Report

What do we have to lose?

Understanding and responding to climate-induced loss and damage to cultural heritage

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Acronyms

COP	Conference of the Parties
NELD	Non-economic loss and damage
SIDS	Small Island Developing States
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WIM	Warsaw International Mechanism

Executive summary

Cultural heritage plays a major role in shaping our identities, enriching our spiritual existence, providing social cohesion and helping us to understand our past. Throughout history, people have experienced loss and damage to their cultural heritage due to war, colonialism, displacement, tourism and other forces, but now there is a new threat: climate change.

Cultural heritage describes the traditions, beliefs and achievements that we have inherited from the past, and that we hope to preserve and pass on. It can be divided into two categories. *Tangible* cultural heritage refers to physical artefacts such as monuments, buildings, artworks and landscapes. *Intangible* cultural heritage refers to practices, beliefs, knowledge and skills, including languages, religions or the techniques associated with traditional livelihoods. Cultural heritage matters because it helps to define communities and enhance social cohesion; maintain wellbeing and mental health; explain the past and shape contemporary politics; and support sustainable economic development. This paper offers a taxonomy of cultural heritage, populated with examples from all over the world where loss and damage is already a reality.

In the context of the climate accords, 'loss and damage' describes the negative impacts of climate change that cannot be avoided due to insufficient mitigation and limits to adaptation. Loss and damage can be economic, referring to the loss of resources, goods and services that can easily be monetised, and non-economic, referring to forms of loss and damage that are more difficult to quantify or measure solely in economic terms. This may include loss of life, health, human mobility, territory, biodiversity, knowledge and practices, ecosystems and – the focus of this paper – cultural heritage.

At 1.1°C of warming above pre-industrial levels, climate change is already threatening cultural heritage in varied and complex ways. Some are relatively direct: extreme weather events can destroy or damage cultural heritage and, as these events become more frequent and severe, cultural heritage will consequently face greater risks. Climate change may also indirectly lead to loss and damage to cultural heritage, for example by exacerbating water and food scarcity and thereby fuelling migration or conflict.

The most effective way to avert or minimise further climate-induced loss and damage is to reach net-zero anthropogenic emissions as quickly as possible. The second most effective way is through actions to prepare for and adjust to the impacts of climate change. Thus, climate change mitigation and adaptation can be understood as strategies to avert and minimise potential or *avoidable* loss and damage. This paper looks beyond mitigation and adaptation, offering a range of examples where loss and damage to cultural heritage is successfully being averted and minimised.

The field of heritage management aims to protect cultural heritage to maintain its benefits for present and future generations. It can be understood either as an adaptation strategy or as a measure to avert and minimise avoidable cultural loss and damage. While heritage management predates climate change, it can offer important lessons for cultural heritage threatened by climate change impacts. Within the broad category of heritage management, there are dedicated

specialisms for conserving and restoring different cultural domains: architecture, artworks, manuscripts, oral traditions, performing arts, spiritual rituals, traditional knowledge, and more. The field draws on expertise from a wide range of disciplines, including architecture, chemistry, linguistics and information and communications technology. However, safeguarding cultural heritage should not just fall to technical experts. At their best, cultural heritage management systems bring together dedicated and specialised expertise in conservation, restoration and stewardship to work with the local communities and authorities who have traditionally managed that heritage, who often stand to lose the most, and whose social, economic, religious and political practices may continue to shape and sustain it.

Much loss and damage cannot be averted or minimised, and this *unavoided* or *unavoidable* damage therefore needs to be addressed. There is currently a lively debate around fair and appropriate ways to address non-economic loss and damage resulting from climate change, including both the means of addressing this and who should be responsible for doing so. International experience of transitional justice suggests that there are five options:

1. **Restitution:** restoring those affected to their original situation (or as close as possible) before the loss and damage occurred.
2. **Rehabilitation:** redressing or repairing the loss and damage through the provision of social services such as healthcare, education or legal support.
3. **Satisfaction:** symbolic measures to recognise loss and damage, such as truth-seeking, apologies or memorialisation.
4. **Material compensation:** the provision of money or other benefits in compensation for loss and damage.
5. **Guarantees of non-repetition:** commitments and measures to prevent similar loss and damage in the future, such as codes of conduct, training or governance reform.

These options vary in their relevance to climate-induced loss and damage to cultural heritage. For example, the language accompanying the Paris Agreement explicitly states that the text around loss and damage does not provide a basis for liability or compensation. Guarantees of non-repetition of climate-induced loss and damage are temporally and technically difficult to disentangle from climate mitigation and adaptation pledges. These options may also be deployed in different combinations depending on the nature and extent of cultural loss and damage, the value placed upon it by affected communities and other stakeholders and the resources available to respond.

A comprehensive response to cultural loss and damage will require funding, even though the primary value of cultural heritage is not financial. Financial support is central to averting, minimising and avoiding loss and damage, even if material compensation may not be possible. By learning from other sectors and adopting inclusive approaches, much more can be done to avert, minimise and address cultural loss and damage through a fair process for those most affected.

1 Introduction

Cultural heritage plays a major role in shaping our identities, enriching our spiritual existence, providing social cohesion and helping us to understand our history. It gives us purpose, influences how we see ourselves and the ways in which we behave, and provides us with a sense of place, social relations and links between past and future. We inherit both tangible and intangible cultural heritage from the past and hope to pass many aspects of that heritage on. Throughout history, people have experienced loss and damage to their cultural heritage, through war, colonialism, displacement, tourism and more, but now there is a new force driving its disappearance and degradation: climate change.

While there is no established definition of 'loss and damage' in the Paris Agreement,[1] the concept has origins in international climate negotiations under the UN Framework Convention on Climate Change (UNFCCC), and is now understood to refer to the impacts of climate change that cannot be avoided due to inadequate mitigation and limits to adaptation.[2] On its own, damage refers to climate change impacts that can potentially be restored, whereas loss refers to impacts that it are not possible to restore or repair.[3] Loss and damage can also be categorised into economic loss and damage, which refers to the loss of resources, goods and services that can easily be monetised, and non-economic loss and damage (NELD), which refers to loss and damage that is far more difficult to quantify or measure solely in economic terms.[4]

Since the UNFCCC was drafted in the early 1990s, Small Island Developing States (SIDS) have highlighted the need to address loss and damage due to climate change. However, it was not until the Bali Action Plan of 2007 that loss and damage was again mentioned in the climate accords, and not until the Cancun Adaptation Framework of 2010 that Parties agreed to establish a work programme on loss and damage. This manifested in the establishment of the Warsaw International Mechanism (WIM) in 2013 at the 19th session of the Conference of the Parties to the UNFCCC (COP19).[5] Article 8 of the Paris Agreement (2015) confirmed that loss and damage would permanently be an issue under the UN climate convention, while the Santiago Network was proposed at COP25 in Madrid to enable knowledge-sharing and technical assistance relating to loss and damage. At COP26 in 2021, the Glasgow Dialogue was established to explore potential arrangements for funding related to loss and damage. These dialogues are expected to run until 2024. As a priority for many countries in the global South, there is therefore growing attention to loss and damage within and beyond the UNFCCC system. Figure 1 summarises key milestones for the incorporation of loss and damage within the UNFCCC.

