a need to understand better how climate change adds to and interacts with a number of previously existing vulnerabilities affecting Indigenous Peoples and local communities, and to recognise Indigenous and local knowledge systems on an equal

footing to science for transformative change. At the same time it should be recognised that heritage science approaches, in recent years, have embraced citizen science and crowdsourcing – and have developed robust, community-led approaches to understanding climate change.

KM13:

To improve pathways towards transformative change, new knowledge is needed on how and why scientific biases and prejudices have existed and continue to exist.

Documenting biases (including of standard methods used and of acknowledging positionality) helps to address legacies of mistrust across disciplinary, social, cultural, political and community-based groups. Biases, for example, are also reflected in how knowledge is cited and acknowledged, and in the use of peer-reviewed expertise versus non-peer-reviewed expertise (e.g. custodians of traditional knowledge). Education, in turn, can also reinforce biases, and thus has a key role in reviewing and reformulating the systems through which such biases are transmitted. These biases obstruct the wider use of humans' adaptation potential and cultural heritage resources in scientific evidence of a changing climate. Non-instrumental, qualitative and quantitative data observed or evidenced by Indigenous and local communities remain underused in understanding and communicating about climate change. **Case Study Box Six** illustrates the highly specialised expertise, knowledge and skills that the Indigenous Peoples of California have in relation to their environment and observed climate changes. The study also reveals how existing methods are used for, in this case, oak preservation.

f. Inequalities, Marginalisation and Climate Justice

Culture, heritage and climate change are all strongly linked to issues and concerns around justice and equity. Causes of climate change, and human and ecosystem breakdown, are exacerbated by socio-political inequalities and the marginalisation, or exclusion, of diverse actors. Those involved in culture and heritage, including understanding the past, bring essential insights and toolkits to help better explain, explore and address climate change and historic inequalities and injustices. These include injustices caused by differential treatments of diverse cultures, heritage and knowledge systems and the ways in which these intersect with both vulnerability to climate change impacts and adoption of low carbon and/or circular economy-based lifestyles.

KM14:

Co-developed reconciliation efforts and approaches are needed to identify and promote mechanisms and practices to overcome the suppression of voices and rights of diverse groups.

Many extractive economies responsible for environmental degradation continue today, which causes high vulnerability, and are influenced by "historical and ongoing patterns of inequity such as colonialism and capitalism" (IPCC, 2022; 4.3.8). They are oppressive in that they enable processes which actively repress the ability of Indigenous Peoples and local communities to access, practice and nurture their own ways of knowing and being. This has led local communities and others to abandon traditional knowledge and practices that are valuable for mitigation, climate adaptation and for developing resilience, as well as practices for use when adaptation capacities are overwhelmed.

Case Study Box 6

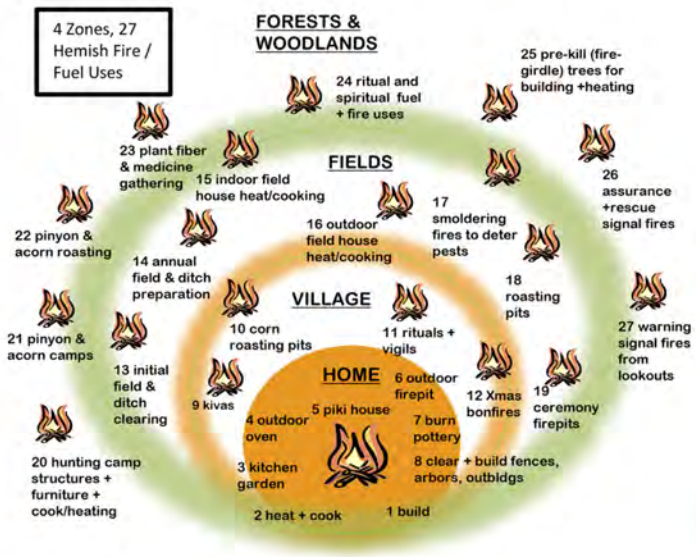
Climate Change and California Indians: Oaks, Fire and Drought

Case Study Region: South West US, North America

Author: William Carmen, Indigenous Knowledge Holder/ Pasqua Yaqui)

Droughts are the most important climatic influence in the Southwest US. Tree ring studies in California indicate that the past century was among the wettest of the last 7,000 years – and, naturally, our current cities, farming, infrastructure and water usage are based upon these most recent 'wet' conditions. Recently we have experienced short periodic droughts, but severe megadroughts in the ninth, twelfth, thirteenth and sixteenth centuries lasted decades. Megadroughts disrupted Native American cultures – some less than others – and provide insight on how we may adapt (or not) to future hotter and drier conditions. Oaks are a keystone of tribal culture and traditions in California; they cover approximately 13 million acres. Indigenous peoples evolved highly specialised traditions for grove stewardship, acorn harvest and storage, and the labour-intensive, multi-step processing required to make them edible. Climate change (warmer temperatures, less water availability, extended extreme droughts) will reduce but not eliminate acorn production, but it will negatively impact oak distribution, recruitment and health (Carmen et al., 1987). There will be an overall loss in oak habitat extent with some species displacing others.

Already threatened by habitat fragmentation, disease and lack of regeneration, traditional fire practices may play a role in oak conservation (Long et al., 2016). Indians learned to live in fire-prone environments and to shape these ecosystems with cultural fire for their benefit; they employed sophisticated practices to ensure availability of food and game, medicinal plants and myriad wildland products such as for basket weaving (Lake, 2021). For example, local Wintu and Pit River people used cultural low-intensity fire to improve acorn production and to enhance deer and elk populations. Recent studies have found that burning stands in January increased the acorn crop compared to unburned areas. The Jemez Pueblo people also used 27 fire practices relative to the domestic, village, agricultural and larger forest landscape (Roos et al., 2021).



Conceptual Map of how Jemez Pueblo peiople are using fire relatice to different social landscapes (Roos et al., 20221, 4)

Government interest in traditional burning has focused most on controlled burns to prevent large, destructive, high-intensity fires, especially in the wildland urban interface. Recent, but small-scale, agreements between the US Forest Service and tribal communities are the first steps in the use of traditional fire knowledge and practice to improve and protect forest ecosystems and infrastructure. However, this is still a difficult process, as people fear fire escaping and do not like the hazardous air quality impacts from smoke; many also have the idea that burning wildlands only increases carbon emissions. However, we must realise that California ecosystems are fire adapted, and so must we be – again. Adaptation will involve reorienting our approach to the environment from one of utilitarian exploitation. A mutualist rather than exploitative relationship with nature is the key.

These pressures, including those from policies, also limit the transmission of languages – Indigenous and others – and so contribute to language loss. This is seen, for example, in certain places where traditional agriculture lacks resources to support it, leading to abandonment of traditional practices due to financial pressures. Both sustainable practices that support climate action by promoting agricultural and cultural diversity, including and traditional practices, that support biodiversity must therefore be incentivised and rewarded in some way. For example, existing mechanisms and practices can be included in frameworks such as agricultural considerations, so that traditional systems in place that promote biodiversity are better supported (pers. comms. Fuller, 2021).

Both sustainable practices that support climate action by promoting agricultural diversity and traditional practices that support biodiversity must therefore be incentivised and rewarded in some way. For example, existing mechanisms and practices can be included in frameworks such as agricultural considerations, so that traditional systems in place that promote biodiversity are better supported (pers. comms. Fuller, 2021).

KM15:

Monitor approaches that involve, empower and partner with diverse actors (Indigenous Peoples and local communities, researchers, practitioners) within government departments to ensure their diverse decision-making processes remain included in climate action planning.

While there is an effort to improve the representation of diverse voices, barriers for inclusion involve strict and rigid structures to participate, inaccessible funding programmes, fixed policy cycles and timeframes and inflexible mechanisms, all of which disable meaningful involvement from diverse actors. The lack of mechanisms and competencies across government departments create barriers so that Indigenous and local knowledge holders are unable to access and communicate with upper levels of government. For example, in countries such as Mexico, the need to rebuild trust between local communities and government or research institutions is vital; local governments currently have little incentive to engage with climate change concerns, making it difficult for local communities to engage and voice the scale and scope of climate change impact (pers. comms. Mora Navarro, 2021). Those involved in culture and heritage, including understanding the past, remain excluded from policies presumed to be separate from culture and heritage issues. However, a consideration of culture and heritage can facilitate the implementation of climate change responses and mechanisms for more appropriate management frameworks i.e. for land use.

KM16:

New knowledge is needed for a nuanced and place-based understanding of cultural loss, economic inequalities and injustice brought about by migration and relocation, whether that constitutes planned retreat, displacement, climate-related disasters, conflicts or emergencies.

The trauma that people experience due to migration, relocation and displacement is long-lasting and has multiple layers, for example separation from territories and loss of cultural heritage, solastalgia and other forms of eco-anxiety related to separation from communities, culture and heritage. However, providing the tools for communities to recreate themselves has clear benefits: 'the physical touchstones of heritage, particularly that of the cultural landscape of "home" can mitigate the long-term effects of migration-related

trauma, as well as the loss of ontological security' (pers. comm, Brabec, 2021). For example, the national government of Fiji published relocation guidelines in 2019, emphasising the importance of community leadership and household participation in the decision-making process. However, relocation is complex. Numerous challenges are evident in balancing the economic impact of climate change with the intangible cultural value that Indigenous Fijians have with the land on which their ancestors have lived for generations. The ability in practice to balance the potential risks and value of cultural heritage has proven to be place-based for each of the four villagesrelocated in Fiji (pers. comm. Forgesson, 2022).

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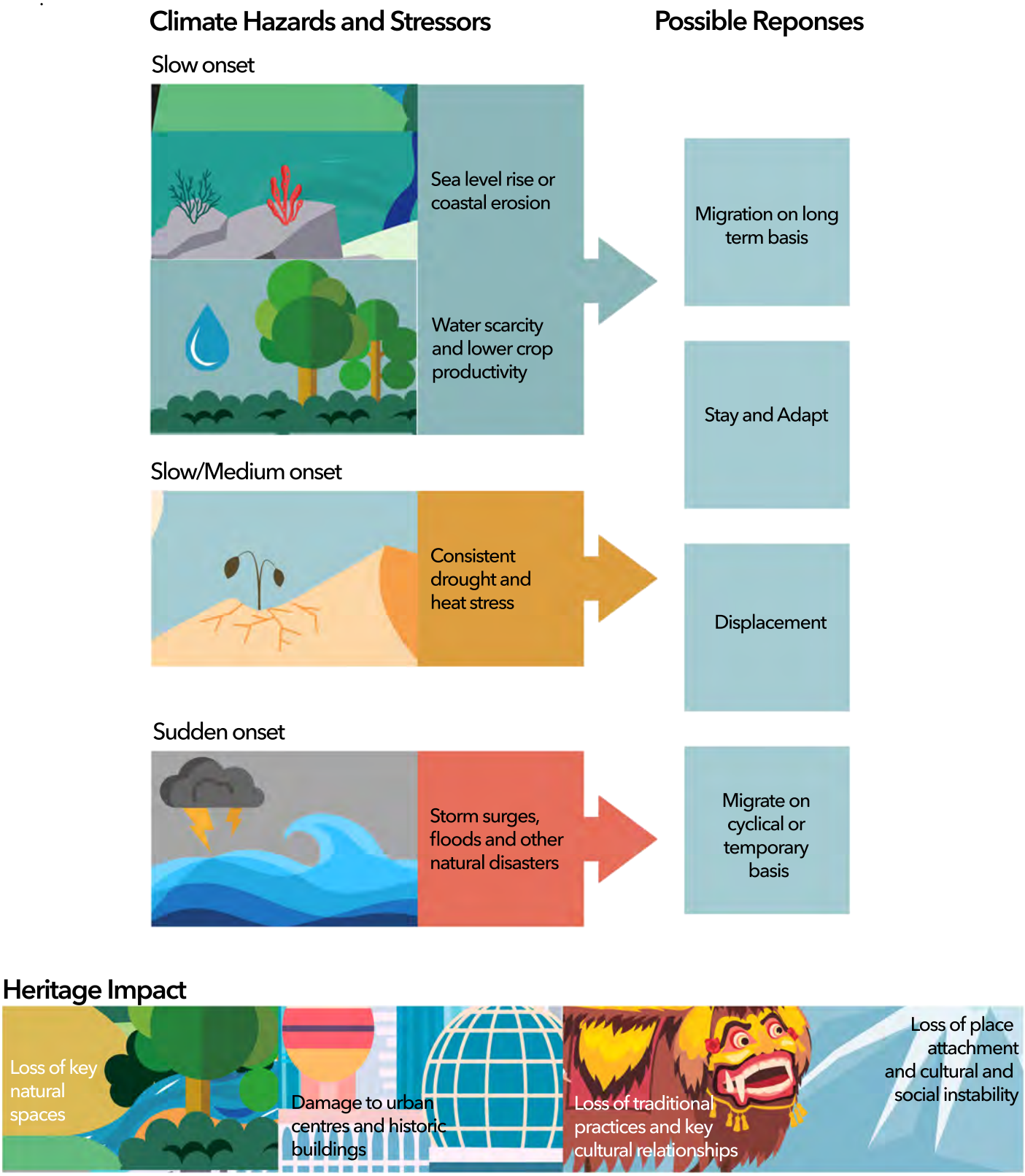

Figure 9: Breakdown of possible impact of climate stessros and hazards on migration and displacement

g. The Capacity to Learn from the Past

Past narratives are neither static nor a fixed series of events, but rather involve active and socio-political negotiations with the present. They also relate to historic continuity of knowledge based on interactions with the environment, exercised in the present. Furthermore, the capacity to learn from any example, whether linked to the past or not, is related to a range of variables which can dictate the relevance and appropriateness of using diverse approaches within different contexts. These variables include: diversity of regions; economic, political and cultural histories and conflicts of territories; degree of distinct connections with surrounding nature, natural resources and ecosystems; social, political and economic systems and their capacities and stability; relationship and access to culture, belief systems, knowledge systems, world views and languages; access to traditional knowledge. It is important to explore more critically the use and relevance of past adaptation for today, while recognising that tomorrow will be very different and may exceed adaptation capacity. There are general lessons to be learned, for example, about factors that made past societies more resilient in the face of climate change, although each case may need to be understood in its particular context.

KM17:

New knowledge is needed to increase understanding of the opportunities and challenges in how different knowledge systems have responded, and are responding, to climate change.

All knowledge systems have different means and ways in which they observe, interpret, understand and respond to climate change. It is important to be respectful of these approaches and to increase awareness and understanding of how each view can comprehend and respond to the unprecedented scale, scope and speed of climate change. The past can enhance understanding of how human intervention impacts surroundings and environments, and how built environments, landscapes and seascapes have been managed and manipulated by people of the past. Lessons related to trade-offs, co-benefits and potential adaptation or maladaptation are useful in understanding how different interventions may impact communities and their culture and heritage in different ways. **Case Study Box Seven** below illustrates how the Hani, one of the most marginalised and poorest hill tribe groups in East Asia, maintain traditional practices that enable climate resilience. Such practices are passed down through generations by ancient songs that record knowledge of ethnic migration, skills and worship.

Case Study Box 7

Use of Local Knowledge in the Adaptation of the Cultural Landscape of Honghe Hani Rice Terraces

Case Study Region: Yunnan Province/China, East Asia

Author: Rouran Zhang/Shenzhen University/ICOMOS China

The Cultural Landscape of Honghe Hani Rice Terraces is composed of a traditional 'forest-village-terraces-water' system. It is a combination of agriculture, forestry and water distribution, as well as a 'living' socio-economic and religious system that is unique. In this system, the forest at the top of the mountain is used by local people as a 'sacred forest' to store rainwater. The water is then channelled through an elaborate drainage system to each village, where it flows into the terraces below the village and finally into the river. This system has been developed over 1300 years of agricultural practices and subsequently passed from generation to generation. It consists of a system of ditches managed by only a few villagers called Gangouren 赶沟人, chosen by the entire village.

The core of the system is called 'wood carving and water distribution', meaning that a horizontal wood or stone is placed at the end of the ditch. The Gangouren then cut slots in the wood according to the actual amount of water needed by each terraced field. Because of its unique 'forest-village-terraces-water' system, these agricultural practices have proved to have good water-holding and regulating functions.

...good illustration of how traditional management methods can be most effectively supported as they contribute to climate adaptation and resilience.

Between 2008 and 2012 the Yunnan province suffered from a rare five-year period of drought, but the Hani terraced fields still maintained good production functions. This indicates that the Hani Rice Terraces have the potential to be highly resilient to climate change. It is a good illustration of how traditional management methods can be most effectively supported as they contribute to climate adaptation and resilience. The survival of these systems also comes from traditional beliefs well established in the area. Hani villagers believe that the biodiversity of the forest behind the village is inhabited by the mountain god. The annual sacrifice to the forest is thus an important part of the Hani people's unique landmark festival, 'the Angmatu Festival (昂玛突节)', a manifestation of the Hani people's ancient ecological culture. The villages themselves were also selected and constructed through consultation conducted with 'Hani ancient songs 哈尼古歌'. Such songs record the Hani people's knowledge of ethnic migration, production skills and worship; they are called the 'wordless encyclopaedia' of the Hani people.

Cultural Landscape of Honghe Hani Rice Terraces © R. Zhang

Example of the Gangouren managing the ditches © R. Zhang

KM18:

Further research and practice are needed to understand whether local successes can work on a larger scale or in different localities, and what trade-offs sustainability practices might involve (for national, regional, local, traditional or Indigenous contexts).

The presence of cultural elements raises questions about the transferability/scalability of both adaptation and mitigation measures. For example, the IPCC Working Group III report, Climate Change 2022: Mitigation of Climate Change, contains an example related to how past energy shocks and the experience of the COVID-19 pandemic influenced the cyclability of cities. Examining historical transitions to cycling across European cities, Oldenziel et al. (2016) found contextual factors including specific configurations of actors to lead to very different outcomes. Kraus and Koch (2021) found a short-term social shock (i.e. the COVID-19 crisis) to lead to differential increases in cycling behaviour, contingent on other enabling conditions. Climate change impacts and cascading impacts also affect different regions in different ways, while also occuring across a range of timescales or periods of time for different regions. For example, rising temperatures or rising sea levels in one region or community may initiate different responses, and so give rise to different experiences, than another region or community facing the same impact. Different communities recognise exposure, risk and impact – or human- and ecosystem-tipping points – in different ways. Impact severity is dependent on location, perspective and approach of individual communities, including their adaptive capacity. That said, historic evidence for the existence of tipping points and frequencies of change in climate systems, social systems and coupled socio-natural systems may help us to identify approaching tipping points in contemporary (local) societies. Analyses of how past societies have responded to or interacted with climate change, in ways that demonstrate relevance to projecting how contemporary societies may respond to or interact with climate change and experience adaptation limits, should be encouraged. Priority should be given to determining how best to accomplish this – for example, through explicit consideration of factors differentiating modern from past societies (such as population size, governance structures, available resources and technology) and through using protocols that include such factors as covariates in analysing databases that encompass both past and present social trajectories.

KM19:

While current anthropogenic climate change appears to be unprecedented, a deeper understanding of observed human and ecological system interactions are valuable to helping address and predict climate-related issues.

The capacity to understand, observe, monitor, tell stories about, name and personify, and/or respond to climate change may be embedded in localities, particularly for Indigenous Peoples and local communities. However, more understanding on what relationships are being observed and used can help us better to understand climate indicators for future predictions. For example, calendrical systems are based on observing and understanding relationships within ecosystems. In Australia, Aboriginals and Torres Strait Islanders develop seasonal calendars based on their unique lands and territories. In particular they rely on a flowering plant to indicate that there is a certain fish available (pers. comms. Grant, 2021) thus recognising connectedness within ecosystems. Similarly in Bangladesh, a Bengali calendar known as 'Fasli San', used by farmers since 1584, helps them to maintain and cultivate their lands properly for crops. These calendars use indicators to understand climate and changes. However, over the last 5 to 10 years these calendars have become no longer accurate; the seasons have changed from six to three, and further adjustments are

required due to accelerated and anthropogenic changes in climate (short winter and prolonged summer and rainy seasons). The 'Fasli San' calendars nonetheless capture the relationship that underpins human and ecological systems (pers. comms. Darain, 2021).

KM20:

We need to explore past emergency preparedness initiatives critically in order to learn from both successful and unsuccessful practices to cope with natural hazards.

This involves critically analysing 1) the response phase after a natural disaster (emergency period and relief period); 2) the recovery phase (including restoration of public services (infrastructure); 3) the structural and non-structural measures adopted in the past disaster prevention phases; 4) the past preparedness phase (e.g. disaster planning, early warning systems that were adopted, logistical planning to rescue movable culture and heritage, emergency drills). In Nepal, for example, extensive work is being done to explore past adaptation of post seismic activities and disasters – a project that has immediate lessons for increasing the challenges brought on by climate change (interdisciplinary research and practice teams, integration of 'scientific' and traditional/ Indigenous knowledge systems). The core issue is how to best share, disseminate and scale the lessons that have been learned from past adaptation methods (pers. comms. Coningham, 2021). This is further explained in **Case Study Box Eight.**

2. Key Topical Knowledge Gaps and Action Items

This section outlines topical research and practice areas where the availability of more evidence-based knowledge would assist actors, operators and decision-makers (e.g. politicians, practitioners, community leaders) to engage more effectively with the cultural and heritage dimensions of climate change and the responses to it. This includes areas in which relevant cultural and heritage knowledge already exists but is not consistently being acted upon, nor included in climate planning. Such areas indicate the existence of 'implementation gaps' which themselves need to be better understood.

Case Study Box 8

Can We Rebuild the Kasthamandap? Disaster Management in Nepal

Case Study Region: Nepal, South Asia

Author: Robin Coningham, UNESCO Chair, Durham University, UK/ Mr Kai Weise – ICOMOS (Nepal)

Disasters, human or natural, very often overwhelm planned responses, a situation that in turn compromises heritage research and protection agendas. This leads to any planned mitigation practices and interventions being somewhat alienating for local communities and Indigenous practitioners. In such environments, archaeology and heritage science, although infrequently mobilised, are uniquely placed to assist in providing a fuller understanding of the impact of climate change on urban infrastructure in the past; they also facilitate reflection on lessons of adaptation and resilience for modern cities and their inhabitants.

Building on North–South partnerships, an interdisciplinary and collaborative research programme has integrated archaeology, geoarchaeology, 3D visualisation, geotechnical and structural engineering with architects and artisans to co-produce and disseminate novel methodologies to characterise environmental adaptation within Kathmandu's historic urban infrastructure. Through analysing and sequencing soil profiles from monument foundations, and assessing their interlinkages with superstructures, we were able to identify why selected monuments failed and how they could be reconstructed. In so doing we drew on traditional methods to preserve intangible values while minimising risk from future environmental disasters. In particular, our project guided the US$1 million reconstruction of the Kasthamandap in Kathmandu. It involved close collaboration between researchers and artisans to translate findings between 'scientific' and 'Indigenous knowledge' domains. This led to further discussions on improving the status of artisans and the official procedures for them to be involved in contracting and restoration projects – bridging between those domains. In the process we reframed how archaeology and heritage science can play a greater role in future sustainable urban planning – and in the move of practitioners from observation to action.

...archaeology and heritage science, although infrequently mobilised, are uniquely placed to assist in providing a fuller understanding of the impact of climate change on urban infrastructure in the past; they also facilitate reflection on lessons of adaptation and resilience for modern cities and their inhabitants.

a. Culture, Heritage and Loss and Damage

The ways in which people perceive, understand and react to the risk of climate impacts are informed and modulated by culture and heritage in complex ways. Intersecting cultural considerations (e.g. attitudes about equality and mobility practices) and "historical and ongoing process of colonialism and capitalism" (IPCC, 2022; 4.3.8) relevant to land and water use and management, can reduce or increase the vulnerability of people and ecosystems to climate change. These considerations inform the recognition, identification, measurement and valuation of the scope and scale of losses and damages across both natural and human systems. In understanding loss and damage, there is a need to explore the scale and availability of relevant data to address climate change impact in both past and contemporary settings, and to work to coordinate the perspectives of the heritage community. The possibility of valuing losses and damages to culture and heritage themselves has important implications for the legal and political Loss and Damage debate. The culture and heritage dimensions of concepts such as risk, vulnerability, losses and damages have important consequences for the design and implementation of corresponding climate response measurers. The experience of losses and damages of cultural resources may intersect not only with the recognition of loss but also with human agency to respond to loss, influencing the measurers adopted to cope and rebuild.

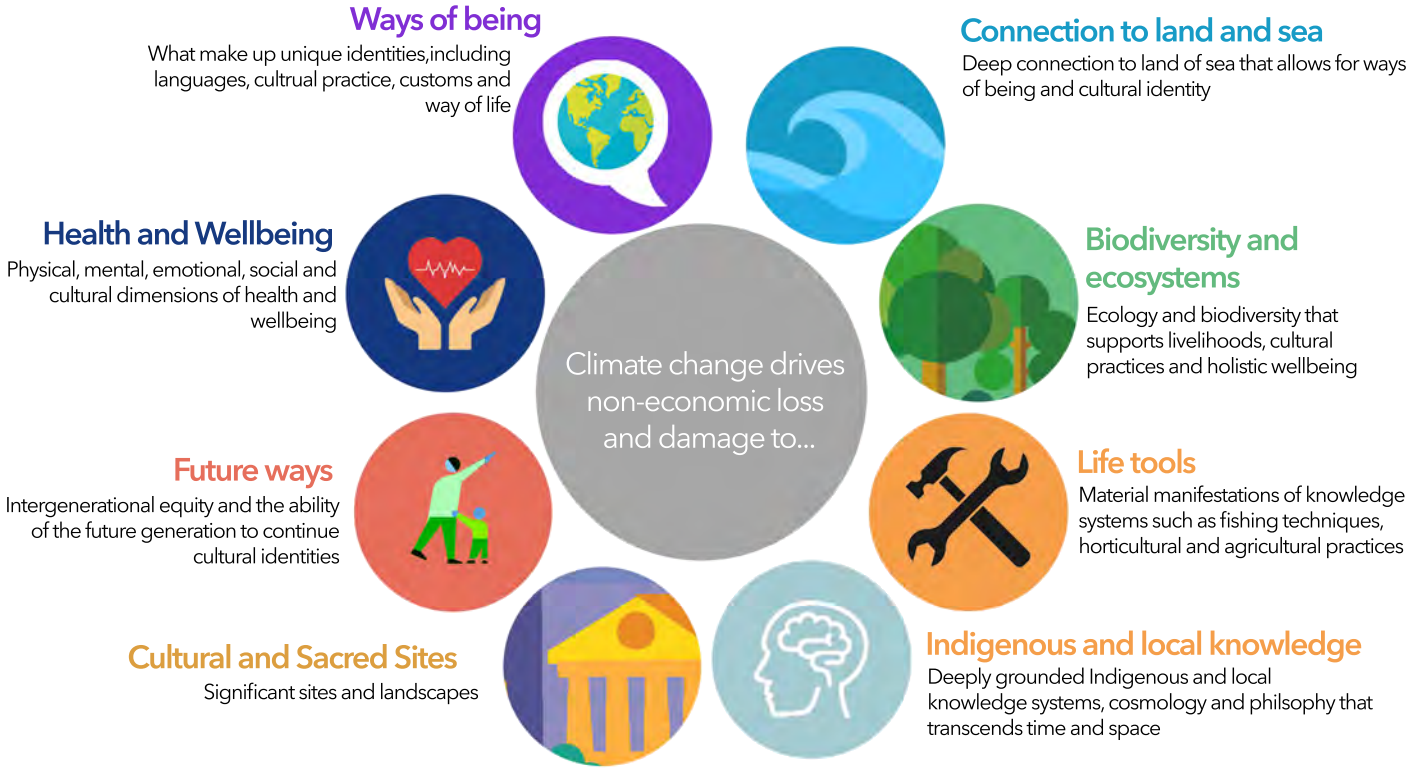

Figure 10: Infrographic of the possible loss and damage to heritage brought about by climate change. Adapted from McNamara et. al. 2021

KM21:

Elaboration of approaches to valuing 'Loss and Damage' to culture and heritage is essential.