Figure 1 Key loss and damage milestones within the UNFCCC

Attention to non-economic loss and damage was prompted by the development and approval of a WIM two-year workplan of the Executive Committee at COP20 in 2014, which included a focus on enhancing knowledge of NELD.[6] At COP23, hosted by Fiji in Bonn, the five-year workplan of the Executive Committee was finalised with five workstreams, one of which focused on non-economic losses. This recognition of the importance of non-economic values, especially for developing countries,[7] significantly increased their visibility. Types of NELD include loss of life, health, human mobility, territory, biodiversity, indigenous knowledge, ecosystem services and cultural heritage.[8] However, the range of NELD types is potentially endless as they are based on lived experiences and individual perceptions.[9]

NELD is consequently more complex to value than economic loss and damage,[10] and the resulting exclusion from monetary assessments can lead to underestimates of – and inadequate responses to – climate change-induced loss and damage.[11]

This paper focuses on one subset of NELD: loss and damage relating to cultural heritage. The focus so far has mostly been on economic loss and damage. Where NELD has been studied, loss and damage to cultural heritage has received less attention than other domains, such as loss of lives and health.[12] This paper highlights the nature of cultural heritage loss and damage and some ways in which climate change may contribute to it, and reviews potential responses in terms of averting, minimising and addressing it.

2 Understanding the nature and scale of cultural loss and damage

2.1 Defining loss of, and damage to, cultural heritage

2.1.1 Defining cultural heritage

Cultural heritage describes the traditions, beliefs and achievements that we have inherited from the past and that we hope to preserve and pass on. Cultural heritage can be divided into two categories. *Tangible* cultural heritage has been defined as 'artefacts, monuments, a group of buildings and sites, museums that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific and social significance'.[13] *Intangible* cultural heritage refers to 'practices, representations, expressions, knowledge, skills – 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'.[14] This heritage shapes how we see ourselves, how we behave and our links between past and future. It also gives us purpose.[15,16] Loss and damage to cultural heritage therefore threatens individual and community identities, sense of place and social cohesion.

Cultural heritage is often dependent upon and shaped by natural heritage, such as biodiversity, ecosystems and geological formations.[17] For example, people's diet – what they eat and how they prepare it – is often shaped by the flora and fauna endemic to their region. This relationship goes the other way, as human influence also impacts the environment.[18] The practice of terracing steep slopes for crop production, for example, has in many cases transformed a physical landscape into one with social, religious and economic meaning. Natural and cultural heritage are therefore often interconnected,[19] as evident among Indigenous Peoples in the Arctic (Box 1). As a result, a loss to one form of heritage often implies a loss to the other, and solutions for averting, minimising and addressing loss and damage may sometimes also be shared. These relationships are particularly important in the context of the climate and biodiversity crises. While exploring the extent, causes and impacts of, and appropriate responses to, loss of cultural heritage, it is important to bear in mind these relationships with the natural world.

Figure 2 Loss and damage in the Arctic Circle

Box 1 Loss and damage in the Arctic Circle

Around 400,000 indigenous peoples live in the Arctic today, including the Sámi in Sámpi, which covers part of Norway, Sweden, Finland and Russia's Kola Peninsula; the Aleut, Yupik and Inuit in North America and Greenland; and the Nenets, Khanty, Evenk and Chukchi in Russia.[20] While these communities have diverse cultures and histories, their ways of life have all been fundamentally shaped by their inhospitable natural environment. Most depend heavily on endemic species such as caribou, seals and whales, which provide food, clothing and fuel. Herding, hunting and fishing are also a source of identity and pride, enabling Arctic peoples to use traditional skills and provide for their communities.[21]

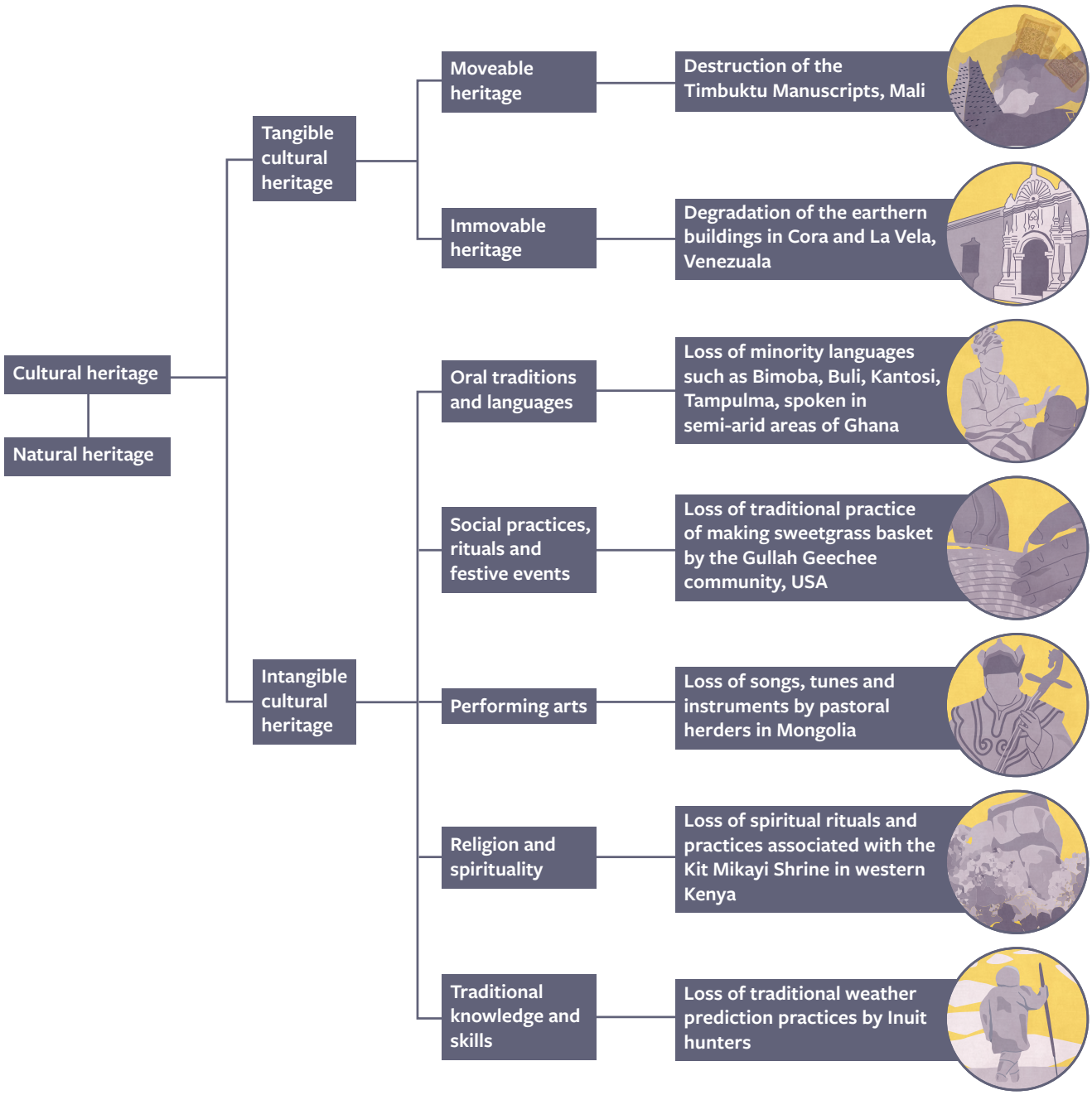
Climate change jeopardises this way of life. Thinning and disappearing sea ice affects the Arctic people's ability to hunt seals and whales, while extreme weather events make hunting more dangerous.[22] The Sámi have observed rising ocean temperatures which are shifting some fish stocks from warmer waters into the icy ecological niches to which Arctic species like whitefish and Arctic char have adapted, while ocean acidification is impacting marine species such as corals that make shells and skeletons from calcium carbonate.[23] Warmer temperatures lead to rain on snow, which thaws and freezes into ice and prevents reindeer from finding food underneath. On Qikiqtaaluk (Baffin Island), the Inuit have observed declining populations of hunted species such as caribou and narwhals.[24]

While current and anticipated loss and damage to natural and cultural heritage has caused profound grief within Arctic indigenous communities,[25] many are leading or contributing to strategies to avert, minimise and address such loss and damage.[26] One strategy involves knowledge exchange among Arctic communities. In Canada, human activities such as logging have contributed to a long decline in some caribou species, while climate change means that moose are increasingly seen in the high-elevation alpine tundra and subalpine forests that caribou prefer.[27] The Nunatsiavut government is supporting workshops where First Nations hunters from the Northwest territories can train the Labrador Inuit in harvesting and processing moose.[28] While the Labrador Inuit face a loss to part of their traditional diets and practices, the initiative will enable them to continue subsistence hunting for deer species – a pivotal part of their cultural heritage.