Loss can, and does, include cultural practices, traditions, places and traditional knowledge systems, sometimes referred to as 'Non-Economic Loss'. Loss of language can bring with it a corresponding loss of knowledge relative to sustainable practices. There is a need to recognise the absence of agreed and shared concepts of heritage and cultural capital and value, and the ways in which this impacts the development of strategies for addressing Non-Economic Loss. Methodologies for accounting for Loss and Damage to culture need to be addressed, but so do the consequences of conceiving of culture and heritage in economic terms. The absence of agreed and shared concepts and understandings of heritage and cultural capital and value across communities, and how this impacts the safeguarding of culture and heritage, is difficult to value in economic terms. Further exploration is also needed of the accepted degree of change and loss as defined by each local community, as the current parameters of accepted change are often imposed by outside experts. Those involved in culture and heritage, including understanding the past, can help to explore appropriate methodologies, including the consequences of valuing culture and heritage in economic terms. They can also to facilitate the learning from, and valuing the shared experiences of, communities affected by migration, displacement and/or relocation (including from disaster or catastrophe). In so doing they help to provide better understanding of the cultural dimensions involved in recognising loss and damage, and the ways in which these affect the development and prioritisation of responses.

KM22:

In order to reduce risk to culture and heritage, a better understanding of their relation to climate impacts, exposure and vulnerability is needed.

At present, there is no systematic assessment of the range of heritage types (e.g. natural, cultural, tangible, intangible) at risk from climate change, nor of the range and severity of climate impact drivers, nor of losses and damages to heritage from climate change. More work is needed to understand how hazards affect cultural heritage at the site level, including integration of physical, socio-economic and cultural vulnerability and exposure of individual sites (Simpson et al., 2022). Revised or new methods are needed to assess the vulnerability of heritage, including heritage values, to a range of climate scenarios and corresponding severity, distribution and scope of climate change impacts, particularly for Indigenous Peoples and local communities. Climate change responses may also put culture and heritage at more risk, as a result of maladaptation and climate mal-mitigation[4]; the monitoring and evaluation of outcomes is therefore critical. These new methods must address the broader consequences of impacts to heritage on associated communities, as well as how to manage loss and damage and the roles and responsibilities of managers/ decision-makers for sites, protected areas or landscapes. Research projects across the world are now beginning to explore how to best to understand, articulate and manage loss. For example, the 'Landscapes Futures' project led by the University of Exeter has developed the idea of 'adaptive release' as a conceptual framework, enabling decisions to accommodate decline or loss of heritage (pers. comms. Fluck, 2021).

[4] Use and definition of malmitigation is taken from IPCC report: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter1_Low_Res.pdf. It states that 'Mal-mitigation includes changes that could reduce emissions in the short-term but could lock in technology choices or practices that include significant trade-offs for effectiveness of future adaptation and other forms of mitigation' (Allen et. al. 2018)

Case Study Box 9

Local and Indigenous Knowledge of Coastal Systems in Ogun, Nigeria

Case Study Region: Nigera, West Africa

Author: Professor Ibidun Adelekan/University of Ibadan, Ibadan, Nigeria

The Ogun coastal stretch in southwest Nigeria is an area that is continuously subject to severe flooding. This is due to heavy rainfall and an increased frequency and intensity of storm surges during the wet season months. Fishing communities have lived along this coastline for over 200 years; at present there are 24 fishing villages which are home to over 30,000 inhabitants. They are currently considered highly marginalised, lacking basic infrastructure and services including all-weather roads, electricity, portable water supply and adequate health facilities.

Due to these increased climatic phenomena, local communities are inundated by floodwater for a greater part of the wet season. For example, the increase in rainfall has caused water bodies (rivers and beel wetlands) in the coastal area to overflow into community settlements and surrounding lands. This has led to socio-economic activities, including the movement of people, fish processing and marketing, being greatly challenged. In the past, dredging of beels around communities to drain flood waters into the sea was undertaken three times at most in a wet season. By 2007 these activities were being performed over five times every two months. However, many communities are still not included within broader governance and development processes, which hampers their access to appropriate facilities and further compounds their isolation with other communities and neighbouring cities.

Example of beels created by locals to drain flood water © I. Adelekan

Impact of flooding on coastal community © I. Adelekan

This, in turn, has jeopardised their ability and platform to bring forward solutions and lessons learned, from skills acquired through a deep understanding of nature-based solutions and the environment around them. Some localised household adaptation strategies have been deployed to cope with increased flooding; these include construction of new dwelling units every three to five years, annual reinforcement of the superstructure of houses and the use of local herbs and homemade remedies for the treatment of climate and flood-related ailments. Other comunity measures adopted include the building of flood bridges within and out of communities to help aid movement, the channelling of water from beels into the Atlantic Ocean to facilitate draining of floodwaters within communities, sand filling of road tracks and the movement of communities closer to the sea (Adelekan and Fregene 2015).

KM23:

New methods to better understand how diverse actors have different views and perspectives on loss and damage are essential to acknowledge different perceptions of risk, as well as forms of loss and damage.

While climate change puts culture and heritage at risk, there is also potential for culture and heritage to be used as a resource to improve risk assessment and climate response for communities at large. There is also a need to address outcome biases in risk and vulnerability assessments which ignore community-led approaches and fail to take account of world views, values, practices and preferences of diverse actors, including Indigenous Peoples and local communities. Because meaningful inclusion (e.g. through consultations, consent and other means) is often missing from risk and vulnerability assessments, the scale, scope and impact of climate change on Indigenous Peoples and local communities are not properly acknowledged by policy-makers, nor in climate change literature. Those involved in culture and heritage, including understanding the past, can address these gaps through culture and heritage methodologies and processes, and by acknowledging and including a plurality of values in assessments. **Case Study Box Nine** illustrates how this exclusion might impact communities, as demonstrated through the Ogus coastal stretch of Nigeria.

KM24:

A better understanding is needed of how to value and incorporate information about climate impacts embedded in communities into local, national and sectoral climate decision-making processes.

...communities experiencing these impacts are often able to provide relevant knowledge, observations and documentation of change, for instance by using citizen science methods and techniques ranging from oral traditions or photographic evidence to ages of trees or levels of constructions built on top of one another over time.

Many places do not have the resources (e.g. infrastructure, technology, funding, human resources and /or capacity) to monitor or document climate change impacts. However, communities experiencing these impacts are often able to provide relevant knowledge, observations and documentation of change, for instance by using citizen science methods and techniques ranging from oral traditions or photographic evidence to ages of trees or levels of constructions built on top of one another over time. Well-known heritage sites and familiar rituals and traditions can provide valuable baselines for observing change. Community-based schemes of observation can have the added benefit of mobilising residents and enhancing an understanding of urgency. These benefits have been documented, but such schemes have not been incorporated at scale in local, regional and national climate planning. For example, Indigenous Peoples are acutely aware of impacts of climate change, but consider it in the context of a much longer time span and imbued with the memory of past events. For some, adapting to climate changing may not be seen as an issue because they have done it in the past. However, for each circumstance new ways of adapting may be required; these can only be defined by the cultural group itself, since the objective is to preserve their culture. Government programmes may be a) assessing an impact when Indigenous cultures may not see it that way and b) looking at complex

solutions when the preferred option for Indigenous cultures may be a more straightforward one (pers. comms. Rivet, 2021).

KM25:

An integrated approach for how best to involve and include individuals and communities (including diverse actors such as Indigenous Peoples and local communities) as equal stakeholders in climate change risk assessments and climate change response planning is vital for improved resilience.

Traditional knowledge holders, as well as researchers and practitioners that work with communities and their culture and heritage, are equipped with insights and approaches that can help to address diversity, inclusion, exclusion, historical tensions and conflicts, participation and respect for values. Further research on the use of these approaches can help to empower communities, particularly Indigenous Peoples and local communities, thus strengthening their voices, decision-making powers and capacity to respond to risk. Exogenous and non-inclusive approaches to culture and heritage can have the opposite impact, however, and their ongoing use needs to be addressed. For example, in Mali and Burkina Faso the Dogon country stretches across 400,000 hectares of the Mopti Region. It is home to 289 villages of mainly Dogon people who have a close relationship with their environment. The cultural landscape 'Cliff of Bandiagara' (Land of the Dogons) was nominated by the State Party of Mali and inscribed in 1989 as a World Heritage property, but only a few of the 289 villages were proposed within the boundaries of the World Heritage property. This exclusion of all other villages and communities have made already fraught relationships between communities even more conflictual, which disrupts community resilience (pers. comms. Chundu, 2021).

KM26:

A holistic approach to risk and risk management is needed through the involvement of communities where climate change impacts might otherwise be overlooked or ignored due to low occurrences of extreme climate events or lack of cultural indicators to assess impact.

Greater consideration of cultural and heritage dimensions of systemic risk and the interplay of physical hazards and cascading impacts across multiple scales is required. Risk and cascading impacts take different forms and affect communities in different ways. They can occur alongside climate-related hazards or emerge as a consequence of them. They include: economic migration leading to the loss of knowledge holders and/or traditional practices; food insecurity in one region as a consequence of water management decisions in another; increased vulnerability due to cultural gender practices; and so on. These impacts are often not accounted for in assessing climate risk (including risk to heritage sites). Losses and damages to cultural resources in turn affect climate vulnerability in iterative ways that also need to be better understood. For example, loss of iconic heritage places can impact identity and social cohesion. Both climate impacts and response measures, as well as intersecting processes such as 'development', can enable or disrupt knowledge systems and undermine adaptive capacity. In Grand Pré, Nova Scotia, the landscape may be subject to change and engineering solutions may be found to adapt the structural elements. However, this does not account for the potential disappearance of critical cultural and/or heritage elements of the landscape that are directly related to the collective memory of the Acadians (pers. comm. Rivet, 2022). **Case Study Box Ten** highlights how the challenges brought on by water management alongside other climate change responses have empowered women in community decision-making and management.

Case Study Box 10

Empowerment of Women in Rural Sri Lanka

Case Study Region: Sri Lanka, South Asia

Author: Dr Dulma Karunarathna, Centre for Asia Pacific Initiative, University of Victoria, Canada

In rural Sri Lanka, a series of ambitious projects has led to the construction of large- and small-scale tanks and canals, interconnected within a catchment of the dry zone. These developments help to harness both monsoon rains and seasonal rain waters, offering a solution to variations in weather and climate. They have in turn led to thousands of small village tank cascade systems being scattered across the country, built through their collective patronage. These 'village cultures' – developed in and around water – have become inextricably linked to their physical environment. In establishing a bio-cultural environment at the heart of village cultures, they reflect a harmonious connection between culture and nature.

Work done with these communities has also predominantly viewed environmental folklore and traditional knowledge systems as valuable cultural heritage assets for climate change adaptation (AH/V006371/1 CRITICAL project) . Folk songs, folk stories and the cultural memory of villagers were collected as primary data, covering all provinces of Sri Lanka. Focus was also given to the role of women in the response to extreme weather events and climate change. Women contribute towards the livelihood of the villages through a range of gendered socio-economic roles; these include paddy cultivation, harvesting, protecting cultivated land, seed conservation, pest control, animal rearing, food gathering, water fetching and craft activities. Women were also found to be the most impacted by extreme weather events. However, the challenges faced by these women have made them resilient. Climate change issues have enriched and strengthened their knowledge of local ecology, traditional weather forecasting and household management, and they have also become proactive in water-related conditions. The challenges have provided local women with an alternative profile to the domestic sphere, offering them the opportunity to demonstrate strength, capacity, skills and responsibility. The situation has also revealed the futuristic approaches of women towards the wellbeing of their families, society and environment. The role of women as heritage bearers, combined with their Indigenous and local climate knowledge, enables them to contribute effectively towards climate solutions, climate change adaptation strategies and environmental decision-making

Traditional Watch hut on a paddy field, Sendiriyagama, North central Province, Sri Lanka Photo © Dulma Karunarathna 2019

Traditional Paddy song and a dancing by women, Climate memories story telling workshop at Hatamuna oya, a tributary of River Mahaveli, Polonnaruwa District, Northcentral Province, Sri Lanka- Photo © CRITICAL Project -Dulma Karunarathna 2022

KM27:

Better understanding is needed of the relationship between climate change responses (including the capacity to respond) and intersectionality.

Interconnected social categorisations as applied to a given individual or group create interdependent systems of discrimination or disadvantage; these in turn impact on exposure to climate risks, adaptive capacity and response. Such categorisations are often culturally embedded, encompassing attitudes about gender, race, class, sexual orientation, physical ability, nation-state status, education and spirituality. Culture-based strategies to redress these systems need to be more widely understood. In addition, a greater understanding is needed of the role of cultural and heritage 'infrastructure' (e.g. institutions, networks and platforms) in building common causes across social movements and intersectional interests, linking climate justice with gender justice and racial justice. This includes new ways of dealing with conflict and historical trauma, as well as culture-based methods for promoting solidarity with, and resourcing of, marginalised and frontline communities. It is important both to increase channels between how climate change information is communicated across communities and to explore how creative tools, and the arts, can help to convey urgency and options to communities. In places such as New Zealand and other settler nations, social, economic and political repercussions from "historical and ongoing processes of colonialism and capitalism" (IPCC, 2022; 4.3.8), in addition to extractive land and sea use and management practices, remain a reality to be addressed. Many resources are still being used to reconcile the repercussions, including the loss of land and status, thus reducing the resources that can be directed towards climate change.

KM28:

Rapid social, political and economic pressures from processes such as urbanisation or modernisation can enable or disrupt knowledge systems and practices, and may impact the resilience of communities.

Looking into the past to identify similar processes, and what effects these processes might have had on past societies, can inform current decision-making. For example, across Africa water sector climate change adaptation responses, influenced by Indigenous and local knowledge, record higher evidence of risk reduction compared with responses that lack Indigenous and local knowledge. However, case study evidence from Southern Zimbabwe indicates urbanisation generally contributes to the disruption or decay of Indigenous and local knowledge systems that include multiple environmental indicators to predict season quality, onset of rains, droughts, floods, etc. These communities traditionally have people referred to as 'dreamers', who are respected and influence other households' decisions around their response to climate variability. However, this position is exclusively held by men, who often abandon this position and leave the village for urban centres. The process is thus disrupted, as women and youths do not replace them in these roles (pers. comms. Simpson, 2021).

KM29:

There is a need better to understand the role of heritage (built, cultural or natural) and archaeological sites as providers of refuge to communities during climate crises (including disasters and catastrophes) and places that have helped people survive, feeling as though they belong and are connected.

These places of safety are understudied. The role of nature and culture in emplacement, wellbeing and mental health are also important, alongside understanding the factors affecting the persistence of inhabitation (or disoccupation) of particular locations: some places have been occupied for thousands of years, while others have been disoccupied for thousands of years.

Those involved in culture and heritage, including understanding the past, can help to explore appropriate methodologies, including the consequences of valuing culture and heritage in economic terms. They can also to facilitate the learning from, and valuing the shared experiences of, communities affected by migration, displacement and/or relocation (including from disaster or catastrophe).

b. Response Options: Mitigation

A better understanding of culture, heritage and the past can create opportunities to increase climate mitigation options and efficacy. Researchers and practitioners can encourage co-operation among diverse groups and actors, and provide information, as appropriate, on how culture and heritage can support GHG reduction and help create low carbon futures. Through facilitating continuous and collaborative dialogue and engagement among relevant groups and actors, culture and heritage work can share experiences, insights and knowledge on the impact of "historical and ongoing processes of colonialism and capitalism" (IPCC, 2022; 4.3.8), nationalism and federalism on GHG mitigation; the contribution of extractive, non-circular economies and petrocultures to the ability and capacity to respond to adverse effects of climate change; and the need to address how mitigation measures can be hindered by the disconnect between culture, heritage and climate change.

KM30:

Improve meaningful collaborations, and include those (e.g. researchers, practitioners, knowledge holders) that understand cultural and heritage values, practices and norms, in order to understand better how people and places have been, or are, shaped by circular or carbon-dependent lifestyles and economies.

It is important critically to identify elements of culture and practice (including approaches towards and values inherent in sustainability, growth, consumption and production and progress) which may dictate, or play a powerful role in, how climate change is understood, perpetuated or addressed. Researchers, practitioners, knowledge holders or other actors involved with culture and heritage knowledge production can share useful information. This may include data and case studies incorporating values, practices and perceptions that enable or disable greenhouse gas-intensive practices (e.g. assessments of risk, access to natural resources, availability of energy sources and uses of alternative sustainable forms of energy). New methods on how to contextualise, memorialise and document these practices (past and present) are also needed. These include the need to foreground analyses of past non-petrocultures in ways that help contemporary populations understand both the advantages and disadvantages of our current reliance on fossil fuels. They should also explore ways to preserve and promote both tangible and intangible cultures of petrocultures. For example, in Europe sulphur dioxide (SO2) levels spiked from the 1960s to the 1980s due to the proliferation of diesel engines and their sulphur-heavy exhaust. From the 1970s European policy aimed to lower SO2 emissions and the consumption of (particularly sulphur-high) coal. This long-term policy was based on evidence from EU-funded research on the impact of acid rain on European forests and marble facades, including those of cathedrals such as the Milan Duomo. The policy has since decreased air pollution, primarily SO2 and particulate matter generated by fossil fuel combustion, leading to a significant decline in the main source of aesthetic and material decay affecting the built environment. Evidence-based policies work, and knowledge exchange between fossilfuel dependent nations can improve the resilience of the environment (pers. comm. Bertolin).

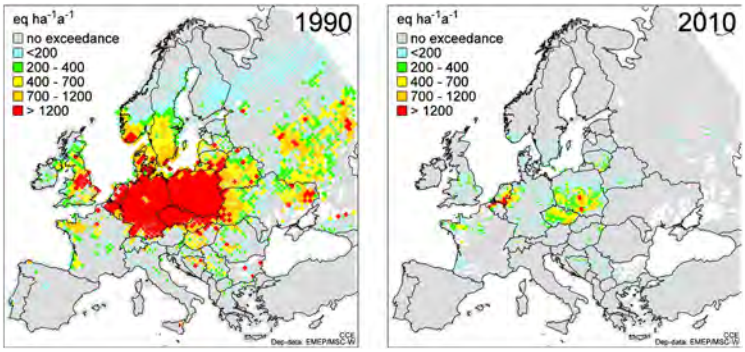

Figure 11: The outcome of emission control of SO2, NOx, and NH3 between 1990 and 2010 presented as maps on exceedance of critical loads of acidity. Such maps have played an important role for illustrating outcomes of future policies as well as of actions taken (from Maas and Grennfelt 2016)

KM31:

Understanding of and support for the role of natural heritage in storing and sequestering carbon is needed, to form part of a broader spectrum of nature-based solutions, as well as of necessary safe-guards.

Even with rapid mitigation efforts, research suggests that carbon dioxide removal will likely be required to offset emissions from sectors that cannot easily reduce their emissions to zero, including air travel. Natural heritage can provide carbon sinks, particularly forests, soils, rangelands and coastal aquatic systems (mangroves, seagrass meadows, etc.), as well as natural spaces in cities (Osipova et al., 2014). New methodologies are needed that allow for an effective cost-benefit analysis of varying approaches to carbon dioxide removal, weighing carbon sequestration values and permanence against impacts to social systems, heritage values and governance and just land use. Examples include the impacts of carbon sequestration in forests on Indigenous land tenure and the impacts of afforestation on archaeological sites. More work is also needed on how to utilise traditional ecological knowledge effectively and ethically in the design of appropriate Culture Driven Regeneration projects, including the valorisation of land stewardship by Indigenous Peoples and local communities. In light of the urgent need to implement climate action such research efforts should be accelerated in support of ambitious mitigation – as well as efforts to strengthen biodiversity, especially in carbon-rich ecosystems. In Sri Lanka and India, for example, communities are involved in delineating lands around bodies of water; they are the custodians of those lands. In these communities natural resource management has been ingrained in traditional practices for centuries, but was formerly regarded as being 'vernacular' and actively dissuaded. In this regard there is a need to recognise the intersections between culture, heritage, biodiversity and mitigation more clearly, and to engage more voices in the South East Asia region (pers. comm. Mascarenhas, 2021).

KM32:

Existing models of heritage tourism (cultural and natural) need critical exploration in relation to their role in climate change and its impacts on heritage.

More critical examination is needed of the benefits (e.g. cross-cultural understanding) and harms (e.g. carbon emissions, degradation of local ecosystem and heritage) of cultural and heritage tourism in the context of climate change. Work is needed by those involved in culture and heritage to understand the role of culture and heritage (cultural/natural) tourism actors in empowering tourism-dependent communities to address the risks of both climate change and response measures in the most appropriate way. Better guidance is needed on the ethical dimensions of cultural tourism in the face of climate change, including so-called "last change tourism" aimed at sites on the frontlines of climate change, like the polar regions, which require long-distance travel and concentrate visitors in ways that increase the vulnerability of sites to climate impacts. This could include the ways in which over-tourism exacerbates climate vulnerability, as well as comparisons of so-called 'slow-tourism' initiatives (e.g. cycle-tourism and trekking) versus 'fast-tourism' and global mechanisms). Huge cruise ships that travel in fjords in Norway, as well as other extremely sensitive environments, not only has an impact on the local ecosystem of the fjords (due to the enhancement of wave motion, excavation of channels and therefore erosion), but also in terms of CO2 emission, modification of the landscape views, visual impact on the integrity of heritage sites and a huge potential impact in case of disaster occurrence. Heritage organisations need to re-evaluate their roles in promoting the large-scale travel required to visit sites and critically assess the impact of such designations (e.g. World Heritage status or Ramsar site, for example) on

tourism-related greenhouse gas emissions. Many of these organisations have been working towards promoting sustainable heritage tourism practices and are developing a Cultural Charter that aims to promote moving away from the current destructive growth paradigm and towards a Commons paradigm.

KM33:

A better understanding is needed of the cultural knowledge inherent in the land use and urban planning and design of historic settlements. These relationships between the planning and design of historic settlements to GHG emissions and circular economies also need to be understood better, so that such knowledge (new and existing) can be incorporated more effectively into climate change planning and in the conservation of the historic cities and settlements threatened by the climate impacts in line with the 2011 UNESCO Recommendation on the Historic Urban Landscape.

Urban land use and territorial planning of historic cities and settlements, including approaches to food production and distribution, have been under-represented in mitigation planning. Those involved in culture and heritage, including understanding the past, have extensive expertise and tools for understanding the spatial dimensions of cities and human settlements, and the interplay of these with circular economies and lifestyles; mobility and walkability; creative economies and local self-sufficiency; gastronomy and healthy living in healthy environments. Many historic cities and urban areas have evolved and developed sustainably for millennia. Tools designed to help urban planners understand the impact of different urban design options on emissions and their implications for adaptation to climate change should take clearer account of these cultural dimensions. More research on, and action relative to, these relationships could improve mitigation and adaptation outcomes while driving additional social co-benefits. Cultural factors inform choices about consumption and production. Such cultural dimensions of behaviour can themselves support more durable green transformation policies, creating a need for more research from those involved in culture and heritage, including understanding the past. Culture and cultural production can inform ideas of growth, sustainability and development, and have implications for green transformation. Better understanding of the relationship between the management of land use and ecology in relation to the impacts of the climate change would be valuable also for the conservation of the historic cities and settlements in line with the 2011 UNESCO Recommendation on the Historic Urban Landscape.

KM34:

More work and investment are needed to improve both the evidence base and the understanding of the mitigation benefits and carbon value arising from continued use or adaptive reuse of existing building stock (including historic buildings and traditional buildings).

The mitigation co-benefits of the historic built environment are widely overlooked in climate planning, and yet heritage and the historic built environment are central to urban sustainability. The continued use and adaptive reuse of existing buildings avoids emissions associated with new construction. On a lifecycle analysis (LCA) basis, this is often the best mitigation strategy, especially when coupled with sensitive interventions to improve operational efficiency. However, better tools are needed for quantifying these benefits. In addition, current carbon accounting protocols often disregard energy embodied in buildings (and consumer goods) and materials produced outside city limits (so-called 'Scope 3 Carbon'). There is an urgent need to fill these gaps in order to gain a more accurate picture of building sector emission.

Such innovations have the potential to expose the carbon costs imposed by demolition and other built environment choices. They complement the need to expand the benefit of heritage and historic buildings conservation and maintenance from the scale of individual buildings to a district or even a city scale. Only a few methodological frameworks have been created to enable this transition. Recently Loli and Bertolin (2018) proposed the Zero Emissions Research and Technology (ZERT) framework, which addresses science and engineering knowledge gaps relevant to embodied carbon, to select proper refurbishment interventions in historic buildings at district level – by assessing the building value, extent of decay, type of intervention required (on one square metre of wall) and its related GHG emission. This framework also considers climate change impact and mitigation potential of the intervention. The ZERT framework is still under development to improve further the assessment of historic building significance during refurbishment or energy retrofitting interventions. **Case Study Box Eleven** illustrates work done in Hong Kong to address concerns regarding the continued utilisation and conservation of historic buildings in ways that support urban sustainability. The cultural dimensions of the ways in which buildings are used, and also frame perceptions of comfort, interest with ideas of "sufficiency" (i.e. reducing the demand for materials and energy while delivering a decent living standard for all within planetary boundaries).

KM35:

Those involved in culture and heritage, including understanding the past, have the expertise to develop forms of communication that also seek to increase ambition and promote climate action and longer-term behaviour change, such as environmental education, sustainability education (a high priority for UNESCO) and social marketing, among others.

Heritage interpretation can leverage heritage and cultural lessons and symbolism to inspire action across multiple world-views to mitigation and climate action.

c. Response Options: Adaptation

A better understanding of culture, heritage and the past can provide opportunities to introduce, develop and enhance adaptation approaches and strategies, thus increasing available options and improving efficacy. Researchers and practitioners can encourage co-operation among diverse groups and actors; they can also provide information, as appropriate, on how culture and heritage can support adaptation, including that of cities, human settlements and built heritage. Through facilitating continuous and collaborative dialogue and engagement among relevant groups and actors, those working in culture and heritage can share experiences, insights and knowledge. In so doing they enhance the ability and capacity of others to respond to the adverse effects of climate change by engaging with diverse knowledge systems, values, practices and ways of life.

Case Study Box 11

Development of Climate Awareness and Strategies for the Historic Urban Centre of Macau

Case Study Region: Macau Special Administrative Region, China

Author: Assistant Professor Kin Hong Ip, Macau University of Science and Technology

General Ye Ting's Former Residence © K. Hong Ip

Traditional slaking and preparation of lime with straw fibres © K. Hong Ip

Vigorous land reclamation and rapid urbanisation have taken a serious toll on the heritage architecture in the once tranquil fishing village of Macau. Recent events such as the increased severity and frequency of summer typhoons, torrential rainfalls and sea water intrusion, all by-products of climate change, have further intensified such impacts. Several adaptive reuse projects have shown unexpected consequences in which salt damage, humidity condensation and biological growth were noticeably worsening.

The original 'passive' buildings have also been mostly decommissioned, substituted instead for more modern designs and materials. As a result, 'living in harmony with nature' has quickly turned to 'altering nature for comfort'. This case study follows a project that investigated the effectiveness of ancient knowledge found in passive building designs for the sustainable future of our living environment.

General Ye Ting's Former Residence is a two-storey building constructed around the 1920s. It was originally located near a local river that has since been filled due to urbanisation. The residence, together with many local heritage buildings, has suffered increased deterioration attributed to several intersecting issues – climate change, vigorous land reclamation and rapid urbanisation, exacerbated by the loss of local knowledge and traditional building skills. This has impacted upon the sustainability of the community's ability to resolve/adapt to climate change. The redundancy of passive building design has also interrupted the natural adaptation system of local buildings to the environment in a way that does not generate harmful greenhouse gases. The restoration of General Ye Ting's Former Residence was a means of involving local experienced craftsmen who have worked and passed on traditional skills to the younger generation. Following work with these craftsmen, previously observed degradation was significantly reduced, following the reinstatement of the traditional permeable materials and original building components such as handmade floor tiles and wooden window shades. The much-needed ventilation was also recreated by reopening the existing lightwell and stopping the use of air-conditioners to counteract the severity of climate change.

KM36:

To understand adaptation and resilience better, more work is needed in understanding the cultural, social, spiritual and political dimensions that are central to a community's capacity and ability to cope with the adverse effects of climate change and biodiversity loss.

Climate change sciences often overlook the human experience and the cultural lens in analysing the causes, impacts and responses to climate change. Those involved in culture and heritage, including understanding the past, are able to share information and expertise about path dependencies and the mapping of events and responses over a timespan extending to millennia to deepen this analysis. Diverse knowledge systems, a multiplicity of social networks and social inclusion play key roles in adaptation and resilience, and more work into how this can be measured and relevant across a range of contexts is essential. Values shape adaptation preferences and culture shapes values (including a sense of what is just and fair, who is responsible, how much change is beneficial) – all which in turn informs adaptation.
the highly technical Indigenous practice of stone walling, practised for hundreds of years, is now being adopted across urban centres and other regions due to the system's climate resilience.

KM37:

Those involved in culture and heritage, including understanding the past, have expertise to help understand better why and how adaptation planning processes can promote inclusivity of particular ethnic/diverse groups and actors while simultaneously overlooking and ignoring other diverse groups.

This includes understanding how local knowledge in informal settlements worldwide can support adaptation, as well as the co-benefits of incorporating local and traditional knowledge holders and local knowledge into adaptation planning – incorporating local ways of knowing and thinking, understanding value systems and local aspirations.

KM38:

A better understanding is needed of how to translate understandings of past events and historic natural and anthropic transformations into contemporary climate adaptation planning.

Cultural landscapes, living heritage, including oral traditions, and tangible heritage, such as archaeological resources, hold evidence of the human responses to past disasters, including changes in vulnerability over centuries. Yet how to interpret and apply this information to adaptation planning and implementation is a challenge. Those involved in culture and heritage routinely work with knowledge from the past (disaster, adaptation intervention, changes in urbanisation), typically consisting of site level information owned by the local community. For example, the impacts of flooding are shown across Europe on mediaeval or early modern stone landmarks and in surviving place names, and topographical features. These data provide valuable information regarding the community's history of hazard response (pers. comm. Bertolin, 2022). Operationalising such data requires more exploration of dynamic, adaptive, policy-planning processes in which diverse actors from different knowledge systems (e.g. historians, architects, cultural professionals, climatologists, urban planners, conservators and experts in risk management) work together.

Case Study Box 12

Stone Walling Practice in the Cordillera Region, Northern Philippines

Case Study Region: Cordillera Region, Philippines/South East Asia

Author: Wilfredo Alangui, University of the Philippines Baguio; Kankana-ey-Igorot and Ilocano

Local construction of Stone Walls using traditional Indigenous practices © W. Alangui

The Indigenous Peoples of the Cordillera in northern Philippines, known collectively as Igorot, have carved out extensive rice terraces on the slopes of mountains and rugged terrains. Rice terraces are also found in Nepal, Vietnam, Indonesia and China. However, the centuries-old Cordillera rice terraces have been described as among 'the most intensive and efficient in the world' (Bodner, 1986). It is an activity that integrates technical and agricultural principles with social and cultural knowledge. It links the Igorot to their ancestors and reflects their worldview. The associated Indigenous practice of stone walling is a vital element of rice terracing agriculture. Stone walling is a soil and water conservation technology for the rice terraces which are built in sloping upland landscapes (Brett, 1985). Stone walls are built to hold the rice paddies, impound water and prevent erosion in general. In many cases they are also used to increase the area of rice paddies. Stone walling is a highly technical form of knowledge. Everything, from stone selection, backfilling and the positioning of individual stone, is carefully considered to build stone walls that last a long time (Alangui, 2010, 2018). It is a gendered knowledge, done mainly by the male members of the community. The highly skilled stonewallers are well regarded members of the community; many of them become respected elders and knowledge holders. As an Indigenous technology developed in upland communities and practised for hundreds of years, the application of stone walls has evolved in varied ways: from holding rice terraces to supporting the houses, irrigation canals, roads and areas that regularly erode due to typhoons (Alangui, 2010, 2018).

Stone walls have long served the purpose of preventing erosions and promoting soil stabilisation in the mountainous areas of the Cordillera region. The technology is currently being adapted in urban centres and many other areas outside of the Cordillera region, now with some modifications. Building stone walls prevents erosion and promotes soil stabilisation in upland communities (both rural and urban), areas that have become increasingly vulnerable to strong typhoons.

Skilled stonewaller working © W. Alangui

Here they recount stories using a history of place, discuss the tangible remains of past hazards (e.g. Monumental Hydrometer, high-water marks and plaques) embedded in historic buildings in the original locations where the disasters occurred, then consider how subsequent communities applied certain changes to build resilience. Such processes help to develop comprehension of how communities have been through difficult times before in order to facilitate adaptation to future change.

KM39:

More knowledge is needed about the role played by cultural approaches and heritage methodologies in ensuring and facilitating the use of local knowledge in adaptation planning, and the ways in which local communities are involved in decision-making processes and policy development.

Integrating local and community knowledge into decision-making processes remains a challenge. Scientific research favours certain types of knowledge to the neglect of others. Governments tend to prefer high-level, top-down solutions while most funders prefer mega-infrastructure in their solutions, investments and responses. However, more support and exploration into multiple micro-infrastructure projects may be a more sustainable option. To understand this, there is a need to grow the evidence base for the cultural dimensions of adaptation and to support the inclusion of cultural dimensions into adaptation planning. Those involved in culture and heritage, including understanding the past, need to work closely across silos to collate lessons learned and linkages made from the experiences of ecosystem-based adaptation practices.

KM40:

A fuller understanding is needed of the role of culture and heritage in human mobility, including migration, displacement and planned relocation as a response to climate change.

Humans have always been on the move, and culture and heritage reflect that mobility. A greater understanding of these phenomena would illuminate climate-related mobility. It is important to avoid the assumption that migration and movement are universally negative (or positive); for example, for some peoples a culture of nomadism is part of their heritage. These are forms of cultural heritage that are often challenged by national borders, privatisation of land tenure, etc.; and in which immobility may also be the result of colonialism and oppression (pers. comms. Sider, 2021). Existing and new research needs to be translated into new cultural heritage methodologies. For example, collaborative community processes are needed to prioritise and document heritage left behind, and to conserve and perpetuate the collective scientific and intangible heritage values of displaced communities undergoing relocation or diaspora. More research is needed on culture- and heritage-based emplacement strategies to help displaced communities, as well as to address the cultural impacts on receiving communities. For example, work on various immigrant populations and receiving communities show that the knowledge systems of both origin and receiving communities can be altered and enhanced overall rather than simply lost. Equally, when people migrate they can alter norms in origin geographies through changing and broadening perceptions (Jiménez, 2017).

d. Culture, Heritage and Capacity for Transformative Change

Culture from arts to heritage can help people imagine low-carbon, just, climate resilient futures. To unlock this potential, the linkages between culture, heritage and transformative climate action, associated co-benefits, trade-offs or limitations remain in need of more analysis. This includes a better understanding of how to maximise all direct or associated benefits and to reduce trade-offs and other disservices that might be better managed or avoided. Culture and heritage dimensions to these decisions are key to identifying opportunities for delivering climate-resilient pathways to benefit diverse actors and communities. Those involved in culture and heritage, including understanding the past, can facilitate and support communities in exploring what climate benefits, associated co-benefits, trade-offs and/or limitations they face. They can also consider what options the communities may have in terms of policy and implementation measures, social cohesion, identifying urgency and other climate-related considerations.

KM41:

Those involved in culture and heritage, including understanding the past, can better inform how knowledge systems include coherent sets of knowledge, practices and values that cannot be separated from each other.

While some attention has focused on how Indigenous and local knowledge and practices have contributed to nature conservation and management, and to climate change adaptation and mitigation, less attention has been given to the cosmovisions and values that underpin knowledge systems. Indigenous Peoples and local communities often understand nature as an interconnected web of life, linking humans and non-humans in a complex relationship. In such conceptualisations, humans are viewed as an integral component of nature and nature is imbued with social, cultural and spiritual values. Moreover, Indigenous Peoples' and local communities' conceptualisations of nature often draw on stewardship ethics based on mutual reciprocity between humans and non-humans, temporary custody for future generations and health of, and attachment to, land. These conceptualisations are the basis for management of landscape and seascape management. They are aligned with the UN Convention of Biological Diversity's 2050 vision of 'Living in harmony with nature' (Orlove et. al., 2022).

KM42:

More insight is needed on climate literacy, and how better understanding of cultural values and norms, deep history and more effective use of local language can improve climate campaigns and Action for Climate Empowerment.

Culture and heritage-based approaches offer additional tools, opportunities and possibilities for advancing climate literacy and empowerment. Facilitating new alliances and coalitions with cultural actors, groups and institutions (such as libraries and museums) can leverage the power of culture and existing cultural infrastructure to advance climate action. Artistic and creative approaches can make the unseen real and provoke re-examination of inherited assumptions in ways that transcend incremental responses and support transformative change. Incorporating climate storytelling and narrative into the interpretation of heritage sites offers powerful symbolism that can inspire action and underscore urgency. Investing and supporting cultural artists and bodies can have co-benefits in terms to being able to communicate more broadly and effectively.

Artistic and creative approaches can make the unseen real and provoke re-examination of inherited assumptions in ways that transcend incremental responses and support transformative change. Incorporating climate storytelling and narrative into the interpretation of heritage sites offers powerful symbolism that can inspire action and underscore urgency.

Currently, however, culture and heritage are often not included in formal climate education strategies, creating an implementation gap that needs to be understood and transcended. The University of Liverpool has been using oral history and archive material to look at flood history of the Lake District World Heritage site. However, in order to encourage engagement with water and the wider landscape, the use of art and, more specifically, poetry has been successful in getting people to reassess some of what they know or understand about those places (pers. comms. Fluck, 2021).

KM43:

The cost and consequences of trade-offs between culture heritage conservation and climate mitigation and adaptation interventions need to be better understood.

Real and perceived tensions exist between climate mitigation and adaptation on the one hand and the safeguarding of culture and heritage conservation on the other. Examples of such tensions include banning the traditional harvesting of peat; the retrofitting of historic buildings for energy efficiency in ways that are perceived to damage heritage values; the insertion of renewable energy infrastructure into cultural landscapes; and the development of carbon mitigation projects that undermine Indigenous Peoples' forest management practices and land tenure. The cost and consequences of trade-offs between climate mitigation (e.g. renewable energy infrastructure and impact on historic/natural environment) and adaptation interventions (e.g. landscape restoration and impact of inaccessibility for local communities) are also not well understood, yet these choices also impact culture and heritage and affect local communities (including Indigenous Peoples) directly. Greater long-term co-operation and multi-sectoral discussions are needed to minimise trade-offs and support co-benefits, especially in the context of transformative 1.5°C pathways. Participatory frameworks are needed for involving culture and heritage advocates, including local communities, in discussions from the concept stage of project development. Meaningful and long-term co-operation and interdisciplinary, multi-sectoral discussions are required to minimise trade-offs and to support benefits through enhancing knowledge towards a more granular, location-specific understanding of the tensions that arise between development policies, heritage conservation and adaptation. Those involved in culture and heritage, including understanding the past, need to be brought into discussions during the very early stages of a project or discussion, in order to contribute to critical thinking about opportunities and challenges to culture and heritage.

Case Study Box 13

Slash and Burn Farming in Southeast Asia

Case Study Region: South East Asia

Author: Gabriel Caballero, ICOMOS Focal Point for the UN Sustainable Development Goals

In Southeast Asia, slash and burn farming is a form of traditional knowledge. For example, the Mountains of the Iglit-Baco National Park has been shaped by the Tau-Buid and Buhid Mangyan communities; here generations of kaingin (slash and burn farming) created a cultural landscape with specially adapted species (Caballero, 2015). However, places such as Indonesia use the technique to such an extent that it increased greenhouse gases and CO2 emissions, affecting neighbouring countries such as Singapore, Malaysia, Thailand, the Philippines and Brunei (Ketterings et al., 1999). Laws to ban fires have been strengthened by the government of Indonesia from 1999, but the practice still exists (Fajrini, 2022). The traditional rotational sequence of cultivation for slash and burn farming includes a fallow period, allowing forests to regrown and nutrients to be replenished. Although some communities celebrate the research that states it can reasonably be effective, this form of farming can also contribute to long-term disruption of nutrient balance and biodiversity loss, requiring other areas to be burned after some time.

A balance between adapting traditional practices and emphasising controlled methods of application, while maintaining social, cultural and environmental knowledge of Indigenous Peoples, is thus required.

One of the potential approaches, therefore, is to provide economically viable alternatives for slash and burn farming that are both socio-culturally sensitive and equitable. Such alternatives include developing other types of agriculture, for example intercropping or productive forests, or creating opportunities for sustainable agro-tourism and ecotourism, which are less harmful to the environment. A balance between adapting traditional practices and emphasising controlled methods of application, while maintaining social, cultural and environmental knowledge of Indigenous Peoples, is thus required. There is also a need to have stronger law enforcement for a ban on large-scale and commercial burning, greater forms of legal protection to Indigenous domains and better discussions between communities and various stakeholders on the global effects of potentially harmful traditional practices.

KM44:

More knowledge about observations and monitoring, as well as evaluations of past or existing communities' or societies' maladaptive responses and unintended lock-ins, are needed to understand better how maladaptation has played out previously and the impact it has had on culture and heritage.

Considering how maladaptation to climate change impacts local culture and heritage can help to improve project design and build more resilient communities. Those involved in culture and heritage, including understanding the past, have expertise in identifying benefits and trade-offs, as well as how or why maladaptive decisions are made. Standards are needed for when climate actions should be deemed maladaptive due to impacts on culture or heritage and other adverse effects. In Ireland, the vernacular architecture of thatched roofs, stones, etc., typical of the Irish landscape, became very unpopular in the post-colonial period; it was associated with a set of historical and cultural associations, including famine, poverty and a peasant lifestyle. Yet such features were intrinsically sustainable, as they drew upon local materials and could be repaired through low-carbon solutions. Today, however, thatch is no longer produced in Ireland; it has to be brought from China, Romania and other countries. This fact, coupled with the low insulation capacity of thatched structures, is making it more difficult for people to live in them. There is a need to take old vernacular structures and make them adaptable to the modern world (pers. comms. Daly, 2021).

KM45:

The role of cultural heritage in 'Just Transition' requires additional research and action.

In order for transformative action to succeed, attention must be paid to the regions, industries and workers who will face the greatest challenges. There is a need to understand better how heritage methodologies and culturally appropriate processes can help to ensure that relevant institutions are acknowledging and integrating local communities' inputs and grievances (e.g. where traditional livelihoods and culture have been adversely affected by climate response measures). Culture/heritage professionals can help to encourage local co-creation of transition planning by supporting community-based prioritisation and documentation of the effects of response measurers, as well as by encouraging activities that recognise the historic contributions of affected regions, workers and industries. Craft, heritage and traditional livelihoods can all feature in contemporary re-skilling and economic diversification.

Part III: Delivering actions to advance collaborative and problem-oriented research on climate change, culture, and heritage

This section focuses on options to support the implementation of this Global Research and Action Agenda on Culture, Heritage and Climate Change. It is supported by the three White Papers (Knowledge Systems, Impacts and Solutions) where complete citations of relevant sources can be found. As illustrated in the previous two sections, many knowledge, research and data gaps still need to be filled in order to understand the culture and heritage dimensions of climate change and unlock the potential of culture and heritage based climate action. The Meeting represented a significant opportunity to bring together knowledge from communities, science, culture, practice and policy, as well as providing a major step forward in understanding knowledge gaps. The Meeting also highlighted the great benefit of working together through diverse perspectives in building evidence based knowledge and expanding global capacity by connecting culture, heritage and climate over the course of, and beyond, the IPCC Seventh Assessment Report cycle. To strengthen these collaborations between different sectors, constituencies, knowledge systems and disciplines, engagement is required at global, national and local levels. This section presents a non exhaustive list of actions that can be taken to enhance such collaboration.

1. Actions for Working Across Knowledge Systems

The co-design, co-production and ethical and respectful sharing of knowledge and information across knowledge systems and by the research, practice and policy communities in a collaborative manner will enhance the value of such knowledge in informing action/initiatives on climate and heritage. A range of actions would enhance such collaborations.

Developing, refining, implementing guidelines for understanding, respecting, recognising and increasing the potential for ethical engagement across diverse knowledge systems, local communities should be prioritised by all actors tackling climate change, but especially by those working to produce, synthesise and disseminate knowledge.

Such guidelines would help organisations – including both climate, culture and heritage public bodies and research organisations – to proceed confidently and avoid problematic approaches, such as those that treat traditional and Indigenous knowledge systems, as well as cultural narratives, as monolithic, static and instrumental, or that divorce such systems from their environmental, cultural and historic contexts. Guidelines could also encourage and guide the inclusion of narration and storytelling as evidence. It is critical that the representatives of Indigenous Peoples and local communities' partner in guideline development. Several examples already exist, such as the Kawerak Recommendations for Co-Production of Knowledge.

New or updated approaches to the management of, and decision-making systems for research organisations (including calls for funding, tenders and contracts) can reinforce and support diverse knowledge systems, for example through co-production approaches. This requires the continuous and critical review of existing approaches and how they consider issues (such as background knowledge, free, prior and informed consent; intellectual property rights; tenure rights; recognition of customary norms and law; acknowledgment of Indigenous sovereignty), as well as continuous development to address emerging issues effectively and inclusively.

A barrier to greater engagement and co-production of knowledge that is consistently expressed is the need to build organisational capacity at community and/or national levels for dealing with Indigenous and local knowledge.

Open lines of communication between Indigenous Peoples and local communities on the one hand and research organisations, public bodies and institutions responsible for climate decision making on the other are essential to supporting co production of knowledge. These linkages should guide the framing and inclusion of cultural information in policy development and research agendas; they should also encourage and assist with the inclusion of narrative and storytelling. However, many climate bodies and institutions currently lack the capacity and expertise to support these outcomes. Indigenous People's organisations and local communities also require greater capacity to support co production activities for example, to operate collective ways ofdefining what knowledge should be shared. This capacity should be developed and funded as a necessary and desirable element of enhancing understanding of climate change, including climate science and policy functions at all levels. Culture and heritage public bodies (e.g. ministries of culture, heritage offices, culture councils, heritage agencies and funding bodies) can act as platforms (or at least advocates) for this outcome, although that option seems rarely to be pursued. Such bodies are well placed to suggest disconnects which need to be addressed.

Capacity should be developed and funded as a necessary and desirable element of enhancing understanding of climate change, including climate science and policy functions at all levels.

2. Actions for Empowering Culture and Heritage Stakeholders to Take Action

At present, many important culture and heritage voices are not being heard in the realms of climate action, planning and policy. Conventional science approaches as well as land, sea and protected area management (and the formal governance of culture and heritage matters) have historically excluded Indigenous Peoples and local communities and their knowledge systems; many continue to do so. Treatments of culture and heritage are often missing from Nationally Determined Contributions, climate planning at all levels and risk and vulnerability assessments. Climate planners often prefer technological and industry-led or market-based solutions, overlooking the less easy to quantify social, economic and cultural aspects and origins of the climate emergency, as well as the more transgressive nature of some cultural and heritage interventions. Traditional scholarly methods for studying culture and heritage tend to be qualitative. It has been argued that data from these methods do not sit comfortably with the approaches prevalent in other social and natural sciences on climate change that foreground measurements and quantification. Some aspects to consider when working to empower people involved in culture and heritage to take climate action can be found below; these can be adapted and developed to suit local contexts.

Attention needs to be given to components of culture and heritage that both enable and disable climate action measures.

Active engagement with and by culture and heritage stakeholders can help tackle activities that contribute to climate change, while advancing those that support sustainability. By working to identify, interpret, contextualise and challenge these 'petrocultures' and related 'carbonscapes', culture and heritage can help

illuminate the origins of anthropogenic climate change and inform response measurers. The absence of attention to these complexities can undermine engagement with, and from, diverse actors. Indigenous knowledge can help understand connections with environmental harm, systemic inequalities and injustices, while cultural institutions/heritage sites managed by trusted organisations with interpretation already framed in place-based, local narratives offer ready spaces for these conversations

Engage with Diverse Partners to Achieve Complex Outcomes.

Inter-disciplinary and multi-disciplinary work has long been encouraged among diverse actor and groups involved with culture and heritage. Leveraging climate action and achievement of other UN Sustainable Development Goals such as reducing inequality and injustice, for example, requires the integration of complex interdependencies across diverse sectors in a systems approach. Empowering culture and heritage actors to achieve such outcomes can require a diverse set of partners. This includes diverse sectors, diverse knowledge systems and diverse types of expertise. Cross-sectoral engagements by culture and heritage actors with climate mitigation initiatives in fields like mobility, agriculture and clean energy are described in the European Cultural Heritage Green Paper. These examples highlight the increasing need for cross-functional teams of practitioners, experts and stakeholders in culture and heritage practice, including climate scientists, practitioners, activists and policy-makers. For government, formally linking climate change planning to the mandates of arts, culture and heritage bodies can help. An example is the 2021 Rome Declaration of G20 Ministers of Culture, which requests that countries consider including culture and heritage in their national Adaptation Communications under Article 7 of the Paris Agreement. The Climate Heritage Network, an informal network launched in 2019 to emphasise the cultural dimensions of the climate conversation, has several initiatives designed to connect cultural voices with climate change policy makers.

More broadly, there is an urgent need to increase the diversity of people at the climate table – promoting in turn a greater involvement (and empowerment) of knowledge bearers, including Indigenous Peoples, local communities and traditional knowledges. For example, the values and cosmologies of Indigenous Peoples and local communities not co-opted by modern take-make-waste approaches can offer counterpoints to "modern" views of progress and development. Such voices should be given the opportunity and the support (including funding) to lead the formulation of sustainable development and climate actions plans, reflecting the proactive rather than reactive substitution of such approaches for models rooted in systems that have proved unsustainable. The development of climate action plans, policies and assessments offers unique opportunities to advance these aims. In the Pacific islands, where the percentage of Indigenous Peoples is high, some national assessments and action plans have begun explicitly to include Indigenous Knowledge. Among other cases, the New Zealand document Arotakenga Huringa Āhuarangi: A Framework for the National Climate Change Risk Assessment for Aotearoa New Zealand (Ministry for the Environment, 2019) promotes the consideration of Mātauranga Māori (Maori knowledge) throughout the assessment process.

Seeking out Synergies; Preparing for Trade-Offs

Multiple lines of evidence reveals that transformative action entails complex and inevitable trade-offs along a continuum of different pathways, highlighting the role of societal values, internal contestations and political dynamics. Yet the linkages between culture and heritage values on the one hand, and climate benefits, associated co-benefits, trade-offs or limitations on the other similarly remains in need of more analysis. Expanding research in these areas will be key to identifying opportunities for delivering better climate-resilient pathways for diverse actors and communities, and for avoiding maladaptation and climate mal-mitigation.

Real-world experiences at the project level show that reconciling trade-offs across sectors and spatial scales is one of the key challenges to the actual integration of adaptation, mitigation and sustainable development. Real and perceived tensions exist between climate mitigation and adaptation on the one hand and the promotion of culture and the conservation of heritage values on the other. Rapid and far-reaching transitions needed to mitigate climate change can arguably be at odds with notions of continuity, conservation, preservation and safeguarding that often lie at the core of cultural and heritage policies. These tensions can problematise climate action by people involved in culture and heritage. To reduce conflicts and promote achievement of win-win outcomes, methodologies for reconciling conflicts in the culture and heritage context should be promoted. In Ireland, for example, people living in peatland communities have cultural and property rights to cut turf for energy – but this traditional practice now clashes with efforts to conserve bog habitats for biodiversity and carbon sequestration. As part of Just Transition efforts, the Community Wetlands Forum is working to address these tensions and encourage solutions.

3. Actions for Enhancing Meaningful Collaborations among Research, Policy, and Practice

The Meeting revealed the richness and diversity of culture and heritage knowledge and forms of expertise. Indigenous and local world-views and traditional techniques, practices and technologies, skills, oral histories, stories and grey literature contain valuable information on the causes and impacts of climate change and responses to it.

The Meeting also revealed several specific issues, topics and recommendations relevant to the heritage and climate science sectors which would benefit from additional attention. These include projects to explore the use and reconstruction of the past and the use of the archaeological and historic record in climate change reporting (including IPCC reports); similar initiatives consider the roles of culture and society in consumption and production behaviours, as well as the role of culture and heritage in mitigation ambitions and adaptation pathways. Such collaborative initiatives should provide recommendations for policy-makers and align with policy-relevant outputs from organisations such as UNESCO and the IPCC.