2.1.2 Classifying cultural heritage

It is useful to define different aspects of cultural heritage to better understand the scope for loss or damage. Figure 3 uses the categorisation of cultural heritage developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO)[29] and expands upon its intangible cultural heritage domains by using the Millennium Ecosystem Assessment's identification of the cultural services that people receive from ecosystems.[30] The figure is not intended to be exhaustive, but rather provides examples of different types of cultural loss and damage. While not all of this loss or damage is climate change-induced, the figure highlights the categories of loss and damage that could be associated with the impacts of climate change. See Annex 1 for more detail.

Figure 3 Classification of cultural heritage with examples that have experienced loss and damage

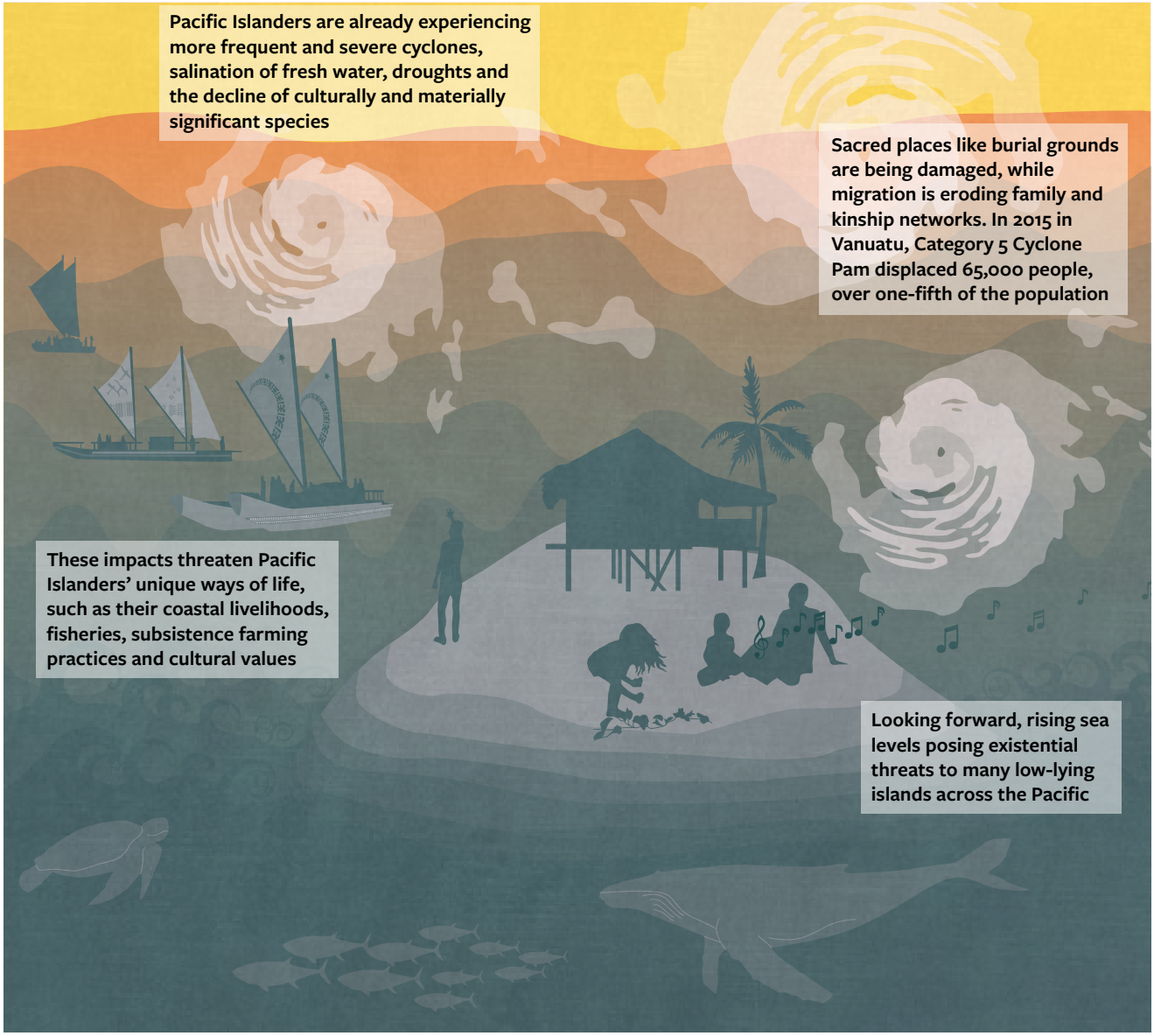


2.2 Causes of cultural loss and damage

Non-economic loss and damage, and by extension cultural heritage loss and damage, can occur due to various climate drivers, which can affect cultural heritage in varied and complex ways.[31] Some causal pathways are relatively direct:[32] extreme weather events can destroy or damage cultural heritage and, as climate change causes these events to become more frequent and severe, cultural heritage will consequently be more exposed. Acute disasters include heatwaves, floods, storms, cyclones, hurricanes and wildfires. Slow-onset events can include sea level rise, droughts, higher average temperatures, desertification and land degradation.

Attribution science calculates the extent to which these are driven by climate change, looking at the severity, duration and frequency of extreme weather and slow-onset climate events. Attribution science is advancing rapidly and becoming more and more precise, but relatively scarce data outside high-income countries makes attribution less reliable precisely where loss and damage is most important. The attribution of loss and damage due to climate change is therefore not accurate enough to inform a global compensation mechanism based on fully attributable responsibility.[33] The level of attribution science does, however, permit the recognition of responsibilities and the identification of people in need, and therefore the allocation of resources to support those people.[34]

Figure 4 Loss and damage in the Pacific



Direct impacts can cause loss to tangible cultural heritage, for example by causing the destruction of or damage to buildings, monuments or sites. Natural features directly linked to cultural heritage, like glaciers or reefs, may also change or disappear due to climate change, or culturally significant species may be unable to adapt to changing conditions. Traditional knowledge, rituals and ways of life may cease to be viable.[35] Many of the SIDS are already experiencing non-economic loss and damage to their cultural heritage, as in the case of Vanuatu (Box 2).

Box 2 Loss and damage in the Pacific

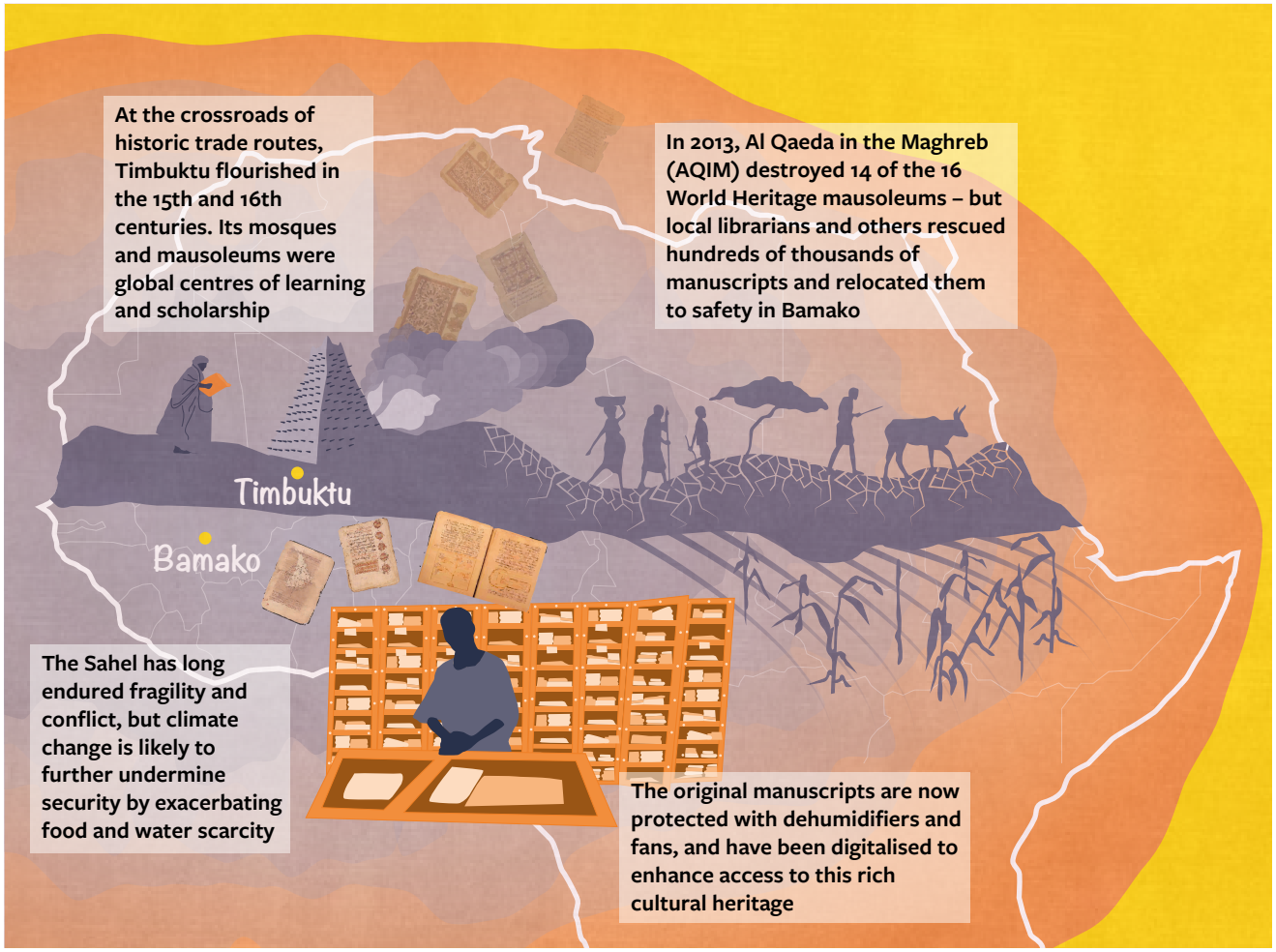
Pacific Islanders are already experiencing non-economic loss and damage, and this is projected to accelerate with further climate change. Observed impacts and projected risks include more frequent and severe cyclones, droughts and floods; the decline or collapse of culturally and materially significant species and ecosystems; and rising sea levels that pose an existential threat to many low-lying islands.[36]

In interviews with stakeholders working on climate change adaptation and disaster risk reduction in the region, some of the cultural loss and damage Pacific Islanders are already facing has been documented.[37] Many reported impacts on their way of life, including the loss of traditional values and communal unity. Migration and displacement erode family and kinship networks, while the changing natural resource base means that customary subsistence farming and fishing are less viable. Oral traditions (such as songs and dances) and local knowledge (such as the use of flora and fauna as weather indicators) may not be passed down, making it more difficult for future generations to adopt Pacific ways of living. Climate change impacts are also damaging or destroying cultural sites and sacred places, such as burial grounds. Many interviewees underscored that the loss went beyond individual sites: many Pacific Islanders define themselves and their communities by their ties to the land and sea, which underpin their identity and form their home – but which are rapidly and profoundly changing due to rising global temperatures.

Climate change is also indirectly but significantly linked to other causes of cultural loss and damage. For instance, it can indirectly lead to cultural heritage loss and damage through migration. Populations experiencing the impacts of climate change may migrate as a form of adaptation and to ensure their safety.[38] When this occurs, the migrating population is torn physically from their tangible cultural heritage, which cannot be moved with them, and which may then be lost or damaged due to climate impacts. Communities also often cannot migrate together, and the customs and norms they share, even the languages they speak, can potentially be lost as a result. Even if the areas to which they move are tolerant of new cultures, their cultural heritage may no longer be relevant or sustained as they assimilate. Communities are often forced or choose to assimilate, with the consequent destruction of parts of their identity as individuals and as a collective.[39] While in some cases migration may be necessary to avoid the impacts of climate change, it has the potential to lead to the loss of social cohesion.[40]

Climate change can also interact with other stressors, such as conflict and pollution.[41] These stressors exert powerful external pressure on the environments in which communities live by making vital resources scarcer, reducing productivity, worsening quality of life or even putting lives in danger. This compounds existing vulnerabilities and tensions in communities. In the case of conflict, powerful groups may seize or weaponise increasingly scarce resources. Marginalised elements of society are often subject to more extreme deprivation and increased violence. The resulting conflict may lead to, for example, the destruction of cultural assets (see Box 3), the fracture of communities and ways of life, or displacement and migration.[42] While the causal impact of climate change on conflict is disputed,[43] it seems clear that, under existing conditions like weak state capacity, climate change can correlate with negative security outcomes, and may therefore contribute to cultural heritage loss in future.[44,45]

Figure 5 Loss and damage in the Sahel



Box 3 Loss and damage in the Sahel

The city of Timbuktu in Mali sits at the crossroads of historic trade routes across the Sahara. This enabled it to flourish in the fifteenth and sixteenth centuries, when the city became a seat of learning and scholarship. The legacy of this period includes mausoleums and hundreds of thousands of manuscripts, which together make up one of the great treasures of African scholarship. Some are over 700 years old and, while primarily written in Arabic, they are annotated in local vernaculars including Bamana, Fulani, Fululde, Songhay, Soninke and Tamasheq.[46]

The Sahel has experienced fragility and conflict for decades (which may be exacerbated by climate change impacts such as droughts). The arrival of Al-Qaeda in the Maghreb (AQIM) in 2012 and its occupation of Timbuktu caused many to fear for the safety of the city's manuscripts – and with good reason. While hundreds of thousands of manuscripts were relocated to relative safety in Bamako, on its withdrawal in 2013 AQIM set fire to two libraries and destroyed more than 4,000 manuscripts. Fourteen of the city's 16 world heritage mausoleums were also destroyed.