Research projects and synthesis studies must look beyond peer reviewed literature to include other forms of knowledge while respecting ethical norms and cultural rights, and so learn from examples elsewhere. One instance of this is the multiple-evidence approach used by IPBES and the CBD, which recognises the incommensurability of diverse knowledge systems and the often-asymmetric power issues that arise when attempting to connect different branches of science with locally-based knowledge systems. Researchers should also support experimentation, including by seeking out and assessing co-produced knowledge and stakeholder-driven research, where questions asked to the local actors focus on what type of information they want to know about things they care about. There is a need to engage with international, government and philanthropic funders of research in order to make their eligibility criteria more inclusive.

There is a need to increase the frequency of dialogue and action among researchers, policy-makers and professional practitioners from climate science and heritage bodies on the topic of Culture, Heritage and Climate Change Science and for concrete actions focusing on undoing marginalisation and exclusion in addressing the impacts of climate change. This might start with a distinction between scales, arenas, forms of action and power relations, ensuring that – starting from a local and community scale – researchers and funders must respect social norms, territorial rights and tenure, recognise formally background knowledge; they also need to apply free, prior and informed consent, and accountability to their methodologies. Inclusivity and openness must also be present at national, regional and international scales, which should encourage and facilitate the representation of Indigenous Peoples and local communities, as well as other marginalised groups, and advance laws and regulation that respect values, territorial rights and customary institutions.

Wherever possible and fair, traditional and Indigenous knowledge bearers should be primary or co-investigators, included as lead and contributing authors on research outputs. Greater involvement of authors with expertise in social science, culture and heritage in established research and synthesis processes should be promoted. Dedicated outreach by key organisations may be necessary to identify and support relevant experts. For example, in 2021 workshops led by the Facilitative Working Group of the Local Communities and Indigenous Peoples Platform (established by the UNFCCC COP24 in Katowice, Poland, in December 2018) explored the area of ethical engagement of Indigenous knowledge in the context of averting, minimising and addressing the adverse impacts of climate change. Actions from these training workshops include the need to support informal and formal networks of Indigenous knowledge holders; enhance financial resources for Indigenous Peoples to organise and schedule local and national workshops, and; support rights to maintain, control, protect and develop knowledge.

4. Actions for Funding

Existing funding and incentive structures can result in preferential financial support to one community over another. Such a situation leads to academic researchers studying only what they are funded to study, while other local communities and/or Indigenous Peoples have little access to funding sources. These biases, often institutional ones or those reflecting the interests and perspectives of donors or national governments, can lead to unequal allocation of research funds. Regional unbalance in funding (which affects both researchers and other stakeholders) further compounds the lack of attention to collaborative research on climate and heritage, which may result in an unequal geographical distribution of funded research. Research funding agencies should encourage, and in some cases require, partnerships between researchers and local community's or Indigenous Peoples' stakeholders from the onset of proposal development. There is a need to assess and address the extent to which the structure of research funding and their inherent biases have created an imbalance in research.

The knowledge gap, particularly in certain regions of the world, is a direct reflection of inequitable and unequal funding. National and international funding programs should facilitate projects centred, managed and led by people from diverse regions of the world to increase capacities and to collect the best and most relevant data – respecting social norms and land tenure, recognising background knowledge and applying free, prior and informed consent and accountability to their methodologies.

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Annex A

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Annex C

List of participants who contributed to the first stage of review (February 2022), which included overall messages extracted from the Meeting.

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Annex D

Further material/resources provided by case study authors:

Cities as Engines of Transformation for Global Sustainability in the Urban World of the 21st Century
Contributing author: Yunus Arikan *(Head of Global Policy and Advocacy, ICLEI World Secretariat)* and Andrew Potts *(Coordinator, Climate Heritage Network)*

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Contributing author: Max Friesen *(University of Toronto)*

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Contributing author: Dr Cathy Daly *(Carrig Conservation and University of Lincoln)*

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Indigenous People, Traditional Ecological Knowledge and Climate Change: The Iconic Underwater Cultural Heritage of Stone Tidal Weirs
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Can We Rebuild the Kasthamandap? Disaster Management in Nepal
Contributing authors: Robin Coningham *(UNESCO Chair, Durham University)*, Mr Kai Weise *(ICOMOS Nepal)*

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Contributing author: Dr Dulma Karunarathna *(Centre for Asia Pacific Initiative, University of Victoria, Canada)*

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Development of Climate Awareness and Strategies for the Historic Urban Centre of Macau
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Slash and Burn Farming in Southeast Asia
Contributing author: Gabriel Caballero *(ICOMOS Focal Point for the UN Sustainable Development Goals*

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Annex B

Scientific Steering Committee and Organising Committee Matters

The Co-Sponsored Meeting was organised and delivered by two committees, the Scientific Steering Committee and the Organizing Committee. The member list and staffing for each committee as of the Co-Sponsored Meeting date can be found below.

Scientific Steering Committee

Co-Chairs

Jyoti Hosagrahar (*Deputy Director for the World Heritage Centre at UNESCO*)
Debra Roberts (*Co-Chair IPCC Working Group II; Head of the Sustainable and Resilient City Initiatives Unit of eThekwini Municipality, Durban*)
William Megarry (*Senior Lecturer in Archaeology, School of Natural and Built Environment, Queen's University Belfast; ICOMOS Climate Change and Heritage Working Group, Focal Point*)

Members

Yunus Arikan (*Head of Global Policy and Advocacy, ICLEI World Secretariat*)
Eduardo Brondizio (*Professor of Anthropology, Department of Anthropology, Indiana University Bloomington, USA. Director of Centre for the Analysis of Social–Ecological Landscapes (CASEL))*
May Cassar (Director of the UCL Institute for Sustainable Heritage)
Gregory Flato (*Vice Chair IPCC Working Group I, Senior Research Scientist at Environment and Climate Change Canada*)
Rohit Jigyasu (*Rohit Jigyasu, Project Manager, Urban Heritage, Climate Change & Disaster Risk Management, ICCROM*)
Valerie Masson-Delmotte (Co-Chair IPCC Working Group I / Senior scientist at Laboratoire des Sciences du Climat et de l'Environnement / Institut Pierre Simon Lapace, Université Paris Saclay)
Hindou Oumarou Ibrahim (*Mbororo pastoralist, Chad, President, Association for Indigenous Women and Peoples of Chad (AFPAT)*)
Hans-Otto Pörtner (*Co-Chair IPCC Working Group II, Physiologist and Marine Biologist at Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research*)
Sandeep Sengupta (*Global Coordinator for Climate Change at the International Union for Conservation of Nature (IUCN))*
Pasang Dolma Sherpa (*Co-Chair, Local Communities and Indigenous Peoples' Platform (LCIPP) of the UNFCCC; Executive Director of the Center for Indigenous Peoples Research and Development; and Chair of the IUCN CEESP Specialist Group on Indigenous Peoples, Customary & Environmental Laws & Human Rights*)
Richard Veillon (*Programme Specialist at the UNESCO World Heritage Centre*)

ICSM CHC Scientific Coordinator
Hana Morel (*Sustainability Manager for MOLA's Coastal and Intertidal Zone Archaeological Network, CITiZAN*)

ICSM CHC Climate Heritage Specialist
Sarah Forgesson

IPCC
Melinda M.B. Tignor (*Head, IPCC Working Group II Technical Support Unit*)

Organising Committee Members

ICOMOS
Andrew Potts
Angelique Ploteau

UNESCO
Dorine Dubois
Maria Gropa
Sara García de Ugarte

IPCC
Melinda Tignor

The German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt DBU)
Constanze Fuhrmann

United Nations
Educational, Scientific and
Cultural Organization

ICOMOS
international council on monuments and sites

IPCC Co-Sponsored International Expert Meeting on
Culture, Heritage and Climate Change

Mr Ahmed Skounti
Professor of anthropology
Institut national des sciences de
l'archéologie et du Patrimoine
Rabat
Morocco

16 September 2020

Dear Mr Skounti,

On behalf of UNESCO and ICOMOS, it is our great pleasure to invite you to serve as an Expert Member of the Scientific Steering Committee (SSC) for the IPCC co-sponsored **International Expert Meeting on Culture, Heritage and Climate Change**, which will be organized by UNESCO, ICOMOS, and the IPCC.

UNESCO and ICOMOS submitted a proposal to the IPCC to co-sponsor an International Expert Meeting on Culture, Heritage and Climate Change earlier this year. This proposal was approved by the IPCC in June of this year. The International Expert Meeting, which will be held in late 2020 or early 2021, will aim to assess the state of knowledge and practice connecting culture and climate change; identify key research and knowledge gaps in this field; and strengthen research and collaborations leading to peer-reviewed scientific publications and other key material to help promote the role of culture for climate change mitigation and adaptation.

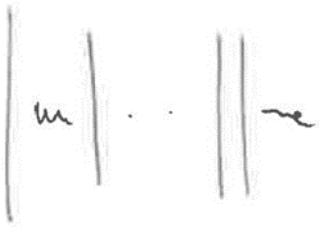
A Scientific Steering Committee (SSC) for the International Experts Meeting will determine how to prepare and present assessments of peer-reviewed scientific publications and other appropriate literature and documentation, select participants for the International Expert Meeting, and develop recommendations following the International Expert Meeting. The proposed Terms of Reference of the SSC are attached.

In addition to the SSC, an Organizing Committee composed of UNESCO and ICOMOS will ensure the coordination and operationalization of arrangements for the Expert Meeting.

We would be grateful if you could confirm you available to serve on the SSC by 24 September 2020 to the Expert Meeting Organizing Committee in care of Andrew Potts at andrew.potts@icomos.org. The first meeting of the Scientific Steering Committee is scheduled

to take place on 29 September 2020 from 2 pm to 4:30 pm CET. Given the global health situation, we currently expect that all meetings and work of the SSC will take place online. Detailed information will be sent in the coming days to all members.

The IPCC Co-Sponsored International Expert Meeting on Culture, Heritage and Climate Change is expected to result in recommendations for incorporating culture and heritage into the IPCC 7th Assessment cycle products, including the AR7 report and forthcoming special report on Climate Change and Cities, as well as, potentially, a special report on culture, heritage and climate change. We look forward to working with you on this important endeavour.



Mr Ernesto Ottone R.
Assistant Director-General for Culture
UNESCO

Professor Toshiyuki Kono
President of ICOMOS

Encl.

IPCC Co-Sponsored International Expert Meeting on Culture, Heritage and Climate Change
Organizing Committee
c/o ICOMOS
11 rue du Séminaire de Conflans - 94220 Charenton-le-Pont - France
Tel. + 33 (0) 1 41 94 17 59 Fax. + 33 (0) 1 48 93 19 16
Enquiries: andrew.potts@icomos.org

UNESCO-ICOMOS-IPCC Co-sponsored

International Expert Meeting on Culture, Heritage and Climate Change

Scientific Steering Committee (SSC)

Terms of Reference

Background

Climate change is among the key challenges of our time. 2019 represented the second warmest year on record and recorded the highest sea levels to date. Earth had its hottest May this year, with 2020 set to be among the hottest 10 years of all time. From recent tidal flooding in Venice to the wildfires in Australia, cultural and natural heritage, including UNESCO World Heritage sites, are feeling the full impact of climate change. Small Island Developing States (SIDS) are already experiencing the uprooting of communities due to climate change, threatening entire ways of life, including the practice and transmission of intangible cultural heritage. Climate change also threatens the diversity of cultural expressions and the cultural and creative industries, with a loss of economic opportunities damaging the livelihoods of artists and cultural professionals, as well as communities as a whole

Yet culture is also an essential resource for climate change mitigation and adaptation. Intangible cultural heritage practices, including traditional land and water management practices, traditional food security strategies, and the use of traditional architecture and building materials, can help communities adapt to a changing climate. Cultural and natural heritage sites can serve as a refuge, both physical and psychological, for communities during and after climate-related emergencies. These sites can also act as assets for recovery and reconciliation in the wake of intercommunal conflicts linked to climate change. Creativity is essential for finding new solutions to environmental challenges, and cultural and heritage institutions and artists have a substantial role to play in inspiring climate action.

Natural heritage sites are also powerful resources for addressing rising greenhouse gas emissions. Ecosystems on land and sea serve as our planet's only "sinks" for greenhouse gas emissions, sequestering 5.6 gigatons of carbon dioxide each year – the equivalent of around 60% of global greenhouse emissions. Many of the natural heritage sites found on UNESCO's World Heritage list, such as the Central Amazon Conservation Complex, the largest protected area in the Amazon Basin, serve this critical function.

The COVID-19 pandemic and resulting economic downturn are increasing the complexity of responding to the climate change challenge and its impacts on culture and heritage. The current crisis has hit the entire creative value chain hard and considerably weakened the professional, social and economic status of artists and culture and heritage professionals. With 90% of the world's museums having closed their doors at the height of the crisis, of which more than 10% may never reopen, and two-thirds of countries continuing to close or partially close their World Heritage sites, communities and their cultural practices are deeply suffering the social and economic impact of COVID-19. Travel restrictions in all of the world's destinations have threatened up to 120 million jobs in the tourism sector, particularly affecting SIDS, whose economies' are largely dependent on this industry. The pandemic has also accentuated the risk of poaching at natural sites and looting at archaeological sites, as a result of reduced surveillance. Likewise, the crisis has made emergency responses to conflict and natural disasters, including climate-related disasters, increasingly difficult, with culture continuing to be caught in the crossfire.

At the same time, confinement measures taken in response to the COVID-19 pandemic have made clear the profound importance of human connections and the critical roles and values of culture in creating and sharing experiences. As well, growing global awareness of systemic inequalities is recognizing their deep histories, that they are shaped in the present by tangible and intangible culture and heritage, and ongoing engagement with these pasts is needed for a just and sustainable future. This Expert Meeting will take place in and work through this full context.

UNESCO-ICOMOS-IPCC co-sponsored International Expert Meeting on Culture, Heritage and Climate Change

In light of these challenges, UNESCO, ICOMOS and the IPCC's efforts have taken on a new urgency, with the three organizations joining forces to combat climate change and safeguard our shared culture and heritage and engage them fully in the global climate response. An **IPCC co-sponsored International Expert Meeting on Culture, Heritage and Climate Change** will be held in late 2020 or first half of 2021 with the aim of assessing the state of knowledge and practice connecting culture and climate change; identifying key research and knowledge gaps in this field; and strengthening research and collaborations leading to peer-reviewed scientific publications and other key material to help promote the role of culture for climate change mitigation and adaptation.

In view of this important meeting, a **Scientific Steering Committee (SSC)** will be established to:

- Support the organization of the International Expert Meeting on Culture, Heritage and Climate Change, ensure global representation through the identification and selection of participants of the International Meeting (invitations to be issued by the Organizing Committee), ensure the peer review of the White Papers and other key documents prepared in view of the International Meeting, review the Final Report (Position Paper) of the International Meeting.
- Provide recommendations regarding the focus, programme and outcomes of the Experts Meeting;
- Ensure follow-up for advocacy on culture and climate change in the SSC's respective fields of competency.

The first preparatory meeting of the SSC is foreseen to take place on 29 September 2020.

Composition of the SSC

The SSC consists of approximately 15 members, as follows:

Co-Chairs

- 3 Co-Chairs, including one representative each from UNESCO, ICOMOS and the IPCC;

Co-Chairing Organisations

- One representative of IPCC WGI;
- One representative of IPCC WGII;
- One representative of UNESCO;
- One representative of ICOMOS;

Key Partners

- One representative of IUCN;
- One representative of ICLEI Governments for Sustainability;
- One representative of the Facilitative Working Group (FWG) for the Local Communities and Indigenous Peoples Platform of the UNFCCC

Invited Experts

- **One representative of ICCROM;**
- 3-5 additional expert members jointly selected by UNESCO, ICOMOS and the IPCC. At least one of these additional expert members will represent an indigenous organization or community.

Criteria for selection of members

All members will be carefully selected with attention to geographic/disciplinary/gender diversity. If major gaps in geographic/disciplinary representation remain after all partner recommendations are considered, UNESCO and ICOMOS may reach out directly for either recommendations or to invite members from the underrepresented areas/disciplines. Furthermore, members of the SSCCC should be selected with a view to ensuring gender balance.

Working modalities

Working modalities will be as follows:

- The SSC is co-chaired by a representative of UNESCO, ICOMOS and the IPCC;
- The SSC will meet regularly through online meetings. Further online meetings via teleconferencing and email consultations will be held as necessary;
- The working language of the meetings will be English. When necessary and feasible, the Secretariat will attempt to provide interpretation in French as required.

Overall Timeline

- **29 September 2020**
  First online preparatory meeting of the Scientific Steering Committee; other meetings to be planned

- **Late 2020/First half 2021**
  Co-sponsored International Expert Meeting on Culture, Heritage and Climate Change held via an online format

- **2021**
  Follow-up for advocacy on culture and climate change in the SSC's respective fields of competency

Culture, Heritage & Climate Change

SCIENTIFIC STEERING COMMITTEE MEETING REPORT | 29.09.20

UNESCO | ipcc INTERGOVERNMENTAL PANEL ON climate change | ICOMOS international council on monuments and sites

Scientific Steering Committee (SSC) Meeting Report

On 29 September 2020, the *United Nations Educational, Scientific and Cultural* Organization (UNESCO), the International Council on Monuments and Sites (ICOMOS), and the Intergovernmental Panel on Climate Change (IPCC) convened an initial meeting of the Scientific Steering Committee (SSC) of the Culture, Heritage and Climate Change Initiative. The Meeting sought to present the SSC members and discuss the expected results of the Initiative, notably

- The organization, in 2021, of an International Expert Meeting on Culture, Heritage and Climate Change, which will examine the state of knowledge of connections between culture, heritage, and climate change and provide strategic recommendations to the international community;
- The elaboration of White Papers to assess peer-reviewed scientific publications and knowledge gaps in the field of cultural heritage and climate change that will provide a foundation for the Meeting;
- The development of Strategic Recommendations, drawn from the Meeting and White Papers, for expanding the state of knowledge of culture, heritage, and climate change and its integration in global climate science, policy, and response.

The agenda items of the SSC meeting were as follows:

- Opening remarks by Mr Ernesto Ottone R., Assistant Director-General for Culture, UNESCO;
- Introduction by Ms Mechtild Rössler, Director of the UNESCO World Heritage Centre and SSC Co-Chair for UNESCO, and Ms Marcy Rockman, Scientific Coordinator with the ICOMOS Climate Change and Heritage Working Group, and SSC Co-Chair for ICOMOS, (IPCC Co-Chair not yet named), and brief self-introductions of the SSC Members;
- Presentation of the International Expert Meeting on Culture, Heritage and Climate Change (UNESCO);
- Introduction to the Scientific Questions and White Paper approach (ICOMOS); followed by SSC discussion;
- Next steps and closing remarks.

1. Cultural Heritage & Climate Change Initiative

Ernesto Ottone R., Assistant Director-General for Culture of UNESCO, opened the initial meeting of the Scientific Steering Committee on Culture, Heritage and Climate Change and presented the UNESCO, ICOMOS and IPCC Co-Sponsored Initiative on Cultural Heritage and Climate Change. UNESCO informed the SSC of the UNESCO Reflection Group on Culture and Climate Change, which was launched in February 2020 at UNESCO Headquarters, on the eve of the 52nd session of the IPCC, and that the goal of this UNESCO, ICOMOS and IPCC Co-Sponsored Initiative is to ensure that culture and heritage are fully assessed and integrated in the international climate agenda.

UNESCO recalled that culture is engrained in communities, reflecting their beliefs, customs and history, projecting their ideas, skills and potential. At the same time, culture offers support, protection and resilience in times of crisis, as well as a means for expression and unity. Yet, despite the growing impact of climate change on culture, as well as the fundamental relationship between culture and climate change **mitigation** and **adaptation**, culture is largely absent from the international climate agenda. UNESCO stressed that for these reasons, integrating the role of culture into climate action has become critical – both as **a shared global asset** that needs to be safeguarded from the effects of climate change, and as **a transversal resource** for climate change mitigation and adaptation.

2021 will be a defining year for our environmental future. The SSC Members were reminded that in May 2021, the world will come together to agree upon a post-2020 biodiversity framework at the UN Biodiversity Conference. Past experience has shown that climate change can no longer be addressed in silos and that an integrated, multidimensional approach is necessary.

In this context, UNESCO presented the objectives of the Culture, Heritage and Climate Change Initiative:

1) To prepare, coordinate, and host the International (UNESCO-ICOMOS-IPCC Co-Sponsored) Expert Meeting on Culture, Heritage, and Climate Change. This International Meeting will bring together culture, heritage, and climate experts (including scholars and practitioners) from around the world to assess the state of knowledge from and about connections between culture, heritage, and climate change science, policy, and response.

2) To produce a set of **White Papers** for examination by the International Experts Meeting, in order to assess the state of knowledge and practice connecting culture and climate change, and strengthen scientific knowledge and collaborations. The White Papers will be commissioned to several teams of experts, under the coordination of ICOMOS. The Scientific Steering Committee (SSC) will establish a process for commissioning, review, and circulation of these papers in view of their submission in preparation for the International Experts Meeting.

3) To develop **Strategic Recommendations** in order to contribute to the integration of culture into the international climate agenda, including the IPCC Seventh Assessment Report (AR7) and the Special Report on Climate Change and Cities. This process will be led in the framework of the SSC, based on the material received from the teams that will draft the White Papers, and further developed and finalized by the International Expert Meeting participants.

With this purpose in mind, the SSC has been established with a view to prepare and oversee the process leading to the International Experts Meeting; discuss the scoping and review of the White Papers and Strategic Recommendations; and agree on next steps.

2. International Expert Meeting on Cultural Heritage & Climate Change (Moderated by UNESCO)

Mechtild Rössler, Director of the World Heritage Centre of UNESCO, and SSC Co-Chair for UNESCO, presented the second item on the agenda of the SSC meeting, dedicated to the International Expert Meeting on Culture, Heritage, and Climate Change in 2021, and provided an overview of the International Expert Meeting on Culture, Heritage, and Climate Change to be held in early 2021 under the sponsorship of UNESCO, ICOMOS and the IPCC. As highlighted by UNESCO, the Expert Meeting will bring together experts from scientific, cultural and heritage bodies and agencies, Indigenous Peoples and local communities, international organizations, key experts at national/local levels, NGOs and academics from across the globe to help advance the integration of culture in the international climate agenda, including in the work of the United Nations Framework Convention on Climate Change (UNFCCC), the implementation of the 2015 Paris Agreement as well as the follow-up to the IPCC Assessment Reports and Special Reports.

The SSC Co-Chair for UNESCO informed participants that the International Expert Meeting is expected to be held online in the first half of 2021 and emphasized the key objective of the Meeting, which is to serve as a catalyst for new partnerships and connections, research, and publications that will support the global community at large in creating a larger role for culture in climate science and climate change responses. Such larger role should ultimately lead to the inclusion of culture inputs to IPCC products in the AR7 cycle.

The SSC Co-Chair for UNESCO recalled that the SSC will thus contribute to the finalization of the list of experts participating in the International Experts Meeting (following established priorities for geographic representation and gender balance) and the framing of its sessions in view of discussing the White Papers and enriching contributions to the Strategic Recommendations that will be developed for policy outcomes.

3. The White Paper Approach: Strengthening Scientific Knowledge (Moderated by ICOMOS)

Marcy Rockman, Scientific Coordinator with the ICOMOS Climate Change and Heritage Working Group, and SSC Co-Chair for ICOMOS, introduced the third item on the agenda, devoted to the Scientific Questions and White Paper Approach. Through this item, ICOMOS launched a discussion on the elaboration of the White Papers that will serve to begin to assess the state of knowledge in the fields of culture, heritage, and climate change, including its representation in IPCC reports, provide a common body of material to be used as a reference for the participants of the Expert Meeting and as a source of knowledge for the preparation of the Strategic Recommendations.

The SSC Co-Chair for ICOMOS, presented the five scientific questions, which featured in the proposal for co-sponsorship approved by the IPCC, to the Members of the SSC with the aim of identifying a subset of focus topics for the White Papers. These questions include: i) the systemic understanding of culture, heritage and climate change; ii) cultural governance; iii) loss, damage and adaptation for culture and heritage; iv) capacity to learn from the past; v) roles of culture and heritage in transformative change and alternative sustainable futures.

Following the presentation, Members of the SSC stressed that **culture and heritage should not be addressed in silos**, and that due to the underlying common thread running through all the questions, the topics could be regrouped. It was also highlighted that the White Papers should encompass a **comparative, regional approach** that takes into account the diversity of roles of cultural heritage in climate action, focusing on a cause and effect interlink. To support this process, a **systems dynamics mapping** was recommended. In the same line, SSC Members suggested to develop an **initial conceptual framework** encompassing the different levels of threats to climate change, types of cultural heritage, social conditions, stakeholders, and possible responses.

During the SSC Meeting, attention was brought to the need to **include scientists and knowledge holders from Indigenous communities** in the IPCC Assessment Report cycles, and integrate intergenerational, dynamic, collective and practical-based knowledge systems and ways of knowing into scientific frameworks. The Facilitative Working Group (FWG) of the UNFCC Local Communities and Indigenous Peoples Platform (LCIPP) is invited to be a key partner of the SSC, in order to ensure that a link is made between the initiative and the discussions currently being undertaken at the LCIPP of the UNFCCC on this subject.

It was agreed that the dichotomy between "western" sciences and "Indigenous" knowledge should be deconstructed and the potential for cooperation, dialogue and complementarity of autonomous and historically distinct systems of knowledge be further explored. It was also recognized that **living heritage, in line with the UNESCO 2003 Convention for the Safeguarding of the Intangible Cultural Heritage (2003 Convention), and science are mutually beneficial** and living heritage and knowledge systems of Indigenous Peoples and local communities are key resources for adaptation to changing climates. Due consideration should be given to accountability, human rights and social policies, and land recognition.

The SSC agreed that cultural governance is crucial to unlock the potential of cultural heritage for climate action, particularly in the need to **strengthen interdisciplinary cooperation** among different institutions and organizations. In this regard, SSC members pointed to reinforcing the link between the culture and environmental sectors and fostering a common understanding and terminology. Moreover, it was stressed that **climate change is fundamentally an ethical issue and therefore necessitates a values-based approach, rooted in equity, justice and solidarity**. In this context, the SSC recalled that the 12 Ethical Principles for Safeguarding Cultural Heritage, endorsed by the Intergovernmental Committee of the UNESCO 2003 Convention in 2005, provide very useful guidance.

At the operational level, SSC Members highlighted the need to raise awareness of the growing urgency to **adapt cultural heritage management systems and conservation techniques to the changing environmental conditions** and rethink cultural heritage interventions, in light of the current challenges faced by cultural heritage.

As a result of the discussions, the following **three topics** are proposed: **i) Impacts, vulnerability and understanding risks, ii) Heritage-based solutions**: integrated approaches that leverage cultural and natural heritage for climate change adaptation and mitigation, building on the UNESCO 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage and the ongoing discussions for the update the UNESCO Policy Document on Impacts of Climate Change and World Heritage; and **iii) Intangible cultural heritage, Indigenous Peoples knowledge systems and climate.** It was noted that topic iii is proposed and should be undertaken in recognition of the UNESCO 2003 Convention for the Safeguarding of Intangible Cultural Heritage, and the United Nations Declaration on the Rights of Indigenous Peoples and in alignment with the UNESCO Policy on Engaging with Indigenous Peoples, and the UNFCCC Paris Agreement.