Multiple methods have been employed in the past to conserve the knowledge in the Timbuktu manuscripts, including facsimiles by hand, engraving, colour lithography and darkroom photography. In recent years, many of the Timbuktu manuscripts have been digitised to maximise access while avoiding further loss and damage, with local conservators and archivists receiving training from South African experts. Original manuscripts have been protected through the installation of dehumidifiers and fans.[47]

Not all impacts can be averted or minimised: much is already being lost or damaged, and much more loss and damage is undoubtedly yet to come. For example, even if anthropogenic emissions ended today, sea levels would continue to rise for thousands of years. Humanity is already seeing both soft limits (for example, due to socio-economic factors that may change) and hard limits (for example, because ecosystems cannot adjust to changed conditions) to adaptation at 1.1°C above pre-industrial levels.[48] Individuals and communities are likely to encounter such limits more frequently as temperatures rise further. The most effective way to curtail climate-induced loss and damage is therefore accelerating decarbonisation in order to reach net-zero emissions as soon as possible, while supporting low-income and other vulnerable groups to adapt to climate impacts that are already locked in by past emissions.* Even achieving this will not prevent all loss and damage to cultural heritage.[49]

2.3 The impacts of cultural loss and damage

Cultural heritage matters because it helps to define communities and enhance social cohesion; maintain wellbeing and mental health; explain

* Reaching net-zero emissions and adapting to rising temperatures will demand profound changes to infrastructures, technologies, institutions and behaviours. It is therefore worth noting that climate action itself – even when carefully considered and implemented – may sometimes have negative impacts on cultural heritage for individuals and communities.

the past and shape contemporary politics; and support sustainable economic development. Thus, the loss of cultural heritage can be profoundly jarring because it is often tied to sense of self and community, connection between past and present, and opportunities for the future.

First, cultural heritage often plays a critical role in anchoring a community or country's common identity. Shared languages, religions, landscapes, worldviews or ways of life can create a sense of belonging, whether to a particular group of people or a particular place. This identity and shared belonging can in turn enhance individual wellbeing and health. The loss of cultural heritage therefore ruptures people's individual and collective identity, as well as the social cohesion that comes from having common reference points and paradigms.[50] For some Quechua farmers in the Peruvian Andes, for example, the collapse of revered glaciers has overturned their sense of order in the world as they are no longer protected by the *Apu* (mountain deities living inside the glaciers). The disappearance of glaciers may therefore be a source of personal distress and undermine collective understanding of the relationship between the human and spirit worlds.

Second, cultural heritage can help to explain both our past and our present. For example, linguists can compare contemporary languages to understand how people speaking different languages were connected in the past. Language can also define regional or national identities in the present. Linguists have mapped the relationship between French and Spanish, but the Basques – who straddle modern France and Spain – speak a language unrelated to either, or indeed to any other existing language. Understanding the history behind the Basque language helps to explain and reinforce Basque nationalism. This example illuminates an important point: that cultural heritage may be used selectively to cultivate identity or legitimacy by creating a sense of continuity with the past. For the Inupiat people of Point Hope, Alaska, rising sea levels may flood the graves of their ancestors and deprive their children of the peninsula where their people have lived for centuries – creating a rupture between past and future that instils fear and anxiety.[51] While such cultural loss and damage is primarily borne by frontline communities such as the Inupiat, it is also collective loss and damage: if the evidence or memory of cultural heritage is lost, all of humanity loses some ability to understand our past and pass on that richness to the future.

Third, while cultural heritage may be difficult to quantify in monetary terms, it is often tied to people's livelihoods and incomes. Its loss and damage therefore may have material and financial implications. The stories in Boxes 1 and 2 demonstrate how traditional knowledge and practices may be tied up in the material and cultural survival of communities. A changing climate renders many techniques, skills or indeed ways of life less viable, so cultural heritage is lost, and with it people's livelihoods. Cultural heritage, both tangible and intangible, may also attract tourists and other visitors, creating a valuable revenue stream and job opportunities. People have been travelling to observe or participate in cultural heritage for hundreds if not thousands of years, as evidenced in ancient pilgrimages to the Bodh Gaya in India, to Mecca or to Rome. Natural heritage also draws travellers and tourism, and therefore contributes to livelihoods beyond traditional knowledge and practices – particularly in small island states around heritage like coral reefs and historic towns. The disappearance or degradation of that cultural heritage will reduce those income-earning opportunities. Even if cultural heritage may not always deeply influence people's sense of themselves, then, its loss can still have huge impacts on their lives.

2.4 Measuring the value of loss and damage relating to cultural heritage

While measuring the value of non-economic loss and damage is extremely difficult, not doing so may mean that this category is ignored in decision-making.[52] There are ongoing debates about whether it is possible and appropriate to put a value on cultural heritage at all,[53] and particularly to estimate loss and damage in monetary terms. In many cases, there are simple proxies available to estimate the extent of loss and damage. For example, the disappearance of a language can potentially be measured by the diminishing number of native and/or fluent speakers, and the loss of a religion by the diminishing number of believers participating in services or rituals. However, while such metrics may suggest the extent of loss and damage relative to the point of comparison, they do not fully communicate the scale of the loss and damage experienced by those affected.

Both qualitative and quantitative techniques are available to value the benefits associated with cultural heritage.[54] The choice of techniques will vary depending on the type of cultural heritage being considered: loss and damage to a historic building, for instance, demands different valuation techniques to the loss of a religion or traditional skills. Many of the benefits associated with cultural heritage are not marketed, and as such they are difficult to quantify in monetary terms – though that does not necessarily preclude the use of economic valuation tools to estimate them. Options include revealed preference methods such as hedonic pricing and travel costs, and stated preference methods including contingent valuation and choice experiments.[55] For example, in the case of tangible cultural heritage, there have been attempts to measure the use and non-use value of the asset and to estimate willingness to pay to prevent climate change-induced damage to cultural and heritage sites.[56] Economic valuation can also be used to determine the financial cost of addressing the loss or damage. However, economic valuation often generates large numbers that struggle to effectively inform action, and it can be suggested that economic valuation techniques do not always reliably measure non-marketed cultural values.[57]

Several other methods could be used to estimate cultural value. There are two broad options for measuring the benefits associated with cultural heritage: first, to ask trained experts (such as historians, curators, linguists or psychologists) equipped with the specific tools of their discipline;[58] and second, to ask the affected individuals and communities ultimately most informed about the loss and damage they are facing.[59] To better capture the value of cultural heritage, multidisciplinary approaches and the involvement of the community whose culture is being valued are recommended to understand the extent of loss and damage, as well as appropriate responses.

Measuring and reporting cultural heritage loss and damage can be costly in time and resources. It may also require specific skillsets, should communities and other stakeholders choose to involve technical experts from specific cultural domains (for example, art historians or linguists). Without sufficient time, resources and expertise, non-economic loss and damage may not be sufficiently reported and estimated.[60] Resourcing and building measurement and reporting capabilities in areas that are exposed to the impacts of climate change will underpin all of the response measures.

3 Responding to cultural heritage loss and damage: a review of the options

Cultural heritage loss and damage has a range of complex causes, which can be both directly and indirectly due to climate change. Existing drivers of vulnerability, such as discrimination, conflict or physical exposure to hazards, are likely to intersect with climate change, such that already marginalised groups are more likely to experience cultural loss and damage. A range of cultural heritage domains can be lost, which may have varying types of value and levels of importance to different groups of people. The impacts of cultural heritage loss and damage are therefore very context-dependent. This means that, when responding to loss and damage, top-down approaches based on generic assumptions of the impacts of the loss may not be useful.[61] Responding to cultural heritage loss and damage instead requires tailored arrangements and measures, with strong participation and ownership by the communities affected.