These three topics will be discussed with the IPCC Co-Chair (once appointed) and the two SSC Co-Chairs (UNESCO and ICOMOS) in order to finalize the number and detailed scope of the White Papers.

In view of fulfilling the ultimate goal of integrating cultural heritage into the IPCC assessment cycles, it was agreed that the **most effective format and scope for the White Papers and SSC contributions must be sought**. The IPCC expressed a shift from the impact and risk assessment approach taken by the Fifth Assessment Report (AR5) to a **solution-oriented approach** currently being applied by the Sixth Assessment Report (AR6). In addition, three important dimensions for the IPCC related to cultural heritage were highlighted:

1. **Resilience**: Climate adaptation through cultural heritage, crisis response, coping with change, loss and transformation.

2. **Carbon neutrality**: The contribution of cultural and natural heritage, and World Heritage properties in particular, to climate change mitigation by reducing the environmental footprint.
3. **Commitment**: The current impact, as well as projected future risks, capacity to cope with change, limiting losses and identifying methods to protect and transmit what communities care for.

The IPCC confirmed that its assessment process follows rigorous standards for the literature that it assesses, and that contributions must be provided in published form in order to be considered in an assessment. Discussion by the SSC affirmed that further attention to Indigenous knowledge in relation to documentation standards is needed.

In addition, the IPCC Working Group II invited SSC engagement in the **review of the 2nd draft of the AR6**, foreseen in early December 2020, and other assessment cycle documents to ensure that cultural heritage is effectively mainstreamed throughout the document.

Conclusions and Next Steps

The discussions of the SSC Members contributed to define the scope of the Initiative, noting that culture and heritage should be regarded as a whole, from built to living cultural heritage, and ensuring that the practices of the communities surrounding culture and heritage are dully considered.

It was made clear that intangible cultural heritage should also be integrated as a whole, integrating various knowledge systems, including Indigenous Peoples knowledge to avoid silos. It was noted that this should be in accordance with the UNESCO 2003 Convention and other UNESCO programmatic activities, such as LINKS and Education for Sustainable Development.

The SSC agreed that an integrated, regional approach should be applied to the elaboration of both the White Papers and the Strategic Recommendations, with a focus on key areas such as resilience, carbon neutrality, commitment and equity, and that intersectoral cooperation across stakeholders must be reinforced.

Going forward, the 2nd meeting of the Scientific Steering Committee is foreseen to take place before the end of 2020 (early December) with the aim of discussing more in-depth the three proposed White Papers, their commissioning and overall timeline/process; to exchange on the scope and recommended format of the Strategic Recommendations, that will contribute to the integration of culture into the international climate agenda, including the IPCC AR7 and the Special Report on Climate Change and Cities; and to coordinate the review the 2nd draft of the IPCC AR6. The next meeting of the Scientific Steering Committee will also provide an opportunity to propose a date for the International Expert Meeting (in the first half of 2021).

Annex 1. Members of the Scientific Steering Committee for Cultural Heritage and Climate Change

Mechtild Rössler (Co-Chair)
Director of the UNESCO World Heritage Centre

An expert in both cultural and natural heritage and the history of planning, Dr. Rössler was appointed in 2015 as the Director of the World Heritage Centre. Ms Rössler has a degree in cultural geography and in literature from Freiburg University (Germany) and a Ph.D. from the Faculty for Earth Sciences, University of Hamburg (Germany) in 1988.
She joined the Centre national de la recherche scientifique (CNRS) at the Research Centre of the "Cité des Sciences et de l'Industrie" (Paris, France) in 1989 and worked in 1990/91 as a visiting scholar on geography, area research and spatial planning at the University of California at Berkeley, USA, in the Department of Geography. In 1991, she started working at UNESCO Headquarters in Paris in the Division for Ecological Sciences and transferred in 1992 to the newly created UNESCO World Heritage Centre. She held different positions including as Programme Specialist for Natural Heritage and cultural landscapes (1993-2001), Chief of Europe and North America (2001-2010), Chief of the Policy and Statutory Meeting Section (2010-2013), Deputy Director (2013-2015) and Director of the Division for Heritage (2015-2018).

Marcy Rockman (Co-Chair)
Scientific Coordinator at ICOMOS

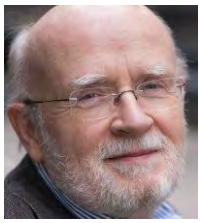
Marcy Rockman is an archaeologist with experience in national and international climate change policy. Her research focus is how humans gather, remember, and share environmental information, and she's used this to address situations as diverse as cultural resource management in the American West and homeland security risk communication in Washington, DC. From 2011-2018 she served as the inaugural US National Park Service (NPS) Climate Change Adaptation Coordinator for Cultural Resources. She is now working with the International Council on Monuments and Sites (ICOMOS) as Scientific Coordinator of a project to improve incorporation of heritage in reports of the Intergovernmental Panel on Climate Change (IPCC). She also works with the non-profit Co-Equal in Washington, DC to provide climate change research for the U.S. Congress. Dr. Rockman holds a Ph.D. in Anthropology from the University of Arizona, and a B.Sc. in Geology from the College of William and Mary.

Valérie Masson-Delmotte (Co-Sponsor)
Senior climate scientist, Laboratoire des Sciences du Climat et de l'Environnement, Institut Pierre Simon Laplace, and Co-chair of IPCC Working Group I

Dr. Valérie Masson-Delmotte is a senior climate scientist from Laboratoire des Sciences du Climat et de l'Environnement, Institut Pierre Simon Laplace. She is the Co-chair of IPCC Working Group I for the AR6 cycle (2015-2022), and has co-supervised three recent IPCC special reports (Global Warming of 1.5°C, 2018; Climate Change and Land, 2019; the Ocean and Cryosphere in a Changing Climate, 2019). Her research interests are focused on quantifying and understanding past changes in climate and atmospheric water cycle, using analyses from ice cores in Greenland, Antarctica and Tibet, analyses from tree-rings as well as present-day monitoring, and climate modelling for the past and the future. She has worked on issues such as the North Atlantic Oscillation, drought, climate response to volcanic eruptions, polar amplification, climate feedbacks, abrupt climate change, and ice sheet changes across different timescales.

Greg Flato (Co-Sponsor)
Vice-Chair of IPCC Working Group I

Dr Flato has been a research scientist at CCCma since 1993, and its manager from 2004-2014. His expertise is in the area of sea-ice and global Earth System modelling. Since joining CCCmahe has worked on the development of a series of global climate models used to simulate historical climate variations and project future climate change. Dr Flato was a lead author of the cryosphere chapter of the IPCC Fourth Assessment Report, and Coordinating Lead Author of the chapter on climate model evaluation in the IPCC Fifth Assessment. He is an adjunct professor at the University of Victoria's School of Earth and Ocean Science and has served on a number of national and international scientific committees including the World Climate Research Program's (WCRP) Joint Scientific Committee, and co-chaired the WCRP Climate and Cryosphere (CliC) core project. He currently serves as co-chair of the WCRP Working Group on Coupled Modelling (WGCM), and in 2015 was elected Vice Chair of the IPCC's Working Group I.



Hans Poertner (Co-Sponsor)
Co-Chair of IPCC Working Group II

Dr Hans-Otto Pörtner studied at Münster and Düsseldorf Universities where he received his PhD and habilitated in Animal Physiology. As a Research and then Heisenberg Fellow of the German Research Council he worked at Dalhousie and Acadia Universities, Nova Scotia, Canada and at the Lovelace Medical Foundation, Albuquerque, New Mexico, USA. Currently he is Professor and Head of the Department of Integrative Ecophysiology at the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research in Bremerhaven, Germany. He acts as an associate editor 'Physiology' for Marine Biology and as a co-editor of the Journal of Thermal Biology. During the IPCC Fourth Assessment cycle Dr Pörtner served as Lead Author on the Working Group III Special Report on Carbon Capture and Storage, and during the Fifth Assessment Cycle as Coordinating Lead Author of Chapter 6 (Ocean Systems) of the Working Group II Report, as a member of the author teams for the Working Group II Summary for Policymakers and Technical Summary, and as a member of the Core Writing Team for the Synthesis Report.

Debra Roberts (Co-Sponsor)
Co-Chair of Working Group II of the IPCC

Dr Debra Roberts is currently head of the Sustainable and Resilient City Initiatives Unit in eThekwini Municipality in Durban, South Africa. Prior to taking up this post in 2016, she established and managed the Environmental Planning and Climate Protection Department of the same municipality for 22 years (1994–2016) and was selected as the city's first Chief Resilience Officer in 2013. Dr Roberts was a Lead Author of Chapter 8 (Urban Areas) and a Contributing Author to Chapter 12 (Africa) of the Working Group II contribution to the IPCC Fifth Assessment Report. She was elected as Co-Chair of Working Group II for the IPCC's Sixth Assessment cycle in 2015. She was a member of the South African United Nations Framework Convention on Climate Change (UNFCCC) negotiating team until December 2015, and has sat on various international advisory bodies focused on climate change issues in cities (e.g., the Rockefeller Foundation's Asian Cities Climate Change Resilience Network and UN-Habitat's 2011 'Cities and Climate Change' Global Report).

Yunus Arikan (Key Partner)
Head of Global Policy and Advocacy, ICLEI World Secretariat

Yunus leads the global policy and advocacy team at ICLEI. Since 2013, he has led global advocacy towards international bodies and multilateral agreements. Yunus helped establish the Bonn Center for Local Climate Action and Reporting – carbon*n* – and served as the Director of the Secretariat for the World Mayors Council on Climate Change. He has a background in environmental engineering.

Sandeep Sengupta (Key Partner)
Global Coordinator, IUCN Climate Change Portfolio

Sandeep Sengupta is the global coordinator for climate change at the International Union for Conservation of Nature (IUCN) in Switzerland, where he leads the organization's engagement on the topic. He has previously worked on a wide range of environment and development issues, both within and outside the government in India, and in international organizations abroad. He is also a visiting faculty at the Graduate Institute of International and Development Studies (IHEID) in Geneva, where he teaches a course on climate change politics and governance. He holds a doctorate in International Relations from the University of Oxford and a master's degree from the London School of Economics (LSE).

Eduardo Brondízio
Co-Chair of the IPBES Global Assessment of Biodiversity and Ecosystem Services

Eduardo S. Brondizio is a Distinguished Professor of Anthropology at Indiana University Bloomington and directs the Center for the Analysis of Social-Ecological Landscapes (CASEL). Committed for three decades to field-based research studying the transformation of the Brazilian Amazon, Brondizio has contributed to several regional and global level environmental assessments and serves on numerous international scientific and editorial boards. He is the Co-Chair of the Global Assessment of Biodiversity and Ecosystem Services of the Inter-governmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

May Cassar
Director of the UCL Institute for Sustainable Heritage

Professor May Cassar is the Founder and Director of the UCL Institute for Sustainable Heritage (UL ISH) and the Bartlett Vice Dean (Public Policy) at University College London. May is the National Co-ordinator/UK Chair of the European Research Infrastructure for Heritage Science (E-RIHS.UK) and Trustee of the National Heritage Science Forum (NHSF). May is a member of the UK Government's Department for Culture, Media and Sport (DCMS) Science Advisory Council and has recently served on the DCMS Challenge Panels reviewing Historic England and the National Heritage Memorial Fund/Heritage Lottery Fund. May directs the Engineering and Physical Sciences Research Council-funded Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology (SEAHA), a multi-million-pound UK Government investment in doctoral training for the next generation of heritage scientists.

Rohit Jigyasu
Programme Officer, ICCROM-Sharjah, and Vice-President of ICOMOS International

Rohit Jigyasu is the Programme Officer, ICCROM-Sharjah, UAE, VicePresident of ICOMOS International, and former UNESCO Chair professor at the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University, Tokyo, Japan where he also serves as scientific coordinator International Programme on Disaster Risk Management of Cultural Heritage. He is also the President of ICOMOS International Scientific Committee on Risk Preparedness (ICORP) and ICOMOS-India. He is also senior advisor at the Indian Institute for Human Settlements (IIHS) based in Bangalore, India, and visiting faculty at several institutions in India and abroad. He has served as a consultant to Archaeological Survey of India, National Institute of Disaster Management, Indian Institute of Human Settlements (IIHS), UNESCO, UNISDR, UNDP, ICCROM, Aga Khan Planning and Building Services and the Getty Conservation Institute for conducting research and training on Cultural Heritage Risk Management.

Hindou Oumarou Ibrahim

President of the Association of Women and Indigenous Peoples of Chad (AFPAT)

Hindou is a founding member of the Marrakech Platform for Climate Action, she is a member of the technical and scientific committee of BIOPALT - UNESCO and also a member of the Executive Committee of the Indigenous Peoples of Africa Coordinating Committee (IPACC), where she is the climate change focal point. She has worked on indigenous peoples' rights and environmental protection through the 3 Rio Conventions (Biodiversity, Climate Change and Desertification) with multiple responsibilities. Hindu was recently appointed Emerging Explorer 2017 by National Geographic. She received the Special Prize of the Danielle Mitterrand Foundation in 2017. She was co-chair of the International Indigenous Peoples Forum on Climate Change and Director of the Indigenous Peoples Pavilion from 2015 to 2017.

Ahmed Skounti

Professor of Anthropology at the Institut national des sciences de l'archéologie et du patrimoine (INSAP)

Mr Skounti is a Professor at the Institut national des sciences de l'archéologie et du patrimoine (INSAP, Department of Anthropology, Rabat). He holds a Ph.D. in social anthropology from the Ecole des Hautes Etudes en Sciences Sociales (EHESS), Paris, France, and is an associate professor at the University of Marrakech. As a UNESCO consultant on issues related to the World Heritage Convention (1972) and to the Intangible Cultural Heritage Convention (2003), he participated in the drafting of the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage. He represents Morocco in the meetings of the Intergovernmental Committees of these two conventions respectively since 1998 and 2007. Mr Skounti is also a member of the Advisory Body of the Arab Regional Centre for the World Heritage (Bahrain), and was a member of the Evaluation Body of the Intergovernmental Committee for the safeguarding of the Intangible Cultural Heritage from 2015 to 2017 and I was Chair of this body in 2015 and 2017. He is also member of the Advisory Body of the International Research Centre on ICH in the Asia-Pacific Region (IRCI), Japan.

Richard Veillon

Programme Specialist at the Policy and Statutory meetings Unit of the UNESCO World Heritage Centre

As a professional with over 20 years of experience in the field of natural and cultural heritage conservation, Mr. Richard Veillon has been working at the Policy and statutory meetings Unit of the UNESCO World Heritage Centre (WHC), in Paris (France) since 2004. Mr. Veillon holds a Master's degree in Biology and Ecology from the University of Rennes I (France) and a Post-graduate degree in Museology of Natural Sciences and Humanities from National Natural History Museum of Paris (France). In 1998, he joined the French Ministry of Foreign Affairs and worked for the Embassy of France in Zimbabwe, where he designed and headed a bilateral cooperation programme in the field of Museums and Heritage. He currently coordinates the World Heritage Reactive Monitoring process and the yearly reporting on the state of conservation of World Heritage properties to the World Heritage Committee, and manages the WHC's online Information System on the state of conservation of World Heritage properties. In addition, he has been serving as the WHC focal point for climate change matters and has participated in the revision of the UNESCO Strategy for Action on Climate Change. He currently coordinates the updating of the 2007 Policy Document on the impacts of climate change on World Heritage properties.

Observing Members

Andrea Carmen

Co-chair of the Facilitative Working Group for the UNFCCC Local Communities and Indigenous Peoples' Traditional Knowledge Exchange Platform, and Executive Director of the International Indian Treaty Council (IITC)

Ms Andrea Carmen, Yaqui Nation, became Executive Director of the International Indian Treaty Council (IITC) in 1992. Andrea was IITC's team leader for work on the UN Declaration on the Rights of Indigenous Peoples and has many years' experience as a human rights trainer and observer around the world. Andrea has been an expert presenter at various UN bodies and seminars on human rights, treaties, and treaty rights, cultural indicators, biological diversity, food sovereignty, and UN Sustainable Development Goals. She has served on a number of boards and advisory councils. In 2010 she one of two members from North America on the Global Steering Committee for the International Indigenous Peoples Forum on Climate Change (IIPFCC) which coordinates indigenous peoples' work with the UN Framework Convention on Climate Change. In February 2019 Andrea was selected by indigenous peoples, tribes and organizations in North America to serve as their representative on the new Facilitative Working Group for the development of the UNFCCC Local Communities and Indigenous Peoples' Traditional Knowledge Exchange Platform for its first three years of operation.

Tiffany Hodgson

Programme Officer at the United Nations Framework Convention on Climate Change (UNFCCC)

Annex C

Annex C-1
Invitation to SSC Members to Suggest Participants dated 8 April 2021

International Co-Sponsored Meeting
on Culture, Heritage and Climate Change

8 April 2021

Dear Scientific Steering Committee Members,

On behalf of the SSC Co-Chairs, I have the honour of inviting you to suggest experts for consideration as participants in the International Co-Sponsored Meeting on Culture, Heritage and Climate Change sponsored by the IPCC, UNESCO and ICOMOS. The proposal for this Co-Sponsored Meeting was agreed by the IPCC Working Group Co-Chairs and endorsed by the IPCC Executive Committee in June 2020.

Co-Sponsored Meeting Participants will be asked to help develop and review the state of knowledge and practice regarding connections of culture, heritage and climate change. This review is intended to inform future actions and research plans. The review will be organized around three overarching scientific questions as well as two cross-cutting issues. A short summary of these questions and issues is included in Annex I to this letter. Suggested participants should have expertise that can contribute to one or more of these areas.

Participants will take part in several activities that will lead to the International Co-Sponsored Meeting, including a series of short webinars spaced over several months in advance of the Co-Sponsored Meeting. The Co-Sponsored meeting itself is tentatively scheduled to take place between **December 6 and December 10, 2021**. Due to the ongoing global health situation and to limit the carbon footprint of this Co-Sponsored Meeting, all Meeting activities will be conducted via web conferencing. Please note that the Co-Sponsored Meeting will be conducted in English.

You are invited to submit suggestions through the online nominations tool. The deadline for uploading suggestions is **Monday, May 3 (midnight GMT + 1).** Kindly be informed that due to a very tight schedule it may not be possible to accept suggestions after the deadline. Suggested individuals will be contacted by the Co-Sponsored Meeting Organising Committee and invited to submit a short application form.

Participants will be selected from among those that return applications. The selection criteria will include scientific, technical and socio-economic expertise, including a range of views; geographical representation; gender balance; and experts with a background from relevant stakeholders. If gaps are identified in the list of suggestions, the Co-Chairs of the Co-Sponsored Meeting Scientific Steering Committee may suggest additional individuals.

I thank you in advance for your consideration of this invitation.

Yours sincerely,

Andrew Potts, ICOMOS
Co-Sponsored Meeting Organising Committee

Annex I

Summary of Overarching Scientific Questions:

1. Systemic connections of culture, heritage, and climate change
    - Nature and scope of representation of diverse forms and scales of culture and heritage in climate literature and assessments
    - Indigenous ways of knowing, western approaches to science in relation to climate change
    - Climate change itself has a history, as do all communities; nature and scope of historical, social, and cultural contexts of the Anthropocene
2. Loss, damage, and adaptation for culture and heritage
    - Vulnerability, significance, prioritization, adaptive/preservation methods
    - Understanding of and approaches to loss and change
3. Roles of culture and heritage in transformative change and alternative sustainable futures
    - Capacity of historic buildings/landscapes to hold carbon
    - Heritage as inspiration for art, connection, understanding, and action on climate

Cross-Cutting Issues

1. Cultural governance
    - Who decides what heritage is? How is heritage knowledge managed?
    - Intersections of heritage with conflict
2. Capacity to learn from the past
    - Use of data and knowledge from the past in climate models and policy
    - Finding common ground between climate and heritage approaches to research questions

Annex C-2
Open Invitation to Suggest Participants dated 20 April 2021

International Co-Sponsored Meeting on
Culture, Heritage and Climate Change

20 April 2021

Dear Sir or Madam,

We have the honour of inviting you to suggest experts for consideration as participants in the International Co-Sponsored Meeting on Culture, Heritage and Climate Change, sponsored by the IPCC, UNESCO and ICOMOS. The proposal for this Co-Sponsored Meeting was agreed by the IPCC Working Group Co-Chairs and endorsed by the IPCC Executive Committee in June 2020.

Co-Sponsored Meeting participants will be asked to help develop and review the state of knowledge and practice regarding connections of culture, heritage and climate change. This review is intended to inform future actions and research plans. The review will be organized around three overarching scientific questions as well as two cross-cutting issues, a summary of which is included in Annex I hereto. Suggested participants should have expertise that can contribute to one or more of these areas.

Participants will take part in several activities that will lead to the International Co-Sponsored Meeting, including a series of short webinars spaced over several months in advance of the Co-Sponsored Meeting. The Co-Sponsored Meeting itself is tentatively scheduled to take place the week of 6 December 2021. Due to the ongoing global health situation and to limit the carbon footprint of this Co-Sponsored Meeting, all Meeting-related activities will be conducted via web conferencing. Please note that the Co-Sponsored Meeting is likely to be conducted in English.

You are invited to submit your suggestions for participants through the online tool. The deadline for uploading suggestions is **Wednesday, 12 May 2021 (midnight GMT + 1)**. Kindly be informed that due to a very tight schedule it may not be possible to accept suggestions after the deadline. Suggested individuals will be contacted by the Co-Sponsored Meeting Organising Committee for further information.

The selection criteria will include cultural, scientific, technical and socio-economic expertise, as well as geographical representation and gender balance. If gaps are identified in the list of suggestions, the Co-Chairs may suggest additional individuals.

We thank you in advance for your consideration of this invitation.

Yours sincerely,

Debra Roberts
Co-Chair, Co-Sponsored Meeting Scientific Steering Committee
Co-Chair, IPCC Working Group II

Marcy Rockman
Co-Chair, Co-Sponsored Meeting Scientific Steering Committee
Scientific Coordinator, ICOMOS Climate Change and Heritage Working Group

Mechtild Rössler
Co-Chair Co-Sponsored Meeting Scientific Steering Committee
Director, UNESCO World Heritage Centre

Annex I

Summary of Overarching Scientific Questions:

1. Systemic connections of culture, heritage, and climate change
    - Nature and scope of representation of diverse forms and scales of culture and heritage in climate literature and assessments
    - Integration of diverse knowledge systems, including Indigenous knowledge systems, across areas of climate research and response
    - Climate change itself has a history, as do all communities; nature and scope of historical, social, and cultural contexts of the Anthropocene
2. Loss, damage, and adaptation for culture and heritage
    - Vulnerability, significance, prioritization, adaptive/preservation methods
    - Understanding of and approaches to loss and change
3. Roles of culture and heritage in transformative change and alternative sustainable futures
    - Capacity of historic buildings/landscapes to hold carbon
    - Heritage as inspiration for art, connection, understanding, and action on climate

Summary of Cross-Cutting Issues

1. Cultural governance
    - Who decides what heritage is? How is heritage knowledge managed?
    - Intersections of heritage with conflict
2. Capacity to learn from the past
    - Use of data and knowledge from the past in climate models and policy
    - Finding common ground between climate and heritage approaches to research questions

For a more detailed description of the foregoing Questions and Issues, please see the attached original Co-Sponsored Meeting Proposal endorsed by the IPCC Executive Committee in 2020. Please note that the original Proposal described five overarching questions while the final plan is to have three overarching questions and treat the other two topics as cross-cutting issues. The scope of each of these five topics remains the same as described in the Proposal.

Proposal for a Co-Sponsored International Expert Meeting on Cultural Heritage and Climate Change

1. Background

This proposal for an International Expert Meeting co-sponsored by the IPCC builds on growing calls for international attention to culture, heritage and climate change. It requests attention to the many connections between culture and the human past and how these intersect with the modern phenomena of climate change. It also highlights the need to address culture and heritage gaps in global climate science and climate change response and seeks to advance the contributions of culture and heritage to climate change mitigation and adaptation.

UNESCO, the UN organization with a mandate that spans both culture and science, works to safeguard culture from the effects of climate change, as well as promote it as a tool for climate change mitigation and adaptation. This work builds on its Strategy for Action on Climate Change (2018-2021), Declaration of Ethical Principles in relation to Climate Change (2017), and standard-setting conventions in the fields of World Heritage, intangible cultural heritage, underwater cultural heritage and the diversity of cultural expressions. International Council on Monuments and Sites (ICOMOS), an international non-governmental organization that works for the preservation of cultural heritage places, has launched several climate change and heritage initiatives and projects. In 2019, ICOMOS released its report Future of Our Pasts: Engaging Cultural Heritage in Climate Action which sets out the relevance of all scales of cultural heritage for the major objectives of the Paris Agreement and engaged several IPCC authors as peer reviewers, including a preface written by Dr. Valérie Masson-Delmotte, Co-Chair of IPCC Working Group I.

This proposal responds to these calls and suggests an Expert Meeting to be organized by UNESCO and ICOMOS in collaboration with three key partners and co-sponsored by the IPCC. The three proposed key partners are the Facilitative Working Group (FWG) of the UN Framework Convention on Climate Change (UNFCCC) Local Communities and Indigenous Peoples Platform, International Union for Conservation of Nature (IUCN), and ICLEI-Local Governments for Sustainability (ICLEI).

The proposed Expert Meeting will be held in late 2020 and bring together representatives from scientific, cultural, and heritage bodies and agencies, Indigenous Peoples and local communities, and climate change, culture, and heritage researchers and practitioners. The goal of this Expert Meeting is to serve as a catalyst for new partnerships and connections, research, and publications (including peer-reviewed literature and other ways of representing Indigenous and traditional ways of knowing) that will support the IPCC, UNESCO and global community at large in creating a larger role for culture and heritage in climate science and climate change responses. It is anticipated that this larger role will include culture and heritage inputs to IPCC products in the seventh assessment cycle, including the forthcoming special report on Cities and Climate Change, a chapter and/or other sections in the 7th Assessment Report (AR7), and/or a special report on culture, heritage and climate change.

2. Objectives

The overall objectives of the proposed Expert Meeting on Culture, Heritage and Climate Change are to:

- Assess the state of knowledge and practice in connecting culture, heritage and climate change;
- Identify key research and knowledge gaps with regard to connections between culture, heritage and climate change;

- Catalyze research and collaborations that will lead to peer-reviewed scientific publications and other appropriate literature and documentation including on local and Indigenous ways of knowing; and
- Expand global capacity in connecting culture, heritage and climate over the course of and beyond the AR7 cycle.

This proposal engages both culture and heritage. For the purposes of this proposal, heritage is understood to include tangible, intangible and natural heritage, which stand alongside the creative economy and its cultural and creative industries. Tangible cultural heritage includes archaeological sites, buildings, structures, and monuments, landscapes, museum collections and archives. Intangible cultural heritage includes the practices, representations, expressions, knowledge and skills and ways of knowing – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. Natural heritage, which encompasses geological and other natural features and in turn supports biodiversity, and human systems are closely linked and mutually reinforcing. Together, cultural sites , traditional knowledge, Indigenous ways of knowing, and value systems and spirituality, play important roles alongside scientific knowledge in sustaining, conserving, and managing the environment.