When evaluating measures to respond to cultural heritage loss and damage, it is helpful to revisit the language of the UNFCCC, which speaks of averting, minimising and addressing loss and damage. To avert means to prevent or keep from happening. To minimise means to reduce as much as possible. The most effective way to avert and minimise climate-induced loss and damage is to reach net-zero anthropogenic emissions as quickly as possible. Earlier action to reduce greenhouse gases would have averted and minimised the extent of climate-induced losses and damages still further. In the absence of sufficient efforts to cut emissions, average global temperatures have increased 1.1°C above pre-industrial levels and will continue to rise due to historic emissions,[62] even if humanity collectively achieved net-zero emissions tomorrow. A still hotter future is therefore locked in. The second most effective way to avert and minimise loss and damage is through actions to prepare for and adjust to the impacts of climate change. Thus, climate change mitigation and adaptation can be understood as strategies to avert and minimise potential or *avoidable* loss and damage.[63] 'Address' in this context means to deal with, respond to, act upon or treat. When adaptation efforts have failed or when individuals and communities have reached the limits of adaptation (including due to soft limits such as lack of resources), it is necessary to address that *unavoided* or *unavoidable* loss and damage. Developing countries requests for loss and damage support would typically fall into this category.[64]

This section has two parts. First, it considers options to avert and minimise avoidable loss and damage relating to cultural heritage (although many of these measures may be regarded as adaptation, given the spectrum between adaptation and averting or minimising loss and damage). Second, it considers options to address unavoided or unavoidable loss and damage relating to cultural heritage. Both sections draw heavily on experiences of heritage management and loss around the world. Although this section is structured in a way that separates averting/minimising avoidable loss and damage from addressing unavoided/unavoidable loss and damage, it is important to recognise that loss, damage and response actually take place on a spectrum. Thus, a combination of tools and techniques may be deployed in response to the

loss and damage of cultural heritage. For example, a low-lying coastal city may choose to relocate some of its culturally significant buildings away from the shoreline (averting loss and damage); invest in the maintenance and restoration of some buildings to reduce the impact of climate-induced shocks (minimising loss and damage); and provide financial support to owners or tenants for the degradation of other buildings which could not be protected (addressing loss and damage).

3.1 Averting and minimising loss and damage relating to cultural heritage

Heritage management is a well-developed field with the purpose of protecting cultural heritage to maintain its benefits for present and future generations. At their best, cultural heritage management systems bring together dedicated and specialised expertise in conservation, restoration and stewardship to work with the local communities and authorities who have traditionally managed that heritage, and whose social, economic, religious and political practices may continue to shape and sustain it. Broad participation is especially important when cultural heritage is under pressure – including from climate change – and expected to contribute to potentially conflicting objectives, such as attracting tourists while maintaining spiritual meaning.[65]

Cultural heritage management typically involves the development of a legal framework that defines the reason for its existence; an institutional framework that gives form to its organisational needs and decision-making processes; and the allocation of resources (human, financial and technical) to plan, implement and monitor the cultural heritage management system.[66] Such systems may be adopted at the national or regional level or designed for a specific cultural asset, whether tangible (such as a single building) or intangible (such as an endangered language used across national borders). Heritage management systems need to be regularly reviewed to ensure that they meet the needs of the cultural asset and its stakeholders – particularly in the face of new challenges and pressures such as climate change.

The field of heritage management offers important lessons for averting and minimising climate-induced loss and damage. Within each of the cultural domains identified in Figure 1, there are highly sophisticated techniques for preserving vulnerable assets and restoring degraded ones that can be deployed in the face of climate hazards. While it is not possible to list all of these tools and processes, some examples illuminate the range of options available to avert and minimise climate-induced loss and damage to cultural heritage.

Focusing initially on tangible cultural heritage, the conservation and restoration of historic architecture ideally demands the use of authentic materials, deployed with the techniques and skills of the era. Neither the materials nor the knowhow may still be used in modern construction. A knowledge of chemistry may be needed to clean buildings and monuments after pollution or flooding, and then to seal them to reduce further damage. In some cases, the relocation of tangible cultural heritage may be necessary. The main temple of Abu Simbel would have been flooded following construction of the High Dam in Aswan, Egypt, and was accordingly partially relocated to higher ground: today, the impressive facade and set of chambers have been safely installed into a man-made mound of earth.[67] The relocation sustains a visible connection to Egypt's rich past, as well as a popular tourist attraction.

Turning to intangible heritage, UNESCO has developed guides to safeguarding intangible cultural heritage, and registries of good practice. These resources and lessons can be applied to climate-induced loss and damage. One domain of intangible cultural heritage is oral traditions and languages. While ideally maintained through their everyday use in society, many languages and traditions are endangered as a result of oppression, assimilation or population decline. In these circumstances, efforts must be made to avert or minimise loss and damage. In Turkey, the whistled language of kuş dili, for example, is being documented, recorded, promoted through festivals and integrated into formal and informal education schemes, including a course run by Giresun University's Faculty of Tourism. These efforts have increased the number of young people learning the language, as well as attracting linguistic tourists and scholars from around the world.[68]

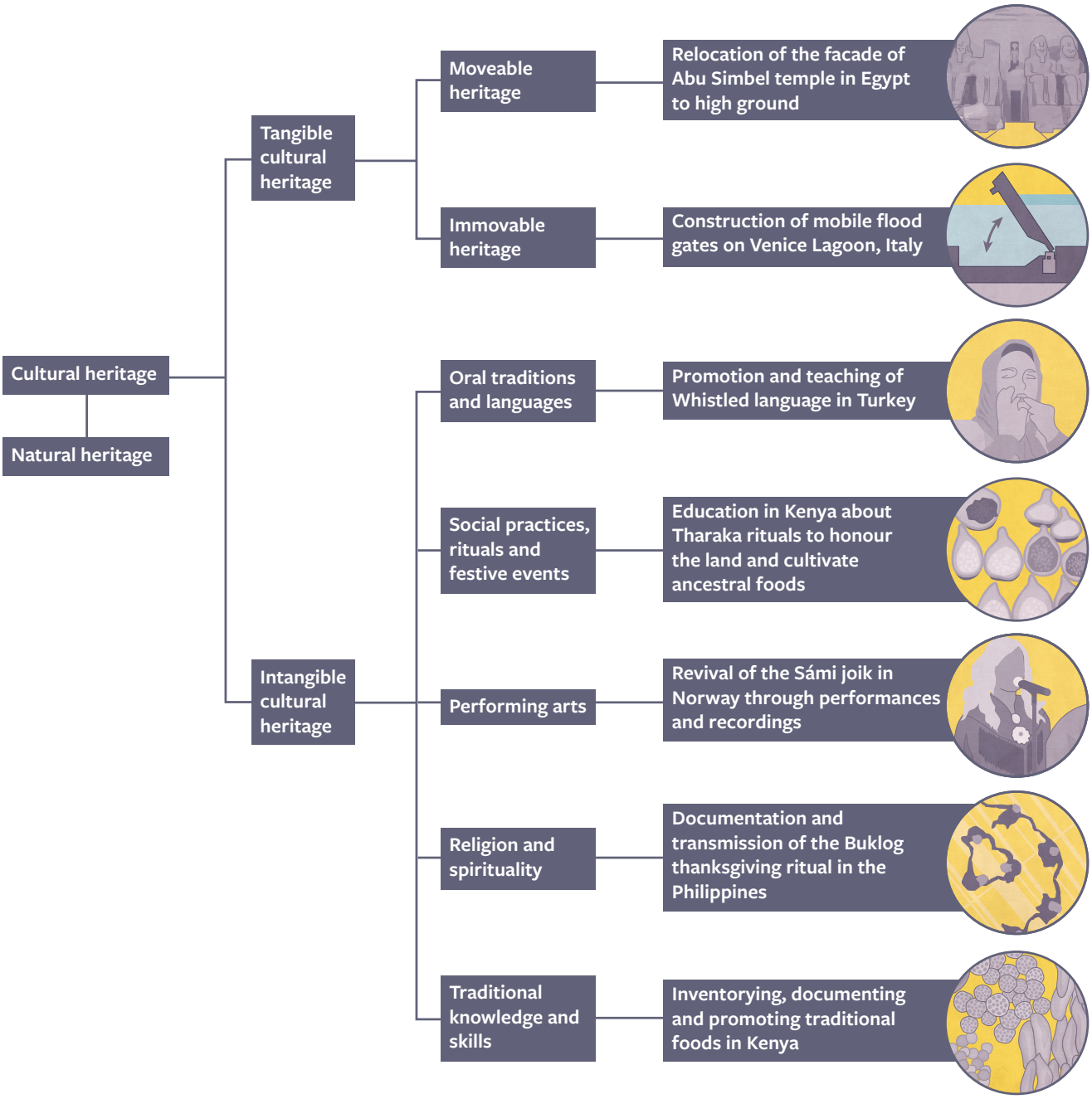
Broad public participation can help ensure continuity and conserve social practices, rituals and events.[69] Multi-generational involvement can ensure that the knowledge and skills to sustain these activities are transmitted to younger people so that they persist. The Subanen Indigenous People in the Philippines undertake the Buklog thanksgiving ritual to express their gratitude to, and ask permissions of, the spirits. The ceremonies and dances also renew the social fabric, fostering harmony among family and clan. The Buklog is under threat due to migration, conflict and other factors, so the Subanen have been working to document and transmit the ritual to younger people.[70] Similarly, the elders of the Tharaka in Kenya have been bringing together younger people to share rituals to honour the land, and the cultivation of ancestral foods.[71]