Climate change represents one of the greatest threats facing culture and heritage today. Increasing fires, floods, droughts, desertification and ocean acidification are threatening both cultural and natural heritage, while rising sea levels, particularly in the world's Small Island Developing States (SIDS) put entire ways of life at risk. Climate change threatens the diversity of cultural expressions and the cultural and creative industries, with a loss of economic opportunities challenging the livelihood of artists and cultural professionals.

Yet culture is also a resource for climate change mitigation and adaptation. Intangible cultural heritage practices, including traditional land and water management practices, traditional food security strategies, and the use of traditional architecture and building materials, can help communities mitigate and adapt to a changing climate. Cultural and natural heritage sites can serve as a refuge, both physical and psychological, for communities during and after climate-related emergencies. These sites can also act as assets for recovery and reconciliation in the wake of intercommunal conflicts linked to climate change. Creativity is essential for finding new solutions to environmental challenges, and cultural and heritage institutions and artists have an enormous role to play in inspiring climate action.

This proposal recognizes that, to date, despite recent efforts, neither culture nor heritage have been substantially integrated into global climate science and response. Therefore, the goal of this Expert Meeting is to provide a basis on which the IPCC and global community can create a more prominent role for culture and heritage in climate science and climate change responses, and through which culture and heritage may further support global climate action. Assessing the links between culture, heritage and climate change responses will serve as a catalyst for new research, projects, and publications on culture, heritage, and climate for and beyond the 7th Assessment cycle.

The specific aims of the Expert Meeting are to:

1. Assess the diverse range of connections between culture, heritage, and climate change, with attention to developments in the field of culture, heritage and climate change since the 5th Assessment Report (AR5). This will include an assessment of the range of issues related to culture and heritage that have been presented in IPCC products to date, how they have been presented, and issues known to the fields of culture and heritage that have not yet been fully incorporated into IPCC products to date;

2. Take stock of the scientific literature regarding culture, heritage and climate change, including literature related to climate impacts on cultural heritage and the creative economy; approaches to

adapting culture and heritage to climate impacts; integrating culture and heritage into climate change responses; and the role of culture, heritage and creativity as a resource to support climate adaptation, mitigation, and climate action;

3. Engage and continue to develop new ways to bring culture, including Indigenous and traditional knowledge and ways of knowing, into dialogue with other areas of climate science and response, with particular attention to building respectful, effective, and sustainable means of "two-eyed seeing" that engage equally traditional and Indigenous ways of knowing and scientific ways of knowing, while maintaining the free, prior, and informed consent of traditional and Indigenous knowledge holders;

4. Identify gaps related to culture and heritage in climate knowledge, practices, and publications, with the goal of fostering new research, methods and relevant literature that will support the AR7, the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change;

5. Take stock of methods and gaps in translating knowledge from and about culture and heritage for climate science and policy, with the goal of stimulating new approaches and literature that will support the AR7, the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change;

6. Create a platform for UNESCO to build new initiatives with its Member States in the areas of culture, heritage and climate change, which will raise both the visibility and engagement of culture in the global climate response;

7. Foster new partnerships between the fields of culture, heritage, and climate change to generate new research and applications to climate issues that will support the AR7, the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change; and

8. Expand institutional capacity to coordinate and further develop standards, knowledge, and practice at the intersections of culture, heritage, and climate change. Such capacity will support the AR7, the forthcoming special report Cities and Climate Change, and potentially a special report on culture, heritage and climate change.

3. Outcomes

The expected outcomes of the Expert Meeting include:

1. A meeting report that will be prepared under the guidance of a Scientific Steering Committee with inputs from meeting participants. This report will provide a summary of the meeting discussions and also will:

- Include recommendations for incorporating culture and heritage into the IPCC 7th Assessment cycle products, including the AR7 report and forthcoming special report on Climate Change and Cities, as well as, potentially, a special report on culture, heritage and climate change;
- Include a full list of participants;
- Indicate when and by whom the proceedings were prepared;
- Indicate whether and by whom they were reviewed prior to publication;
- Specify all sources of funding and other support; and
- Prominently display the following disclaimer at the beginning of the document:

"IPCC co-sponsorship does not imply IPCC endorsement or approval of these proceedings or any recommendations or conclusions contained herein. Neither the papers presented at the Workshop nor the report of its proceedings have been subject to IPCC review."

With the development of additional funding support, additional outcomes will include:

2. Scientific proceedings and a research agenda, published in peer-reviewed literature;

3. A series of follow-up workshops, demonstration projects, and other activities to catalyze new research and publications and other relevant forms of literature, documentation, and action on culture, heritage and climate change;

4. Building of capacity between existing cultural and heritage institutions to foster, share and make widely available new work in the area of culture, heritage and climate change, with particular attention to the linkages between science, culture, heritage and climate change; and

5. A possible campaign on culture, heritage and climate action, which could further support global advocacy efforts.

4. Scientific Background

Thus far, the literature on the links between culture and heritage, in all its forms, and climate change has focused primarily on the impacts of climate change on heritage, although there has been increased focus on the role of cities as creative hubs for more sustainable ways of life, as embodied by many of the members of UNESCO's Creative Cities Network. There is also growing recognition of the importance of creativity for finding new solutions to environmental challenges, as well as the role of cultural institutions and artists in leading behavioral change linked to climate action.

Cultural heritage includes the knowledge derived from human experience and the human past. This knowledge is dynamic and is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history. The notion of intergenerational transmission of intangible cultural heritage is also important. Intangible cultural heritage is sometimes referred to as "living heritage," in that it is transmitted yet constantly recreated. Cultural heritage holds evidence of paleoclimatic change; social evolution and past human responses to environmental change and environmental stress; contemporary knowledge of environments, land use, and resource stewardship developed over generations of Indigenous Peoples and local communities; patterns and events in the development of the modern world, including histories of colonialism, capitalism, and industrialization that have contributed to the modern phenomena of climate change and its patterns of impacts; and embodied carbon held in the historical structures and buildings of cities and other settlements, patterns of which shape use and expectations of fossil fuels, among others.

Cultural heritage is also integral to human well-being (Heritage et al. 2018). It provides a sense of continuity, connection to place and collective memory, which underpin individual, community, and national identities. The recent IPCC *Special Report on Oceans and Cryosphere* (SROCC) notes that consideration of social values offers an opportunity for a wider perspective on impacts on human systems. Cultural heritage therefore may be seen both as part of social values and, through the choices that are made in conserving, adapting, or letting go of different forms of cultural heritage, as a conduit for expressing social values, aspirations, beliefs and worldviews. Interdisciplinary understanding of social values is an emerging field and was first incorporated into IPCC reports with the SROCC; it was not substantially incorporated into the AR5.

Recent IPCC reports have engaged some other components of heritage. For example, the AR5 Working Group II report included Box 16-4, Historical Perspectives on Limits to Adaptation, which gathered examples of current understandings of how past civilizations responded to environmental stress. That this topic is set out in a box illustrates IPCC's recognition of the importance of this topic. However, as this box ends with the statement "It would be *useful to consider* how lessons learned from historical experience *may* relate to the perceived multiple environmental changes characterized by the 'Anthropocene' era" (emphasis added), it is also evidence that more work is needed to build relationships between historical experience and modern environmental changes and that the IPCC should return for further assessment of work in this area.

The IPCC *Special Report on Global Warming of 1.5C* (SR1.5) included cultural heritage as part of tourism, which includes tourism to heritage places and forms a key part of the creative economy. The IPCC *Special Report on Climate Change and Land* (SRCCL) includes attention to land governance, which includes rights of Indigenous Peoples and local communities abilities to continue traditional lifeways, genetic heritage of traditionally managed species, and heritage losses that can result from conflicts over forest management and as an outcome of land degradation. The SROCC, along with its attention to social values, also recognizes that non- economic losses of climate change include impacts on intrinsic and spiritual attributes of high mountain landscapes, the interconnections of land, water, and ice for culture, livelihoods, and well-being in the Arctic, and that loss of local and Indigenous knowledge and associated cultural heritage limits the ability of all to recognize and respond to changes in the oceans and cryosphere. SROCC also raises issues of loss of heritage in managed retreat and resettlement.

This Expert Meeting will take stock of this post-AR5 work on and consideration of culture and heritage in relation to climate change (inclusive of research, practice, and policy) and define a series of research themes and questions that can be addressed as part of the IPCC's 7th assessment cycle. To do this, it will mobilise and bring together a diverse set of stakeholders, inclusive of scientific, cultural and heritage bodies and agencies; Indigenous Peoples and local communities; United Nations member states; and climate change, culture and heritage practitioners. This mobilisation will support and inform IPCC AR7 products, including the AR7 report and forthcoming special report on Climate Change and Cities, as well as, potentially, a special report on culture, heritage and climate change.

For maximum progress on these goals, it is proposed that this Expert Meeting be co-organized by UNESCO (culture, natural sciences, education, communication and social and human sciences), ICOMOS (conservation of heritage places), IUCN (natural heritage), FWG (local and Indigenous ways of knowing), and ICLEI (governments, cities, and settlements) and co-sponsored by the IPCC. This will create synergies with intergovernmental processes including the UN Sustainable Development Goals, the UN Sendai Framework on Disaster Risk Reduction, and the UNFCCC Warsaw International Mechanism for Non-Economic Loss and Damage.

5. Scientific Grounding and Open Research Questions

A review of the AR5 and AR6 special reports, UNESCO's programmes, publications and standard-setting tools, and the preparation of the ICOMOS *Future of Our Pasts* report, which was prepared by a global team of researchers and peer reviewers, and consultations with other international heritage experts and practitioners, has identified the following areas of literature and knowledge of, from, and for culture, heritage, and climate change that should serve as the basis for developing an Expert Meeting:

1) Systemic understanding of culture, heritage, and climate change

Culture is held and manifested in many forms. Heritage includes oral traditions, and expressions, performing arts, social practices, rituals, and knowledge and ways of knowing and practices concerning place, self, and

the environment, and the interconnections that integrate these forms that have come into culture from the human past. Heritage also includes tangible forms such as archaeological sites, landscapes, historic buildings, structures, monuments, museum collections and archives and the knowledge contained within them and derived from their study. Culture in turn encompasses cultural expressions manifested through diverse modes of artistic creation, production, distribution, through a wide range of means and technologies. Collectively, culture and heritage are multi-scalar, with a broad reach across both time and space. Culture and its history is manifested at the community level, as well as at regional, national and international scales. An essential issue for climate change is how to capture the diverse qualities and characteristics of culture across these scales in climate assessments.

A critical focus in this area and all of the following areas is attention to connections between Indigenous Peoples and local communities, local and Indigenous knowledge systems, climate change, and scientific climate knowledge, as highlighted in Article 7.5 of the Paris Agreement. In this frame, Indigenous Peoples and local communities, their knowledge systems, and cultural heritage are not co-defined; Indigenous Peoples and local communities are also vital contemporary communities (Nakashima et al. 2012). However, given the generations of experience held by Indigenous Peoples and local communities and their knowledge and knowledge systems, and the close connections of Indigenous Peopoles and their knowledge systems to their surrounding environments, the vulnerabilities and responsiveness of these close connections to climate change may be difficult to describe, engage, and address without attention to the heritage they hold. In turn, an area for exploration is how attention to Indigenous Peoples and local communities and their knowledge systems through cultural heritage may provide new or effective means for action.

Attention to Indigenous knowledge and experience by the IPCC has grown over recent assessment cycles. Analysis by Ford et al. (2016) of representation of Indigenous knowledge and experience in the AR5 identified a 60% increase in Indigenous-relevant keywords from the AR4. Despite this increase, gaps were noted in conveying the complexity and diversity of Indigenous experiences, the highly dynamic and evolving nature of traditional knowledge systems in light of climate impacts, and the diversity of both Indigenous experiences and knowledge in their understanding and responses to climate change. Cross-chapter Box 4 in the more recent SROCC describes in more detail the concept of “two-eyed seeing”, which brings together Indigenous ways of knowing and what is described as “Western [scientific] knowledge” for the benefit of all while preserving the distinctiveness of each. While the SROCC recognizes the importance of local and Indigenous knowledge systems for understanding global change with high confidence, it also acknowledges the complexities of building such “two-eyed seeing” and the tendency for scientific knowledge to continue to be prioritized.

Another gap noted by the Ford et al. (2016) analysis of the AR5 is a tendency toward generalizations of Indigenous knowledge, cultures, and ways of knowing. They note this is problematic as human dimensions of climate change include components that are place- and culture-specific, and such approaches may fail to address historical and contextual complexities that underpin Indigenous experiences with and responses to climate change. Further, they note these approaches have the effect of separating climate change from its social, political, historical, and cultural contexts.

These gaps may be addressed by expanding IPCC attention to include the history and culture of all communities and to encompass the full temporal and spatial scope of the human experience. All communities, regardless of age, have heritage, inclusive of histories of landscape learning and development (Rockman 2010), understandings and expectations of place, and values and connections to other communities and places both regionally and around the world. Such an approach should not diminish attention to Indigenous Peoples and local communities; rather it would address another concern expressed by Ford et al. (2016) that separate sections addressing Indigenous Peoples and local communities and their ways of knowing may isolate them from the main body of assessment reports. Cultural heritage, in this view, is a collection of diverse ways of knowing and may serve as a common frame of reference and a basis for collaborative discussion. Further assessment of this approach by and in collaboration with Indigenous Peoples and local communities is needed.

A culture and heritage-based approach brings into a common frame the roles that values, senses of place, identity, as well connection to place and environment hold in experiences of and vulnerabilities to climate impacts, as well as capacities and directions of climate response and adaptation (Thomas et al. 2019). Histories of components of culture shape connections with the natural world across communities, regions, and nations, including perception and acceptability and unacceptability of risk (McNeeley; Lazrus 2014). History and heritage can be a source of creativity and inspiration for climate response (Dawson et al. 2017; Rice et al. 2015). Capacity to practice culture, which is supported by cultural heritage, contributes to overall well-being (Heritage et al. 2018). However, given its complexities, culture and connections to heritage also presents challenges to climate action and response, such as in decisions or plans to relocate or migrate (Adger et al. 2013; Nakashima et al. 2012). Work is needed to assess the status of research and work that navigates these diverse benefits and complexities of culture and heritage in relation to climate change.

An approach to culture and heritage that addresses all communities also recognizes that climate change itself, and the contemporary response to it, have history and heritage (the social, political, historical, and cultural contexts noted as missing by Ford et al. 2016). While definition of the Anthropocene includes a relatively recent starting date (Crutzen 2002; Steffen et al. 2015), contributing forces to anthropogenic climate change include economic, technological, cultural, intellectual, and philosophical trends that have realized phenomena such as colonialism, capitalism, and industrialization over the past several centuries. Work in the fields of historical archaeology and industrial archaeology, among others, recognize that these phenomena are dynamic, have evolved, and have potential to continue to evolve (Wurst 2015; Wurst; Mrozowski 2016). Assessment is needed to link this form of understanding of climate change with the tools and approaches of culture and heritage.

Moreover, by adopting a wider approach to culture and heritage in all its forms, including cultural expressions, specific attention could be paid to contemporary art forms, artistic expressions communicated through words (literature), sound (music, radio), images (photos, TV, films), movement (performing arts such as dance, theatre) or objects (sculpture, painting, design) and cultural goods, services and activities produced and distributed by the cultural and creative industries. Cultural heritage is the record of human creativity through time and all forms of heritage are bases for creativity in the present. As argued by (Tyszczuk; Smith 2018), a greater integration of contributions inspired by culture and creativity into climate change scenarios would help to reshape climate model outputs and imagine alternative futures. However, knowledge gaps on the interconnections of climate with diverse cultural expressions, cultural and creative sectors, including in the digital environment, remain. Addressing these gaps would help assess how culture and creativity can be further mobilized as powerful resources for addressing climate change impacts.

2) Cultural governance

Climate change is challenging public policies across all policy areas. As a systemic issue, climate change must be addressed in cultural policies. Beyond local innovative experiences – especially at the city level – the ecological transition and the fight against climate change are rarely formulated as specific objectives of cultural policies. Wider efforts are thus needed, notably through enhanced data collection, to inform both cultural and environmental policies.

A critical frame for assessing culture, heritage, and climate change is recognition of who decides what heritage counts as heritage and how. Such decisions, whether made explicitly or implicitly, shape the allocation and direction of heritage safeguarding and attention to histories and the diversity of cultural expressions.

Multiple UNESCO conventions include standards for the engagement of communities in the identification and safeguarding of their heritage. For example, UNESCO's 2003 Convention for the Safeguarding of the Intangible Cultural Heritage states that the communities concerned should decide what constitutes their

cultural heritage and what does not. As noted above, intangible cultural heritage is defined as what the 'communities, groups and, in some cases, individuals recognize as part of their cultural heritage' (see Art 2.1). Each community, group or individual should assess the value of its own intangible cultural heritage and this intangible cultural heritage should not be subject to external judgments of value or worth. No safeguarding of elements of their intangible cultural heritage should take place without their involvement and commitment, especially that of practitioners and other active tradition bearers. In turn, under UNESCO's 1972 Convention concerning the Protection of the World Cultural and Natural Heritage ("the World Heritage Convention"), the duty to identify, but also protect, conserve, present and transmit to future generations the natural and cultural heritage situated in its territory belongs primarily to the State Party itself (see Art. 4 of the Convention). Engagement of many and diverse stakeholders and rights-holders, including the site owner/manager, the State Party, national heritage agencies, local authorities, other government agencies, local communities, Indigenous Peoples, universities, researchers and academics, local businesses, tourism operators, NGOs and user groups (e.g. fishermen, forest users, recreational users) in the nomination process is essential, however, in developing shared responsibility for the site, as well as ensuring the full inclusion of local knowledge in its management.

Questions that must now be raised are how the practices and knowledge that come from the implementation of these Conventions and other heritage laws and practices held at local, state, and national levels, as well as by Indigenous Peoples' organisations, intersect with the current and future stresses of climate change and the needs of climate science and climate response. Collectively, decisions made under these Conventions and other regulations and practices will determine what heritage will be carried forward and available to future generations. Decision points for management and governance of culture and heritage therefore carry implications for justice and equity across a range of adaptation approaches, including but not limited to situations of migration and relocation. Assessment is needed to bring together the range of such decisions, their outcomes, as well as pathways for alternative approaches.

Currently links between climate change and areas of security, including but not limited to environmental, agricultural, and water security and conflict, are strengthening, but remain difficult to quantify (Mach et al. 2019). The roles of culture and heritage in these links are noted but also are not yet well defined (United Nations 2012). Therefore assessment is needed to identify instances in which maintenance, support, recognition, or engagement of cultural heritage has improved security or reduced stress, and also situations in which cultural heritage has been or may be used as a source or focus of stress.

Governance also speaks to management and framing of scientific and climate-relevant information and creation and maintenance of collaborative frameworks that include and engage cultural heritage. The IPCC SROCC moved forward practice in bringing together traditional and Indigenous knowledge holders with other scientists; additional work is needed to continue to build method and practice in connecting and relating traditional and Indigenous knowledge systems and the scientific process, inclusive of free, prior, and informed consent of the traditional and Indigenous knowledge holders. As well, the Convention on Biological Diversity, in collaboration with IUCN, UNESCO, and others, are advancing a new joint programme of work linking nature and culture within the post-2020 global biodiversity framework, which it is anticipated will include collaborative activities with ICOMOS. Work is needed to identify and then build on case studies that have productively and effectively linked nature and culture approaches and identify where new methods and work are needed.

3) Loss, damage, and adaptation for culture and heritage

Essential questions exist in the science and understanding of the impacts of climate change on both tangible and intangible cultural heritage, natural heritage, and the creative economy. Areas of research include: 1) what are material consequences of climate change on historic materials, historic buildings and structures, archaeological sites, and landscapes, and museums and archives, and what are the implications of these material impacts for intangible cultural heritage; local and Indigenous ways of knowing, natural heritage; and the creative economy (Rockman et al. 2016; Sabbioni et al. 2012); 2) what are the geographic distributions of

these consequences, and how may these consequences develop across potential climate scenarios; 3) what are existing tools for identifying, monitoring, and documenting impacts and where are new tools needed; and 4) what is the state of tools for assessing and comparing vulnerability of elements of culture and heritage across communities, regions, and time?

Identifying and characterizing impacts of climate change on culture and heritage brings forward further essential questions regarding adaptation, prioritization, and loss. Insofar as tangible components of heritage do not have inherent capacity to adapt, what are existing technical and policy tools for adaptive management of heritage? These may include but not be limited to methods of documentation, excavation, maintenance, repair, curation, and legislative tools regarding conservation, funding, training, and education. In turn, while the practice and transmission of intangible cultural heritage may change in response to or as part of surrounding environmental change, assessment is needed of the processes and tools available to understand and document such change, and where additional methods, tools, and approaches are needed. Similarly, the creation, production, distribution and access with regard to diverse cultural activities and products are being challenged by climate change. Wider efforts are needed to assess policy responses for the cultural and creative sectors and to identify adaptation practices and responsive models of economic activity for artists and cultural professionals.

Further, as adaptive management, documentation, or other conservation action cannot be taken at once for all elements of cultural heritage that are experiencing climate damage or facing risk of climate damage, what are the current tools and approaches for prioritizing cultural heritage elements and places for heritage safeguarding and conservation and where are tools currently lacking? The cultural and creative sectors are facing similar issues in ensuring the protection and promotion of diverse cultural expressions in a changing environment. Assessment is needed of systems for combining vulnerability and concepts such as significance or valuation, as well as how well such systems of prioritization may support future needs for heritage, such as biological and cultural diversity and sustainability.

It is recognized that it never has been possible to safeguard all forms of culture and heritage and will continue to be so as climate change progresses. Therefore, additional assessment is needed of current and needed tools, methods, and practices that recognize, engage, and transform the process of loss (DeSilvey 2017). A critical focal point in this area is the intersection of migration and other forms of displacement and heritage (Kim 2011), inclusive of effects of both climate and migration on cultural and natural heritage left behind, which elements of culture and heritage can be carried forward as part of the process of migration and how, and management and maintenance of culture and heritage of those who have migrated in new locations alongside the culture and heritage of arrival locations.

4) Capacity to learn from the past

How do we learn from the past? Assessment is needed of the status of how data and insight from the past are being used to address current climate challenges, and where gaps remain in data, practice, or both. Some cultural heritage can inform climate science relatively directly, such as through paleoenvironmental and paleoclimatic data and related information on past human uses and management of environments (Ingram 2008; Stahle et al. 1985; Zhuaung; Kidder 2014). Sources of such information include underwater cultural heritage, including paleolandscapes, submerged sites, and shipwrecks. For measurable portions of the Holocene, sea levels were lower than present and human occupation extended far into areas that are now underwater. These areas, such as the Paleolithic and Mesolithic landscape known as Doggerland now under the North Sea, hold unique traces of the human interactions with and responses to submergence and related wide-ranging environmental change (Gaffney et al. 2007). Many other examples of past environmental change and evidence of human communities living through and beyond that change can be found in other prehistoric submerged landscapes, sunken cities, and harbour and port structures.

However, many questions and much variability can remain with respect to data comparability and data gaps and the nature of temporal, causal, and other interconnections between past human activity and past environmental change (Kennett; Kennett 2000; McIntosh et al. 2000; Stahle et al. 1985). In other instances, traditional land, water, and fire management, agricultural and husbandry practices, and traditional architecture, which many communities recognize as part of their intangible cultural heritage, can inform adaptation and/or mitigation approaches, either directly or in adapted forms. In these areas, questions to be addressed include how to integrate traditional techniques with other ongoing socio-economic systems when use of traditional techniques has lapsed and the range of skills, training, and resources that are needed for effective and sustainable use into the future.

As noted in the AR5 Working Group II Box 16-4, Historical Perspectives on Limits to Adaptation, while there has been substantial research into past civilizations and their interactions with environmental change, substantial gaps remain in translating these findings for use in addressing modern anthropogenic climate change. Assessment is needed of the current status of understanding of long-term processes of social change, such as cultural evolution and patterns and trajectories of path dependence, characteristics of social rigidity and flexibility, and the capacity shown by past societies (or not) to switch from one to the other (Hegmon et al. 2008). Related assessment is needed of how understanding of these long-term social processes that can only be seen through study of the past are being used to inform contemporary climate approaches, and where gaps remain between such study of the past and application to present challenges and issues. In brief, what are current methods for translating insights from centuries or millennia of human-environment experience into meaningful approaches to contemporary climate science and climate response?

Learning from the past requires asking questions of it. Therefore, it is also essential to assess questions that climate science, adaptation, and mitigation communities have for and about the human past and related concepts of human behavior and society, how those who form and shape research into the past (archaeology, paleoanthropology, and related fields) develop their questions, and how the questions of these different communities may be better aligned, communicated, and addressed.

5) Roles of culture and heritage in transformative change and alternative sustainable futures

Culture offers both climate services and sources of resilience and ambition for action in response to climate change. For example, intangible cultural heritage practices, including traditional land and water management practices and the use of traditional architecture and building materials, can help communities adapt to a changing climate. At a broad scale, heritage is an essential component in the creation of place and a focus of place attachment. Cultural and natural heritage sites can serve as a refuge, both physical and psychological, for communities during and after climate-related emergencies (Christie 2017). Assessment is needed of where and how these sites have acted or may act as assets for recovery in the wake of intercommunal conflicts linked to climate change.

As well, heritage fields use multiple participatory governance models, such as stakeholder consultation, in determining appropriate responses to projected impacts to heritage. Sites, monuments, museums, archives, and cultural institutions are venues for inspiration, education, story-sharing, and other forms of collective memory and community enactment around climate change. Culture and heritage therefore play roles in inspiring individual and collective climate action, though to date the scope of these roles has not been well assessed. Citizen science and other forms of community engagement ranging from archaeology to oral histories not only gather information about climate impacts to heritage but also serve as platforms for individual and community mobilization (Bethel et al. 2014; Dawson et al. 2017; Miller; Murray 2018). In this regard, cultural expressions also have a role in responding to environmental challenges. Cultural expressions not only convey an artistic dimension but also symbolic meaning and social values. In this regard, artists, cultural institutions and professionals are able to imagine alternative narratives and futures. They can also promote more sustainable ways of living and shape new social norms through creativity. In doing so, they are critical

levers to reinforce dialogue and cooperation in the fight against climate change. On these bases, further assessment is needed of where culture and heritage has been used to create, support, or further community adaptation. Similar questions should be followed with respect to disaster preparedness and recovery.

Systematic assessment is also needed of the environmental impact of the cultural and creative sectors, including in the digital environment, and how they may be engaged to encourage eco-friendly practices. In turn, the creative and cultural sectors can be critical levers to raise awareness about ecological crisis and to promote responsive models of economic activity. In a context where cities have become active players in climate action, culture can be a strong driver for cities to undergo an ecological transition, by boosting innovative thinking around locally adapted solutions, which may be drawn from local heritage, that meet development targets, while at the same time encouraging low-carbon practices and strategies, and triggering behavioural change and promoting civic engagement. Attention is also needed to identify and enable the creative sectors that have an awareness-raising and transformative potential, including the audio-visual and music industries, food and gastronomy, and crafts

Culture also has multiple roles to play in decarbonization and mitigation. Creativity is essential for finding new solutions to environmental challenges, and cultural institutions and artists have an important role to play in leading behavioral change linked to climate action. Contemporary patterns of production, consumption, lifestyles, and social organization tend to be swifter, less place-adapted, and more carbon intensive than traditional patterns developed over longer periods of time. Culture and heritage intersect with approaches such as circular economy and life cycle assessment and contributes to more sustainable modes through demonstration of alternate templates for living, emphasis of non-material measures of well-being, and worldviews and systems of values and beliefs that highlight nature-culture connections, among others.

Natural heritage sites represent one of the most powerful resources at our disposal for addressing rising greenhouse gas emissions. Ecosystems on land and sea serve as our planet's only "sinks" for greenhouse gas emissions, sequestering 5.6 gigatons of carbon dioxide each year – the equivalent of around 60% of global greenhouse emissions (IPBES 2019). Many of the natural heritage sites found on UNESCO's World Heritage list, such as the Central Amazon Conservation Complex, the largest protected area in the Amazon Basin, serve this critical function. Further assessment is needed not only of these capacities of natural heritage sites, but also the roles of cultural values for natural heritage in engaging and expanding these capacities. In particular, greater exploration of the role of traditional and Indigenous ways of knowing and cosmogonies in preserving natural heritage is needed.

In the built environment and building sector, adaptive use and reuse of the historic built environment avoids the carbon costs of new construction, while the traditional performance characteristics of historic buildings and architectural styles can support energy efficiency and in some cases be incorporated into new buildings as well (Elefante 2012; Sesana et al. 2019). Continued assessment is needed of the carbon benefits of such reuse and efficiency improvements and how these may be expanded or extended. There are multiple areas of alignment between these aspects of cultural heritage and the forthcoming IPCC special report on Cities and Climate Change. In addition, building on the IPCC SRCCL, work is needed to continue assessment and attention to new areas in which the mitigation and sequestration components of traditional and Indigenous land use, resource stewardship, and husbandry may be supported and enhanced.

The need exists to further elaborate the role of culture and heritage in delivering climate-resilient development pathways, i.e. systems in which the decarbonization imperative reflected in the Paris Agreement is accomplished in tandem with the achievement of the goals embodied in the 2030 Agenda for Sustainable Development. For example, culture can be a driver for human settlements, notably cities, to undergo an ecological transition, within the larger framework of an ecosystem-based adaptation approach to climate change. While culture is embedded in the dominant modes of production, consumption, lifestyles and social

organization that give rise to emissions of greenhouse gases, it can also provide a blueprint for low-carbon technologies and lifestyles. The latter is achieved by emphasizing aspects of cultural practice that align with circular economy approaches, including a focus on multi-generational time scales and horizons and promoting an ethic of stewardship, reuse and conservation. The creative sector can boost innovative and imaginative thinking to foster local-adapted solutions to climate change related issues, trigger the transition to more responsible production and consumption patterns and encourage the sustainable use of natural resources in urban settlements, promoting social transformations that promote collective responsibility. For instance, design opens up new pathways for more compact, low-carbon urban practices and strategies, addressing through a creative lens various issues such as use of energy, mobility, urban development or public spaces design. These experiences should be more thoroughly documented, analyzed and evaluated to better understand, characterize and measure their contribution to ecological transition and identify possible obstacles, with a view to optimize their impact and scale them up at the policy level. This work should also bring to the fore methodologies and systems that address the ethical and equitable aspects of the deep societal transformation needed to drastically reduce emissions to limit global warming (e.g. to 1.5°C) and achieve desirable and liveable futures and well-being for all.

Work is needed to integrate all dimensions of sustainable development – including environmental sustainability – into cultural policies in order to reduce the contribution of the cultural and creative industries to greenhouse gas emissions. In some cases, mitigation actions can threaten traditional practices and cultural resources and undermine heritage protection as it has been conventionally understood. Examples of such tensions include banning the traditional harvesting of peat; retrofitting of historic buildings for energy efficiency in ways that impact heritage values; and implementing carbon sequestration models without regard to local or Indigenous forest management practices and land tenure (ICOMOS 2019). In other areas, some of the cultural and creative industries – notably audiovisual or music industries – bear a significant environmental impact across the value chain, including in the digital environment. Although a number of innovative initiatives have emerged towards greener production practices, overall awareness of the environmental impact of the cultural and creative industries remain widely insufficient. As cultural tourism, whilst providing opportunities for economic and social development, can also drive unsustainable practices and including greenhouse gas emissions.

This wide range of cultural interactions taking place in a variety of settings creates both complexities and difficulties in determining the adaptation limits of heritage practices and systems and the threshold for recognizing losses and damages to cultural significance. Perhaps as a result, climate action is not systematically addressed in cultural policies in most countries around the world. Building knowledge and data – particularly at the global level - to assess the environmental impact of cultural and creative industries is therefore essential to inform policy-making and support transformative action within the cultural and creative sectors. These data would better inform frameworks that allow for the identification, negotiation and where possible reaching of consensus on co-benefits and trade-offs, in order to achieve ‘win-win’ outcomes, whilst at the same time managing and minimizing conflicts between goals.

6. Partner Organisations

The Expert Meeting will include contributions from a set of partners. Current partners are:

1. IPCC, through its scientific guidance and co-sponsorship, including the intent indicated by Working Groups I and II to serve on the Scientific Steering Committee for the Expert Meeting;

2. UNESCO, sponsoring organizer, the United Nations organization with a mandate that spans both culture and the sciences;

3. ICOMOS, sponsoring organizer, an international NGO that works for the conservation and protection of cultural heritage places;

4. IUCN, key partner, an international membership union whose members include nations and government agencies, NGOs, Indigenous Peoples' organisations, scientific and academic institutions and business associations and which is a global authority on the status of the natural world, including natural heritage;

5. ICLEI Local Governments for Sustainability, key partner, an international organization of local governments and national and regional local government organizations committed to sustainable development;

6. The Facilitative Working Group (FWG) for the Local Communities and Indigenous Peoples Platform of the UNFCCC has been invited to serve as a key partner and, based on conversations with its Co-Chair and members, it is expected that this invitation will be formally acted upon at the next FWG meeting; and

7. A national/city government to serve as host (to be confirmed; interest indicated by Germany).

Additional partners may be incorporated at a later stage.

7. Timing and Duration

The Expert Meeting is expected to be held in late 2020. To the extent possible, it will be synchronised with other ongoing international conferences, IPCC events, and the UNFCCC COP26. The Expert Meeting itself is expected to last three days, with an opening plenary on the morning of the first day; and a closing plenary on the evening of the third day. It is expected that the Scientific Steering Committee meet the day prior to the conference and that a welcome reception will take place in the evening.

8. Proposed Content and Agenda

The format of the Expert Meeting will be finalised by the Scientific Steering Committee. An indicative agenda is presented below:

Day 0
- Arrivals
- Voluntary city tours
- Scientific Steering Committee meeting
- Welcome reception

Day 1
- Opening plenary
- Initial thematic presentations
- Initiation of working group discussions
- Conference dinner

Day 2
- Working group discussions (morning)
- Keynote presentation (lunch)
- Working group discussions (afternoon)

- Cultural event (music/art/dance)

Day 3
- Working group discussions (morning)
- Working plenary
- Closing plenary and ceremony

9. Conference Participants

The conference is expected to draw between 45-50 participants from across the world, of which over a third will be from developing countries. The selection process for participants will be designed by the Scientific Steering Committee and will follow IPCC priorities for geographic representation, gender balance, as well as diversity in areas of culture and heritage expertise. Developing country and Indigenous Peoples and local community participants who do not have institutional support for travel would be provided travel funding from funds being requested by ICOMOS. If additional funding is raised, the number of participants will be raised, including participants from developing countries, Indigenous Peoples and local communities.

10. Scientific Steering Committee, Organizing Committee and Management arrangements

A Scientific Steering Committee (SSC) will manage the conference and its proceedings. The SSC will be co-chaired by UNESCO, ICOMOS and the IPCC. The bureau of WGI and WGII will be involved in providing scientific input into the preparations for the conference. SSC members will be drawn from the organizers and co-organizers, key partner organisations and key stakeholder groups and will strive to maintain a balance across regions, gender and scientific themes.

The conference will be administered by an Organizing Committee, including representatives from the IPCC Secretariat and organizers from the host city (Germany, host city to be determined).

11. Timeline

Phase I
Preparation

2019
- July: presentation of Expert Meeting proposal idea at World Heritage Committee meeting in Baku, Azerbaijan; initial meetings with States Parties regarding support for project
- October: expert meeting proposal scoping workshop (side event of the Climate Heritage Network Launch), Stirling, Scotland
- November-December: initiate Scientific Steering Committee; prepare proposal for international Expert Meeting

2020
- March: submit proposal to the IPCC requesting IPCC co-sponsorship of Expert Meeting

Expert Meeting

- March/April: first SSC meeting, by web conference

- May/June: Commissioning of prepared papers (plenaries, thematic, keynote); commissioning of white papers to serve as basis for working group discussions
- June/July: IPCC-Heritage Dialogue event, as a side event of 44th session of the World Heritage Committee (44COM), Fuzhou, China
- June/July: second SSC meeting, held in margins of Dialogue event (with web conference component if needed)
- Early September: third SSC meeting, to be held via web conference
- Late 2020: IPCC international Expert Meeting on culture, heritage and climate change, Germany (city TBD)

2021

- Early 2021: release of report on Expert Meeting report and recommendations

Phase II (funding being developed)

- Mid-late 2021: publication of peer-reviewed article(s) on and about Expert Meeting and recommendations
- 2021 onward: additional workshops, seminars, and other work to move forward collaborations and publications to address issues and knowledge gaps identified in the Expert Meeting process

12. IPCC Financial Implications

No financial support is being sought from the IPCC.

Direct costs for the Expert Meeting, using a base rate of Euro 2,000 per participant, is expected to be roughly Euro 90,000 plus in-kind host support. In-kind contribution, of the conference venue, local Secretariat and conference dinner of approximately Euro 50,000 is expected to be made by the host city in coordination with its State Party.

[Not for circulation]

13. Contacts

[Not for circulation]

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Annex C-3
Sample Acceptance Notification

10 August 2021

Dear,

Thank you for applying to participate in the International Co-Sponsored Meeting on Culture, Heritage and Climate Change (ICSM CHC, Meeting). As the co-chairs of the ICSM CHC Scientific Steering Committee (SSC), we are pleased to inform you that you have been selected as a participant.

The SSC selected approximately 100 participants out of the 400 experts who were suggested. Those selected represent an incredibly diverse range of cultural, scientific, technical and socio-economic expertise, as well as broad geographical representation and gender balance. This diversity will be an enormous asset as Meeting participants undertake to consider the state of knowledge and practice regarding connections of culture, heritage, and climate change.

The ICSM CHC will be held online during the week of 6 December 2021. Virtual plenaries and discussion sessions will be held on December 6, 8, 10. Online posters will be available Dec. 6-10, with dedicated viewing time on Dec 7, 9. Please reserve these dates now in your calendars.

As a participant, you are requested to take part in several activities that will help prepare for the Meeting. These include engagement with three white papers currently being prepared that will provide a common research background and point of reference for the overarching scientific questions and cross-cutting issues of the ICSM CHC (for your reference, a summary of these questions and issues is included in Annex 1 and full version is attached). A short series of three white-paper focused webinars will be held for participants in late September and early October (dates are anticipated to be Thursday, September 23, September 30, and October 7). Participants will receive full drafts of the white papers at the end of October.

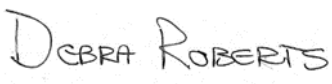
Participants will also be invited to submit and share posters as part of the ICSM CHC. A detailed call for poster abstracts will circulated soon and posted on the participant platform of the ICSM CHC (more on the website below). As will be detailed in the call, posters will be asked to address one or more of the overarching questions or cross-cutting themes of the Meeting from the perspective of the participant's work and knowledge. Posters will be displayed virtually throughout the Meeting with dedicated sharing times on December 7 and 9. Content of shared posters will be incorporated into the Meeting report.

A special participant section of the ICSM CHC's soon-to-be-launched website (cultureclimatemeeting.org) is being set up and in order to allow participants to connect with each other, share information and receive updates about the Meeting. In the coming days, you will receive a separate email inviting you to join the Platform and set up your participant profile. After receiving this email invitation, if you have any questions on how to log into the Platform or set up your participant user profile, please do not hesitate to reach out to us. It is important that you join this Platform as it is through this site that you will receive further instructions about the Meeting.

If for some reason you are unable to accept this offer to participate, please let us know by no later than 27 August 2021. Otherwise, there is no need to formally accept this offer. Your action to set up your profile in the Participant Platform will be your indication that you accept. Thereafter, if circumstance change and you become unable to participate, please let us know as soon as possible. This may allow us to identify a replacement with comparable expertise from the Meeting waiting list.

The intersections of human cultures and heritage with climate change are many and diverse, ranging from impacts and loss to critical data, knowledge, and support for adaptation and mitigation. The International Co-Sponsored Meeting on Culture, Heritage and Climate Change presents an important opportunity to more fully integrate these connections of culture and heritage with global climate science and response. We are grateful for your interest and expertise and look forward building this Meeting with you.

Yours sincerely,



Debra Roberts
Co-Chair, Co-Sponsored Meeting Scientific Steering Committee
Co-Chair, IPCC Working Group II

Marie-Laure Lavenir
Acting Co-Chair Co-Sponsored Meeting Scientific steering Committee, Director General, ICOMOS

Mechtild Rössler
Co-Chair, Co-Sponsored Meeting Scientific Steering Committee
Director, UNESCO World Heritage Centre

Annex I

Summary of Overarching Scientific Question and Cross-Cutting Issues:

Overarching Questions

1. Systemic connections of culture, heritage, and climate change
    - Nature and scope of representation of diverse forms and scales of culture and heritage in climate literature and assessments
    - Integration of diverse knowledge systems, including Indigenous knowledge systems, across areas of climate research and response
    - Climate change itself has a history, as do all communities; nature and scope of historical, social, and cultural contexts of the Anthropocene

2. Loss, damage, and adaptation for culture and heritage
    - Climate impacts on culture and heritage, including methods of describing vulnerability of culture and heritage to climate impacts
    - Adaptive/preservation methods for culture and heritage, including understandings of significance and approaches to prioritization of/for action
    - Understanding of and approaches to loss and change

3. Roles of culture and heritage in transformative change and alternative sustainable futures
    - Capacity of historic buildings/landscapes/traditional land use to hold carbon
    - Cultural and natural heritage as sources of resilience or refuge in response to disasters
    - Heritage as inspiration for art, connection, understanding, and action on climate

Cross-Cutting Issues

1. Cultural governance
    - Who decides (or has decided) what heritage is? How is heritage knowledge managed?
    - Intersections of heritage with conflict

2. Capacity to learn from the past
    - Use of data and knowledge from the past in climate models and policy
    - Finding common ground between climate and heritage approaches to research questions

For a more detailed description of the foregoing Questions and Issues, please see the excerpt from the original Co-Sponsored Meeting Proposal endorsed by the IPCC Executive Committee in 2020. Please note that the original Proposal described five overarching questions while the final ICSM CHC plan is to organize these as three overarching questions and two cross-cutting issues. The scope of each of these five topics remains the same as described in the Proposal.

Annex C-4
List of Co-Sponsored Meeting Participants

The Co-Sponsored Meeting welcomed a total of 103 invited participants. The regional distribution of conference participants and their breakdown by gender and areas of expertise is summarised in table C-4(1), and the full list of conference participants follows in table C-4(2). The nationalities indicated below are those provided by conference participants at the time of registration.

Table C-4(1). Co-Sponsored Meeting Participants by Region, Gender and Expertise

TOTAL PARTICIPANTS IN ATTENDANCE	
Region	
Africa (WMO Region I)	7
Asia (WMO Region II)	23
South America (WMO Region III)	7
North America (WMO Region IV)	14
South-West Pacific (WMO Region V)	10
Europe (WMO Region VI)	42
TOTAL	**103**
Expertise	
Climate Change (without previous major focus on culture or heritage)	17
Culture or Heritage	79
Natural Heritage	7
Indigenous/Knowledge Holders	
	4
Gender	
Female	65
Male	38

Figure C-4(1). Overall Attendance by Region

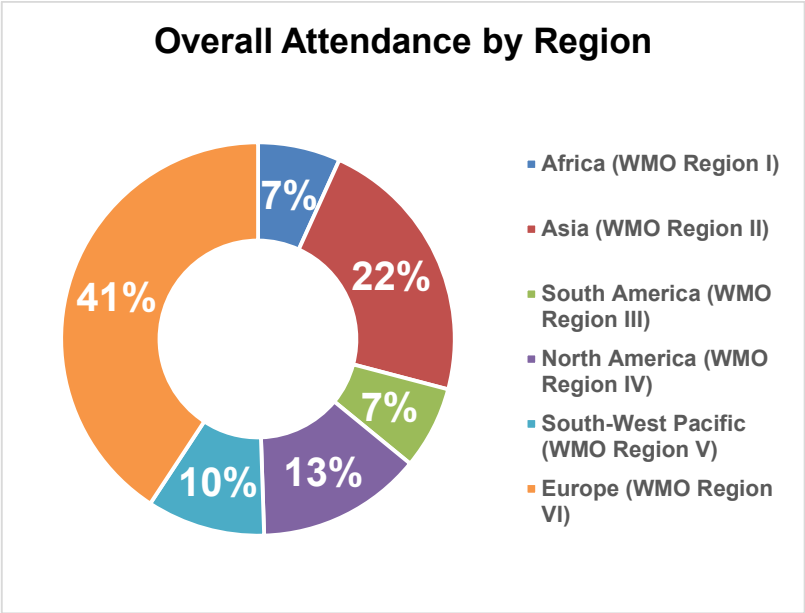


Figure C-4(2). Overall Attendance by Gender

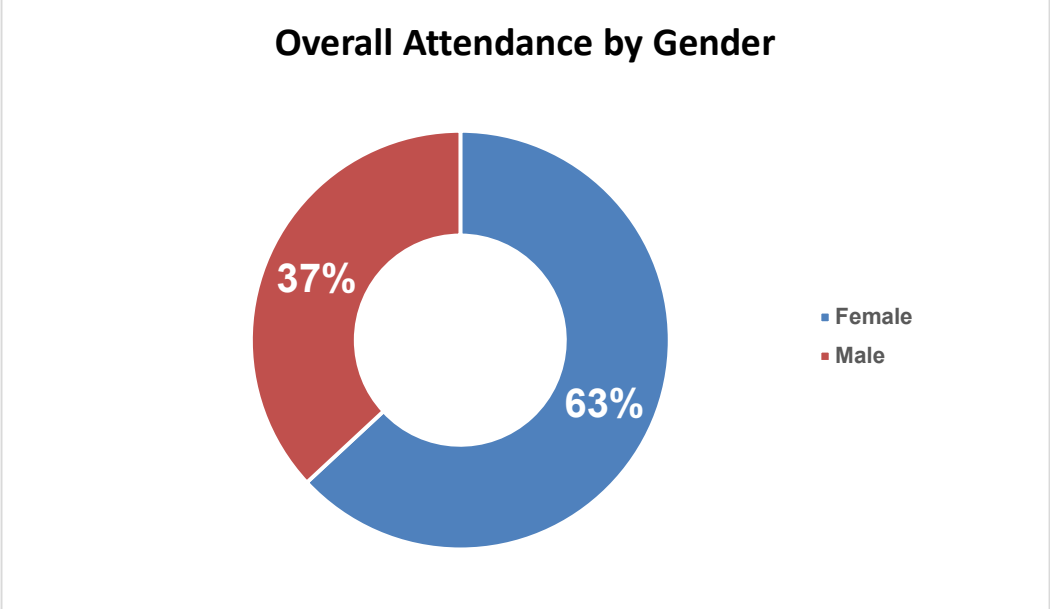


Table C-4(2). List of Co-Sponsored Meeting Participants

Participants	Expertise	Region	Country
Salma Sabour	Natural Heritage	Africa (WMO Region I)	Morocco
Nick Simpson	Climate Change (without previous major focus on culture or heritage)	Africa (WMO Region I)	South Africa
Moses Chundu	Culture or Heritage	Africa (WMO Region I)	Zimbabwe
Debra Roberts	Climate Change (without previous major focus on culture or heritage)	Africa (WMO Region I)	South Africa
Ibidun Adelekan	Culture or Heritage	Africa (WMO Region I)	Nigeria
Siona O'Connell	Culture or Heritage	Africa (WMO Region I)	South Africa
Mohamed Abdrabo	Culture or Heritage	Africa (WMO Region I)	Egypt
Jeong-eun Kim	Culture or Heritage	Asia (WMO Region II)	Korea
Jiyoung Kim	Culture or Heritage	Asia (WMO Region II)	Korea
Kin Ip	Culture or Heritage	Asia (WMO Region II)	China
R. Michael Feener	Culture or Heritage	Asia (WMO Region II)	Japan
Tomo Ishimura	Culture or Heritage	Asia (WMO Region II)	Japan
Akifumi Iwabuchi	Culture or Heritage	Asia (WMO Region II)	Japan
Zhang Rouran	Culture or Heritage	Asia (WMO Region II)	China
Aseel Alharthi	Climate Change (without previous major focus on culture or heritage)	Asia (WMO Region II)	Saudi Arabia
Fatima Al Sulaiti	Culture or Heritage	Asia (WMO Region II)	Qatar
Malak Al-Nory	Climate Change (without previous major focus on culture or heritage)	Asia (WMO Region II)	Saudi Arabia
Nourah AlSudairy	Climate Change (without previous major focus on culture	Asia (WMO Region II)	Saudi Arabia

	or heritage)		
Chandni Singh	Culture or Heritage	Asia (WMO Region II)	India
Dulma Karunarathna	Culture or Heritage	Asia (WMO Region II)	Sri Lanka
Poonam V. Mascarenhas	Culture or Heritage	Asia (WMO Region II)	India
Prajina Karmacharya	Culture or Heritage	Asia (WMO Region II)	Nepal
Alexey Butorin	Natural Heritage	Europe (WMO Region VI	Russian Federation
Sandeep Sengupta	Climate Change (without previous major focus on culture or heritage)	Asia (WMO Region II)	India
Aziz Ballouche	Culture or Heritage	Africa (WMO Region I)	Morocco
Gabriel Caballero	Culture or Heritage	South-West Pacific (WMO Region V)	Philippines
Yunus Arikan	Culture or Heritage	Europe (WMO Region VI)	Turkey
Kh Mahfuz ud Darain	Culture or Heritage	Asia (WMO Region II)	Bangladesh
Samir Abdulac	Culture or Heritage	Europe (WMO Region VI)	France
Salah El-Ekhfifi	Natural Heritage	Asia (WMO Region II)	Libya
Gabriela Mora Navarro	Culture or Heritage	North America, Central America and the Caribbean (WMO Region IV)	Mexico

Jon Kohl	Culture or Heritage	North America, Central America and the Caribbean (WMO Region IV)	Costa Rica
Milagros Flores-Roman	Culture or Heritage	North America, Central America and the Caribbean (WMO Region IV)	Puerto Rico
Chiara Bertolin	Climate Change (without previous major focus on culture or heritage)	Europe (WMO Region VI)	Norway
Mirela Kamberi	Climate Change (without previous major focus on culture or heritage)	Europe (WMO Region VI)	Albania
Alexandra Troi	Culture or Heritage	Europe (WMO Region VI)	Italy
Antonia Gravagnuolo	Culture or Heritage	Europe (WMO Region VI)	Italy
Birgitta Ringbeck	Culture or Heritage	Europe (WMO Region VI)	Germany
Carola Hein	Culture or Heritage	Europe (WMO Region VI)	Netherlands
Cathy daly	Culture or Heritage	Europe (WMO Region VI)	Ireland
Cristina Sabbioni	Culture or Heritage	Europe (WMO Region VI)	Italy
Dorothee Boesler	Culture or Heritage	Europe (WMO Region VI)	Germany
Mechtild Rössler	Culture or Heritage	Europe (WMO Region VI)	Germany
Franziska Haas	Culture or Heritage	Europe (WMO Region VI)	Germany
Hannah Fluck	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Heather Viles	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Joanne Clarke	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Johanna Leissner	Culture or Heritage	Europe (WMO Region VI)	Belgium
Jyoti Hosagrahar	Culture or Heritage	Europe (WMO Region VI)	France

Nathalie Vernimme	Culture or Heritage	Europe (WMO Region VI)	Belgium
Paloma Guzmán	Culture or Heritage	Europe (WMO Region VI)	Norway
Jane Downes	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Sandra Fatoric	Culture or Heritage	Europe (WMO Region VI)	Netherlands
Victoria Reyes García	Culture or Heritage	Europe (WMO Region VI)	Spain
Elena Osipova	Natural Heritage	Europe (WMO Region VI)	Denmark
Bill Bordass	Climate Change (without previous major focus on culture or heritage)	Europe (WMO Region VI)	United Kingdom
Christophe Rivet	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	Canada
Cornelius Holtorf	Culture or Heritage	Europe (WMO Region VI)	Sweden
Dario Camuffo	Culture or Heritage	Europe (WMO Region VI)	Italy
Dorian Fuller	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Jordi Pascual	Culture or Heritage	Europe (WMO Region VI)	Spain
Jørgen Hollesen	Culture or Heritage	Europe (WMO Region VI)	Denmark
Josh Cohen	Culture or Heritage	Europe (WMO Region VI)	Denmark
Neil Dawson	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Nick Shepherd	Culture or Heritage	Europe (WMO Region VI)	Denmark
Oliver Martin	Culture or Heritage	Europe (WMO Region VI)	Switzerland
Robin Coningham	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Scott Allan Orr	Culture or Heritage	Europe (WMO Region VI)	United Kingdom

Shumon Tobias Hussain	Culture or Heritage	Europe (WMO Region VI)	Denmark
Tom Dawson	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Richard Veillon	Natural Heritage	Europe (WMO Region VI)	France
Cecilie Smith-Christensen	Culture or Heritage	Europe (WMO Region VI)	Norway
Christos Zerefos	Climate Change (without previous major focus on culture or heritage)	Europe (WMO Region VI)	Greece
May Cassar	Culture or Heritage	Europe (WMO Region VI)	United Kingdom
Csaba Zsolt Torma	Climate Change (without previous major focus on culture or heritage)	Europe (WMO Region VI)	Hungary
Deborah Coen	Climate Change (without previous major focus on culture or heritage)	North America, Central America and the Caribbean (WMO Region IV)	United States of America
Melinda Tignor	Climate Change (without previous major focus on culture or heritage)	North America, Central American and the Caribbean (WMO Region IV)	United States of America
A.R. Siders	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Elizabeth Brabec	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Lori Ferriss	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Sarah Sutton	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Ben Orlove	Culture or Heritage	North America, Central American and the	United States of America

		Caribbean (WMO Region IV)	
Chris Marrion	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Tim Kohler	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Brenda Ekwurzel	Climate Change (without previous major focus on culture or heritage)	North America, Central American and the Caribbean (WMO Region IV)	United States of America
Max Friesen	Culture or Heritage	North America, Central American and the Caribbean (WMO Region IV)	Canada
Rosario Carmona	Culture or Heritage	South America (WMO Region III)	Chile
Javier Mejuto	Culture or Heritage	Europe (WMO Region VI)	Spain
Marcela Hurtado	Culture or Heritage	South America (WMO Region III)	Chile
Maya Ishizawa	Culture or Heritage	South America (WMO Region III)	Peru
Chris Underwood	Culture or Heritage	South America (WMO Region III)	Argentina
Eduardo Brondizio	Natural Heritage	South America (WMO Region III)	Brazil
Daniela Diaz Fuentes	Culture or Heritage	South America (WMO Region III)	Chile
Elia Nakoro	Culture or Heritage	South-West Pacific (WMO Region V)	Fiji
Jennifer Rubis	Culture or Heritage	South-West Pacific (WMO Region V)	Australia
Lauren Rickards	Climate Change (without previous major focus on culture or heritage)	South-West Pacific (WMO Region V)	Australia
Chrissy Grant	Culture or Heritage	South-West Pacific (WMO Region V)	Australia

Helen McCracken	Culture or Heritage	South-West Pacific (WMO Region V)	New Zealand
Ruth Morgan	Culture or Heritage	South-West Pacific (WMO Region V)	Australia
Sue Hodges	Culture or Heritage	South-West Pacific (WMO Region V)	Australia
Ariadne Gorring	Culture or Heritage	South-West Pacific (WMO Region V)	Australia
Christopher Ballard	Culture or Heritage	South-West Pacific (WMO Region V)	Australia
Jon Day	Natural Heritage	South-West Pacific (WMO Region V)	Australia

Annex D

White Paper Author Teams

White Paper I: Intangible cultural heritage, diverse knowledge systems and climate change (Knowledge Systems)

Lead Authors
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Melissa Nelson *(Anishinaabe, Cree, Métis, Arizona State University)*
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Jennifer Rubis *(Indigenous Peoples Specialist at Green Climate Fund)*
Gideon Sanago *(Tanzanian Maasai, Coordinator for Climate Change;* Pastoralists Indigenous Non-Governmental Organizations *(PINGO's Forum))*
Andrew Wilson (*Colombia University)*

Staff Associate
Petua Mukimba (*Colombia University)*

White Paper II: Impacts, vulnerability, and understanding risks of climate change for culture and heritage (Impacts)

Lead Authors
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Scott Orr *(UCL Institute of Sustainable Heritage)*

Contributing Authors
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Joanne Clarke *(University of East Anglia)*
Maya Ishizawa *(University of Tsukuba)*
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Christopher Ballard *(Australian National University)*
Poonam Verma Mascarenhas *(Archinova_Environs, University of York)*
Patricia Pinho *(UC Santa Cruz)*
Jean-Baptiste Bosson (*International Union for Conservation of Nature (IUCN))*
Tiffany Morrison *(ARC Centre of Excellence for Coral Studies, James Cook University, Australia)*

Chapter Scientist
Luckson Zvobgo (University of Cape Town)

White Paper III: The role of cultural and natural heritage for climate action (Solutions)

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Joshua Benjamin Cohen *(Aarhus University)*
Christian Ernsten *(University of Maastricht)*
Oscar Guevara *(World Wildlife Fund (WWF))*
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Annex E

Opening Ceremony Statements from Leaders of Co-Sponsoring Organisations

6 December 2021

E-1

Remarks by IPCC Chair Dr Hoesung Lee

Your Excellencies, distinguished friends and colleagues,

We are very happy to be working together on this with UNESCO and ICOMOS.
As Chair of the Intergovernmental Panel on Climate Change – IPCC – I'm honoured and pleased to welcome you to this unique gathering. For the first time in IPCC's history, we are bringing together, in one forum, the scientists and experts from the culture and heritage community and those working on climate change science.