The transmission of skills and techniques is also fundamental to safeguarding performing arts, while recording, documenting, inventorying and archiving performance can complement inter-generational knowledge transfer. There is a long history of reclaiming or reviving music, typically led by musicians and activists in collaboration with ethnographers, anthropologists and collectors.[72] The revival of the *joik* (a vocal musical tradition of the Sámi people), for example, involved the documentation and notation of lyrics and melodies, audio recordings and live performances to new audiences – including at Eurovision.[73] These techniques can be used to avert and minimise climate-induced loss and damage to oral traditions. Education has also proved a powerful tool for transmitting music and other intangible heritage to new generations.

Figure 6 shows the classification of cultural heritage with examples of measures used to avert and minimise potential loss and damage. More details are provided in Annex 2.

These examples illustrate the potential of heritage management to avert and minimise loss and damage to both tangible and intangible cultural heritage, and the options available to safeguard cultural heritage in the face of climate change. The field draws on expertise from an immensely wide range of disciplines, from architecture and chemistry to linguistics and ICT, depending on the nature and condition of the cultural heritage in question.

Figure 6 Classification of cultural heritage with examples of averted and minimised loss and damage



It is important to reiterate that cultural heritage management should involve not just recognised heritage experts but also its key stakeholders, including the individuals and communities whose heritage is at risk. The Sámi and the Tharaka, for example, respectively partnered with recording studios and non-government organisations to revive their musical and agricultural traditions. Community participation in planning and decision-making (including the allocation of resources) is critical to ensure that any measures introduced meet their needs, and that no approach is adopted without consultation and adaptation to local contexts.

Averting and minimising climate-induced loss and damage to cultural heritage will require substantial resources, specific capabilities and an enabling institutional and policy environment. Maintaining cultural heritage is often costly even in the absence of new climate hazards, and there are legitimate debates about how to allocate scarce (public) resources given other pressing needs, including climate change mitigation and adaptation. The examples presented in this section make it clear that there are a wide range of non-financial responses to avert and minimise loss and damage, and these are pertinent to negotiations about loss and damage finance within the UNFCCC, but sufficient financial resources and supportive governance arrangements are still required. Against this backdrop, the findings of a recent global literature review[74] are highly relevant. The analysis suggests that finance and governance are the two most common constraints to adaptation,[75] a barrier which may lead to potentially avoidable loss and damage. Where this occurs, it is necessary to pivot from averting and minimising loss and damage to addressing it.

3.2 Addressing cultural loss and damage

Much loss and damage cannot be averted or minimised, and this unavoided or unavoidable damage therefore needs to be addressed. There is currently a lively debate around fair and appropriate ways to address the non-economic loss and damage that result from climate change, including the means of addressing them, and who should be responsible for this.[76]

This sub-section looks at five options to address cultural loss and damage: (1) restitution, (2) rehabilitation, (3) satisfaction, (4) material compensation and (5) guarantees of non-repetition. These five options were introduced into climate debates by Klinsky (2016),[77] drawing on international experiences of and frameworks for transitional justice.[78] Subsequent work has identified similar mechanisms to address loss and damage, although often the categories put forward are less comprehensive. For example, the excellent papers by Schäfer et al. (2019)[79] and Shawoo et al. (2021)[80] both identify access to counselling as an important means of redress. This is one element of rehabilitation, alongside (for example) access to medical care and legal and social services. Similarly, the authors of both papers put forward recognition of loss, official apologies and active remembrance as discrete measures to provide some satisfaction to those affected by loss and damage.

The five options may be used on their own or deployed in combination. It is important to recognise that, although material compensation is a discrete option, the other four options also entail costs. For example, the construction of damaged buildings (restitution), access to education (rehabilitation), the digitalisation of languages (satisfaction) and the enforcement of standards or codes of conduct (guarantees of non-repetition) may require finance to cover building materials, school fees, ICT infrastructure or inspections. Thus, access to sufficient resources is a cross-cutting theme across all these options.

Restitution

'Restitution' is intended to restore those affected to their original situation before the loss and damage occurred.[81] This may involve the restitution of their identity or citizenship; restoration of their livelihood or employment; return of their property or to their place of residence; enjoyment of human rights, identity, or their family or community.[82] The potential for restitution of cultural heritage depends on the nature and impacts of the loss and damage.

Tangible cultural heritage may be restored (if not too badly damaged) or reconstructed.[83] The historic town and Old Bridge of Mostar in Bosnia, for example, represented a unique architectural blend formed through four centuries of co-existence between Eastern Orthodox Serbs, Roman Catholic Croats, Bosniak-Muslims and Sephardic Jews. Destroyed during the conflict of the 1990s, both have now largely been reconstructed and stand as a symbol of both reconciliation and diversity.

Restitution of intangible cultural heritage may also be possible. Many island communities, for example, are losing their traditional coastal and marine livelihoods as climate change leads to displacement. While restitution for loss of place may not be possible, restitution of traditional livelihoods, with all their specific skills and spiritual meaning, may be achieved through planned relocation.[84] Vunisavisavi Village and Biausevu Village in Fiji offer one such example, with communities moving to relatively close sites where they could pursue similar livelihoods. In some cases, such as with Vunidogoloa Village, additional livelihood initiatives were introduced to support relocation.[85] The cost of relocating this village of 26 houses and 140 or so residents, in 2014, was over 500,000 USD, borne mostly by the Fijian government (estimated at over 75%) and the rest by the villagers themselves.[86] Meanwhile, Vanuatu projects a cost of 1.7 million USD for a single cultural aspect of relocation planning: community-led plans to maintain connections to original ancestral burial sites.[87] When adopted in anticipation of climate change impacts, planned relocation may be seen as adaptation; when adopted after loss and damage has occurred, it may be understood as a partial restitution.