Not only is this a historical meeting but it is a historical opportunity to explore and deepen our collective knowledge and understanding of how climate change impacts culture and heritage, and how these can enlighten our pathways to possible solutions in tackling climate change.

Our culture and heritage are windows into millennia of human experience from which we can draw and use them to shape our strategies to adapt and to make our communities more resilient to climate change risks and challenges. Are we capable of projecting from our collective past into our shared future? I believe yes, we are. I believe this is not only possible, but it is imperative that we do so.

For decades now, we have known that the world is warming. Our most recent report is the contribution of the Working Group I to the Sixth Assessment Report, published this summer. It laid out the most up-to-date physical science knowledge about climate change. The report clearly shows that recent changes in the climate are widespread, rapid, and intensifying, affecting every part of the world. Some of these changes are unprecedented in thousands of years.

It is indisputable that human activities are causing climate change. There are indelible human fingerprints on the changes to our climate. Compared to the pre-industrial era, our planet is already 1.1°C warmer. Human influence is making extreme climate events, including heatwaves, heavy rainfall, and droughts, more frequent and severe.

Climate change is already affecting every region on Earth, in multiple ways. The changes we're experiencing today will increase with further warming.

It is critical to recognise that there is no going back from some changes in the climate system. However, some of these changes could be slowed and others could be stopped by limiting warming. And the science is very clear on that. Unless there are immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C or even 2°C will be pushed beyond our reach.
But it is not just about temperature. Climate change is bringing multiple different changes in different regions, such as more intense rainfall and associated flooding, as well as more intense drought in many regions.

Some of these changes in our climate system are particularly relevant to the theme of this gathering and they present a clear and imminent threat to our culture and heritage.

For example, the continued sea-level rise will have irreversible and dire impacts on people living in the small Island States, such as Kiribati and Tuvalu or in the Arctic. This means loss of human habitat,

loss of territory and livelihoods, posing complex and difficult existential questions not only for these societies but equally so for the entire international community.

Consequently, this also means the loss of cultural identity, material and non-material traditions and the sense of belonging for these communities. Beyond these themes, there are additional layers of interlinked and complex social, economic, legal, human mobility and other questions that warrant the full and undivided attention of policymakers.

We also must recognize the threats posed by storm-driven coastal erosion, temperature changes, rising sea levels and floods to the world's cultural heritage sites. Most of these sites are bedrocks and sources of vitally important indigenous knowledge. Their physical loss is not only an irreparable loss to our collective history and our science. As these heritage sites perish, they can leave an unbridgeable chasm in our ability to pass on indigenous and local knowledge from one generation to the next one.

One should not forget the intangible, yet so profoundly valued experiences of our cultural and natural heritage – the aesthetic and spiritual enrichment they offer to us, the role they play in societies and cultural identities, in our recreation and knowledge, and how these subtle memories and experiences shape our physical and mental health.

Distinguished friends and colleagues,

I would like to stress here that IPCC assessment reports increasingly acknowledge the need for climate science to explore and tap into all areas and forms of knowledge. This is a critical component if we as IPCC are to present comprehensive and balanced assessments of the causes, impacts and responses to climate change.

I urge you to approach this gathering with ambition and vision. This co-sponsored meeting will allow us to explore the importance of cultural knowledge and heritage in understanding and responding to the climate change challenge. And we are only at the start. I hope this meeting will help generate more research across diverse disciplines and raise awareness among policymakers about cultural and natural heritage and climate change and possible models of adaptation and mitigation.

Culture and heritage are vitally important aspects of our lives and resources influencing how our communities and societies adapt to climate change. This meeting is convened just before the approval session of the IPCC's Working Group II contribution to the Sixth Assessment Report. This report will provide important information that will help inform the growing global debate on impacts and adaptation to climate change – especially given the strong focus on this issue that emerged at the COP26 in Glasgow.

I wish you a successful and productive meeting.

Thank you for your attention.

ENDS

E-2

Remarks by ICOMOS President Prof Dr Teresa Patricio

Excellences, Mesdames et Messieurs, chers collègues,

Je tiens à vous dire combien j'apprécie cette occasion de pouvoir vous rencontrer, et c'est avec grand plaisir que je m'adresse à vous, au nom de l'ICOMOS, à l'occasion du lancement de cet événement si important : la toute 1re réunion UNESCO-GIEC-ICOMOS visant à renforcer les synergies entre la culture, le patrimoine et la science du changement climatique.

Tout d'abord, permettez-moi de présenter l'organisation que je représente 'ICOMOS, est l'organisation consultative du Comité du Patrimoine mondial pour la mise en œuvre de la Convention du Patrimoine mondial de l'UNESCO , et , entant qu'organisation internationale non gouvernementale, ICOMOS se consacre à promouvoir la théorie, la méthodologie et la technologie appliquées à la conservation, la protection et la mise en valeur des monuments et des sites ; et cela évidement dans plusieurs domaines, en favorisent l'échange international d'informations scientifiques et en réalisent des projets variés dans des thèmes d'actualité.

En tant qu'organisation internationale du patrimoine, l'ICOMOS considère comme une évidence que l'utilisation durable du patrimoine est la pierre angulaire des activités visant à atténuer les effets du changement climatique. Il est essentiel que nous trouvions des moyens de garantir que la culture et le patrimoine soient pris en compte dans la lutte contre le changement climatique et qu'ils occupent une place centrale dans toutes les agendas internationaux.

C'est pourquoi l'Assemblée générale triennale de l'ICOMOS a voté l'année dernière pour déclarer une urgence climatique et écologique, appelant à une action collective urgente de tous les acteurs concernés pour sauvegarder le patrimoine culturel et naturel du changement climatique, y compris, non seulement par des réponses d'adaptation, mais aussi par la mise en œuvre d'une approche collective de précaution qui poursuit des voies pour limiter le réchauffement climatique à 1,5°C par rapport aux niveaux préindustriels.

Cette réunion internationale coparrainée sur la culture, le patrimoine et le changement climatique représente dès lors, une étape importante dans les efforts déployés depuis longtemps par l'ICOMOS pour améliorer l'intégration de la culture et du patrimoine dans la science du climat en général et dans le travail du GIEC en particulier.

Cela fait presque 6 ans, jour pour jour, que l'ICOMOS a coparrainé un événement en marge de la COP21 à Paris, auquel participait le Dr Youba Sokona, vice-président du GIEC, et qui portait sur la manière d'améliorer le traitement du patrimoine culturel dans le 6e rapport d'évaluation (RE6) du GIEC. Maintenant, avec la réunion coparrainée lancée aujourd'hui, nous nous concentrons principalement sur le potentiel d'impacter le prochain cycle d'Evaluation (le 7e rapport d'évaluation) (RE7/AR7).

L'attention de l'ICOMOS sur ces questions a été durable et ciblée. Pourquoi ? Parce que nous croyons fermement que pour que l'évaluation du changement climatique soit complète, pour que la présentation des options d'atténuation et d'adaptation soit solide, elles doivent prendre en compte les dimensions (matérielles et immatériels) de la culture et du patrimoine dans toute leur diversité.

Le moment choisi pour cette réunion coparrainée est crucial. Dans les années à venir, le GIEC évaluera le changement climatique et les villes - et les villes sont des structures fondamentalement culturelles.

Ma vision est de contribuer à l'élaboration de solutions et à la prise de mesures pour les villes et les communautés pour mettre en œuvre les objectifs de développement durable (ODD) des Nations unies d'ici 2030, en mettant particulièrement l'accent sur la régénération urbaine, notamment dans le contexte du changement climatique. Nous devons tous promouvoir des villes pour tous, socialement inclusives, des villes qui sont régénératrices et résilientes, qui ont des identités partagées et un sens du lieu.

Dans les mois et années à venir, le GIEC contribuera au Bilan Mondial de l'Accord de Paris, visant à faire le point sur la mise en œuvre de l'Accord de Paris dans le but d'évaluer les progrès collectifs du monde vers ses objectifs à long terme. Et …je propose ici que nous devons savoir si l'inattention à la dimension culturelle du changement climatique a contribué à des lacunes (insuffisances) dans cette ambition collective mondiale !

Dans les mois et années à venir, le groupe de travail 2 du GIEC contribuera à l'élaboration d'un objectif mondial en matière d'adaptation - je pense que la culture et le patrimoine sont essentiels pour reconnaître et répondre au risque climatique et qu'ils seront donc essentiels à ce processus. La culture et le patrimoine sont à la fois menacés par les effets du changement climatique et font partie de la solution. La culture et le patrimoine, y compris la créativité et les systèmes de connaissance des peuples autochtones et des communautés locales, peuvent contribuer à une transition équitable et à la réalisation des objectifs de l'accord de Paris, en tenant compte des différentes situations nationales. Des stratégies fondées sur la culture peuvent aider à renforcer l'ambition et la capacité d'action des communautés, à soutenir l'adaptation et la résilience au climat, à contribuer aux interventions d'atténuation et à remédier aux pertes et dommages causés par les impacts climatiques. De telles prémisses seront certainement examinées dans les jours à venir, ce qui signifie que les résultats de cette réunion ont une chance inégalée d'améliorer et de renforcer tout le travail crucial qui suivra.

Vous avez, certainement déjà tous entendu que la DBU – la Fondation fédérale allemande pour l'environnement, (La Deutsche Bundesstiftung Umwelt DBU), l'une des plus grandes fondations d'Europe qui promeut des projets innovants et exemplaires dans le domaine de la protection de l'environnement, est l'un des principaux donateurs de la réunion coparrainée. Grâce à cette collaboration, la DBU a, de sa propre initiative, suscité des réflexions et échanges en langue allemande sur les thèmes de la culture, du patrimoine et du changement climatique. Je les applaudis pour cela et je remercie mes collègues d'ICOMOS Allemagne pour leur enthousiasme à aborder ces sujets. Demain même, ICOMOS Brésil et leur Commission 'changement climatique et patrimoine' organisent une réunion de travail en langue portugaise. … J'espère que leur travail et le vôtre serviront d'exemple et que les dimensions culturelles et patrimoniales du changement climatique seront abordées dans chaque pays, dans chaque région du monde et dans chaque langue, reflétant ainsi toute la diversité culturelle de la race humaine, qui est la nôtre !

Je remercie les collègues du monde entier qui ont participé à ces efforts au fil des ans. La réunion coparrainée est un énorme pas en avant, mais nous avons encore beaucoup à faire. C'est notre responsabilité à tous, et nous devons veiller à un engagement partagé, où l'aide de chacun sera nécessaire pour faire en sorte que les recommandations de la réunion soient mises en œuvre, notamment dans le cadre du 7^{e} cycle d'évaluation du GIEC (2022-2028), qui aborde des questions essentielles pour faire face à l'urgence climatique, comme les villes et le changement climatique, et le bilan mondial de l'accord de Paris.

Avant de terminer, permettez-moi de souligner l'énorme quantité de travail qui a été faite pour nous amener à ce point par l'équipe de la réunion coparrainée de l'ICOMOS, je les remercie, leurs efforts sont extraordinaires !

C'est mon plus grand plaisir de voir aujourd'hui dans cette réunion, les scientifiques les plus remarquables et les experts les plus expérimentés … je vous souhaite de riches échanges et que votre travail ici nous rapproche de la réalisation de cet objectif crucial : quand il s'agit de faire face à l'urgence climatique, la culture et le patrimoine sont pris en compte ! L'ICOMOS est à vos côtés dans ce travail !

Je vous remercie d'avoir consacré votre temps à m'écouter ! Merci

Annex F

International Co-Sponsored Meeting on Culture, Heritage and Climate Change Programme

The programme of the International Co-Sponsored Meeting on Culture, Heritage and Climate Change can be found below. All times are UTC.

Monday, 6 December, Day One: Knowledge Systems

Session 1a and 1b – 1am and 4pm Monday
Theme: Knowledge Systems, Power, and Interpretation of Climate Change
Session 2a and 2b – 7am and 6pm Monday
Theme: New Conditions, New Knowledge?
Session 3 – 2:15pm
Theme: The Challenges and Opportunities of Integrating Knowledge Systems
Panel Discussion –1pm – Knowledge Systems

Tuesday, 7 December, Day Two: Poster Sessions

Session 1: 7-8am
Session 2: 8-9am
Session 3: 9-10am
Session 4: 1-2pm
Session 5: 2-3pm

Wednesday, 8 December, Day Three: Impacts

Session 4a and 4b – 1am and 4pm Wednesday
Theme: Collective Understanding of Uncertainty
Session 5a and 5b – 7am and 6pm Wednesday
Theme: Identifying common factors for vulnerability and resilience
Session 6 – 2:15pm Wednesday
Theme: Impacts, Power, and Interpretations of Climate Change
Panel Discussion –1pm – Impacts

Thursday, 9 December, Day Four: Poster Sessions

Session 1: 9-10am
Session 2: 1-2pm

Friday, 10 December, Day Five: Solutions

Session 7a and 7b – 1am and 4pm
Theme: Climate Justice
Session 8a and 8b – 7am and 6pm Friday
Theme: Impacts and Capacity Building
Session 9 – 2:15pm Friday
Theme: The Power of Heritage in Climate Thinking
Panel Discussion –1pm – Solutions

Annex G

Process for collecting information for *Global Research and Action Agenda on Culture, Heritage and Climate Change*

Information for the *Global Research and Action Agenda for Culture, Heritage and Climate Change* (GRAA) was compiled from all sources of official Co-Sponsored Meeting inputs, which include plenary and parallel sessions, posters, and the White Papers (commissioned by the SSC in advance of the Co-Sponsored Meeting).

The preparation of the GRAA was a 9-month project that followed the occurrence of the Co-Sponsored Meeting (6-10 December 2021). The methodology for preparing the GRAA can be described as falling into four phases: (1) Rapportage; (2) Table of Content and Review; (3) Compilation of Key Messaging; (4) Participant and SSC Engagement and Consultation. Each of the phases is outlined below.

(1) Rapportage

All Co-Sponsored Meeting sessions (i.e., all breakout rooms and all poster presentations) were recorded by the online platform (zoom) function, and had had two Rapporteurs per break—out room who took minutes of the discussions, and completed a Rapporteur sheet with relevant queries regarding the discussion. All case studies or examples mentioned during The Co-Sponsored Meeting were also captured.

(2) Table of Content and Review

The Table of Content was developed through discussions with the SSC, Co-Chairs (and associated members of the co-sponsor teams), using a draft the Scientific Coordinator observed as pertinent takeaways from the analysis of the Co-Sponsored Meeting.

(3) Compilation of Key Messages

Once the final Table of Content was established, key messages derived from analysis of the Co-Sponsored Meeting discussions were added into Table of Contents headers and discussion points.

Examples and case studies used were selected based on their (a) geographical coverage; (b) relevance to the Meeting's Scientific Questions (i.e., Knowledge Systems, Impacts, Solutions); (c) type, or form, of culture or heritage addressed; (d) participant involved (i.e., researcher, traditional knowledge holder, practitioner).

(4) Participant and SSC Engagement and Consultation

All outlines and documents were sent to all Meeting participants and the SSC for comments and feedback. On 7 February 2022, participants were emailed requesting that they feed back on (a) the GRAA headers, and (b) the discussion points to help identify any major gaps or omissions. They were given 18 days to provide feedback, and some exceptions for detailed feedback were extended. On 7 February, the SSC members were also sent an email requesting their feedback regarding the Table of Contents, and Key Messages. Similar to participants, SSC members were given 18 days to provide feedback, and some exceptions for detailed feedback were extended.

All responses were added into a document shared with the Co-Chairs (and associated members of the co-sponsoring organisations' teams), with all feedback/comments included in the document (with the associated participant named). All effort was made to be as inclusive as possible, and to

acknowledge all participants who provided input into the document through citation.

By May, the Co-Chairs (and associated members of the co-sponsor teams) and SSC were once again given a month's opportunity to feed into the Agenda document as it came to its final stages. Members of the SSC that had previously not provided feedback had another opportunity, and several did so.

All finalised Case Study boxes were also sent back to participants (who authored the boxes; although edits may have changed meanings/interpretations) to confirm they were happy with its content and presentation.
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Annex H

Summary of participant inputs to the *Global Research and Action Agenda on Culture, Heritage and Climate Change*

Inputs from all Co-Sponsored Meeting sessions, posters, commissioned White Papers and discussions were recorded and informed and shaped the Global Research and Action Agenda. These inputs were used to define the priority areas to form the outline. Once the outline of the Research and Action Agenda was identified, all inputs were summarised and binned under the appropriate section. Individual research gaps and approaches for action which were identified. Through the process of writing the document, the outline of the draft changed slightly, however, the breakdown of the key messages found in this table was developed through consultation that took place throughout the writing process.

A list of participants who contributed to the first stage of review is below:

List of participants who contributed to the first stage of review (February 2022), which included overall messages extracted from the Co-Sponsored Meeting
Chiara Bertolin *(Norwegian University of Science and Technology)*
Robin Coningham *(UNESCO Chair, Durham University)*
Cathy Daly *(Carrig Conservation and University of Lincoln)*
Lori Ferriss *(Director of Sustainability and Climate Action at Goody Clancy)*
Max Friesen *(University of Toronto)*
Carola Hein *(TU Delft)*
Maya Ishizawa *(University of Tsukuba)*
Dulma Karunarathna *(Centre for Asia Pacific Initiative, University of Victoria, Canada)*
Jon Kohl *(PUP Global Heritage Consortium)*
Timothy Kohler *(Washington State University)*
Helen McCracken *(JSC-ANZCORP)*
Gabriela Mora Navarro *(Instituto Nacional de Antropología e Historia)*
Scott Orr *(UCL Institute of Sustainable Heritage)*
A.R. Siders *(University of Delaware)*
Cecile Smith-Christensen *(World Heritage Catalysis, University of Cumbria)*
Michael Smith *(Arizona State University)*
José Lobo *(Arizona State University)*
Scott Ortman *(University of Colorado Boulder)*
Sarah Sutton *(CEO of Environment & Culture Partners (ECP))*
Chris Underwood *(President of the International Committee on the Underwater Cultural Heritage (ICUCH))*
Ibidun Adelekan *(University of Ibadan, Ibadan, Nigeria)*
Wilfredo Alangui *(Kankana-ey Igorot and Ilocano, University of the Philippines in Baguio City (UP Baguio))*
Rosario Carmona *(Department of Anthropology of the Americas, Uni-Bonn, Germany)*
Ben Orlove *(Colombia University)*

Neil Dawson *(University of St. Andrews/SCAPE Trust)*
Deborah Coen *(Professor, Chair of the History of Science & Medicine Program, Yale University)*
Melissa Nelson *(Anishinaabe, Cree, Métis, Arizona State University)*
Victoria Reyes-García *(CREA Research Professor at the Institut de Ciència i Tecnologia Ambientals (ICTA))*
Jennifer Rubis *(Indigenous Peoples Specialist at Green Climate Fund)*
Gideon Sanago *(Tanzanian Maasai, Coordinator for Climate Change Pastoralists Indigenous Non*
Governmental Organizations (PINGO's Forum)
Andrew Wilson (Colombia University)

Annex I

Initiatives informed and catalysed by the Co-Sponsored Meeting

In the months following the Co-Sponsored Meeting, several initiatives have started, which were informed and catalysed by the Co-Sponsored Meeting process which have been initiated by SSC members, OC and other organisations to further the discussions between the research, practice and policy communities on culture, heritage and climate change science. Below is an illustrative list including some of these initiatives.

2022 UN Climate Conference (COP27)

Several decisions taken and initiatives launched at COP27 were informed or catalysed by the Co-Sponsored Meeting:

The COP27 cover decision, the Sharm el-Sheikh Implementation Plan (SHIP), contains the following discussion of cultural heritage in Section VI on Loss and Damage:

> 44. Notes with grave concern, according to information in the contributions of Working Groups II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, the growing gravity, scope and frequency in all regions of loss and damage associated with the adverse effects of climate change, resulting in devastating economic and non-economic losses, including forced displacement **and impacts on cultural heritage**, human mobility and the lives and livelihoods of local communities, and underlines the importance of an adequate and effective response to loss and damage (*emphasis added*)

This is thought to be the first reference to "cultural heritage" in a COP cover decision.

The decision taken on the new framework adopted for the Glasgow-Sharm el-Sheikh work programme on the global goal on adaptation includes "tangible cultural heritage" as one of the framework's themes. That same decision also establishes traditional knowledge, knowledge of indigenous peoples and local knowledge systems as a cross-cutting consideration.

The Sustainable Urban Resilience for the Next Generation (SURGe) Initiative is one of several led by the COP27 Presidency launched at COP27. The Initiative, which counts "locally-led and culture-positive" action as one of its guiding principles, aims to support customised approaches depending on local contexts of rapidly developing cities, while recognising that culture and heritage represent both an asset to be protected from climate impacts and a resource to strengthen communities' transformative change. These provisions draw on GRAA Case Study Box 1, "Cities as Engines of Transformation for Global Sustainability in the Urban World of the 21st Century," authored by Yunus Arikan, ICLEI and Andrew Potts, Climate Heritage Network.

A holistic treatment of the cultural dimensions of the climate crisis was at the heart of "The Sharm El-Sheikh Declaration on Culture-based Climate Action" proposed at COP27 by the Climate Heritage Network with the endorsement of Jordan. The Declaration stresses that culture, from arts to heritage, plays a fundamental role in helping people to imagine and realize low carbon, just, climate resilient futures and that culture-based climate action has a crucial role to play in meeting the objectives of the UNFCCC, including also those related to mitigation and promoting climate-resilient sustainable development. The Declaration expressly welcomed the International Co-Sponsored Meeting on Culture, Heritage and Climate Change. The Declaration was discussed during a landmark High Level Ministerial Dialogue on Cultural Heritage-Based Climate Solutions held on 17 November 2022 with the support of Egypt. Both SSC Co-Chair Dr Debra Roberts and Organising Committee member Andrew Potts spoke at the event.

G20 Ministers of Culture Meeting (2021)

2021 saw an important policy development with the organisation of the first ever meeting of G20 ministers of culture by Italy, the G20's 2021 president. "Addressing the climate crisis through culture" was selected as one of the meeting's priority areas, marking the first time the topic has been featured by the G20. A series of preparatory "G20 Culture Webinars" were organised by the Italian Ministry of Culture. One of these, entitled "Addressing the Climate Crisis through Culture. Preserving Cultural Heritage and Supporting the Green Transition," was held on 12 April 2021. Co-Sponsored Meeting Co-Chair Dr Debra Reports presented the work of the Co-Sponsored Meeting at this webinar during a panel entitled "Culture-Based Solutions Driving Climate Action." The Ministerial meeting was held in July in Rome and led to the unanimous adoption of the 32-point Rome Declaration. The Declaration includes a notable statement on culture as a climate change solution, as well as a ground-breaking request that countries consider including culture and heritage in their national Adaptation Communications under Article 7 of the Paris Agreement. The G20 Ministerial in turn influenced the **Naples Conference of the Ministers of Culture of the Euro-Mediterranean Region** held in Naples from 16-17 June 2022. The final Declaration of the Naples Conference included an extensive treatment of culture and climate change under the heading "A cultural agenda for the European Green Deal. From Glasgow to Sharm El-Sheikh and beyond."