Restitution of cultural heritage may be impossible or only partially possible. In these instances, complementary measures should be taken.

Rehabilitation

Rehabilitation seeks to redress or repair harm through the provision of social services such as healthcare, education or legal support.[88] Rehabilitation is intended to help individuals or communities recover economically and socially from trauma. The scope for rehabilitation depends on the impacts of the loss, which can only be assessed through extensive dialogue with the communities that have suffered.

The provision of medical services can play an important role in supporting individuals and communities to recover from loss and damage. Trauma counselling, for instance, may be helpful to facilitate grieving and bolster emotional resilience, especially after the sudden shock of loss due to extreme events.[89] Building such capacity can be expensive: a three-year project ending in 2015, supported by the Temasek Foundation and the Institute of Mental Health in Singapore, spent 1.74 million USD to train 600 community workers to build emotional resilience in Thailand, China and Indonesia, with different programmes tailored to each country. Knowledge gained from the programme in Thailand was put into practice after an earthquake in Chiang Rai in 2014.[90] Such rehabilitation measures can help to address the impacts of loss and damage on individuals' mental health, sense of identity and way of life.

Access to education can be an important way for individuals and communities to adjust to new ways of life and develop new livelihoods or sources of income. Provision of education may be particularly important where loss and damage resulted in missed opportunities for learning. Evidence from the town of Obafemi-Owode in Nigeria, for example, shows that children may be withdrawn from school if environmental degradation affects their parents' incomes, as they may no longer

be able to pay for their education.[91] In addition to facilitating rehabilitation in the aftermath of loss and damage, education programmes may be designed to support restitution or provide satisfaction. For example, the endangered languages of Irish and Welsh have been revived in part through the establishment of schools teaching primarily in these languages.

Satisfaction

Satisfaction describes symbolic measures to recognise loss and damage. Such measures may be deployed where financial or material responses are either inadequate or inappropriate.[92] Satisfaction could include verification and recognition of cultural loss and damage; apologies that acknowledge the extent of, and accept responsibility for, cultural loss and damage; sanctions against those responsible for the loss and damage; and/or memorialisation of or tributes to the cultural heritage lost or damaged.

Memorialisation 'provide(s) the necessary space for those affected to articulate their diverse narratives in culturally meaningful ways'.[93] It encompasses public, physical representations or commemorative activities that recognise specific events, people or cultural heritage that has been lost or damaged. It can take the form of authentic or symbolic sites, the renaming of streets, sculptures and statues, film, literature and other mediums specifically designed for representation and redress.[94] While memorialisation is used to recall and honour the past, it also has benefits for present and future generations, such as helping with the healing process or raising awareness.[95] In some flooded and salinised areas of Bangladesh, for example, traditional agricultural practices of rice farming are no longer viable, and instead underpin shared stories to pass down to younger generations that will not be able to farm.[96]

Another example is the Museum of New Zealand, which recognises the history and continued presence of indigenous populations, focusing on areas such as their culture, their suffering and their contributions.[97]

Truth-seeking and apologies can also provide satisfaction,[98] and are widely used as part of transitional justice initiatives. Public apologies can acknowledge loss and damage that may not have been recognised at the time. It may also involve an acknowledgement of a wrong, a truthful admission, a public statement of remorse and a guarantee of non-recurrence.[99] In 2008, an apology by Canadian Prime Minister Stephen Harper to the victims of the Indian Residential Schools system was received positively by survivors, highlighted the issue to the general public and was seen as a good start for the Truth and Reconciliation Commission of Canada. While this truth-seeking mechanism was not an unqualified success, the Commission offered an opportunity for people to share their experiences and contributed to healing.[100] The Commission also instituted a compensation mechanism for claimants totalling CAD 3.23 billion; the process itself cost CAD 411 million between 2008 and its conclusion in 2015.[101]

Material compensation

Compensation describes the provision of money or other benefits for loss and damage, which may include material damage, physical and mental harm, loss of earnings and earning potential, loss of opportunities (such as education), costs incurred for services such as counselling or legal advice, and moral damage.[102]

The language accompanying the adoption of the Paris Agreement explicitly states that 'Article 8 of the Agreement does not involve or provide a basis

for any liability or compensation'.[103] This suggests that material compensation is not a possibility within the climate accords. However, this by no means precludes the provision of finance for loss and damage relating to cultural heritage. As outlined in the beginning of this sub-section, all the other options to respond to loss and damage – restitution, rehabilitation, satisfaction and guarantees of non-repetition – typically require significant resources. Even before beginning to address loss and damage, resources may be required to institute a fair and comprehensive process to engage with those who face or have faced cultural loss and damage, gauge the value and impacts of that loss and develop a plan to address it. The provision of loss and damage finance is therefore urgent.

Guarantees of non-repetition

Guarantees of non-repetition aim to prevent similar loss and damage in the future. In other arenas, such guarantees might include putting in place standards or codes of conduct, providing training or education or changing the governance of the entities that caused or experienced harm. Responding to climate-induced loss and damage with guarantees of non-repetition is complicated by the time lag between greenhouse gas emissions being produced and loss and damage being experienced. Guarantees of non-repetition of loss and damage therefore temporally and technically blur with climate change mitigation and adaptation policies.

This brings us back to the point made at the outset of this section. There are a range of options available to avert, minimise and address loss and damage to cultural heritage. Many could also be regarded as climate mitigation and adaptation measures. Moreover, these options may be deployed in different combinations depending on the nature and extent of cultural loss and damage, the value placed upon it by affected communities and other stakeholders, and the resources available to respond.

4 Conclusion

Climate change threatens cultural heritage all over the world. There is already evidence of climate-induced cultural loss and damage;[104] even with much more aggressive mitigation and adaptation policies, more cultural heritage will be lost due to climate change that is 'baked in' from past emissions. Insufficient climate policies will incur much avoidable loss and damage.

The impacts of cultural loss and damage are hard to define and difficult to measure, but they can be devastating to individuals and communities. Losing cultural heritage can affect people's sense of place, of order, of purpose, of legacy – in short, their sense of self. Humanity as a whole is poorer for the loss of cultural heritage, but climate-induced loss and damage will also be borne unequally because individuals and communities who already face individual discrimination and structural disadvantage are more vulnerable to climate hazards.

Although the threat posed by climate change is relatively new, people have been seeking to avert, minimise and address loss and damage to cultural heritage for centuries. This paper highlights the opportunities to draw lessons from other disciplines to safeguard cultural heritage in the face of rising global temperatures, or to redress unavoided or unavoidable loss and damage. In all cases, these responses to loss and damage should bring together dedicated and specialised expertise to work with the local communities and authorities who have traditionally sustained and managed cultural heritage.

Heritage management offers a suite of options for averting and minimising cultural loss and damage, which can be tailored to specific types of cultural heritage. This field of practice encompasses the techniques needed to conserve or restore tangible heritage, such as manuscripts, buildings and landscapes. It also encompasses the techniques necessary to protect and revive intangible cultural heritage, such as oral traditions, performing arts and spiritual practices. The tools of heritage management can also be deployed as part of adaptation strategies, where cultural loss and damage is avoidable or reversible.

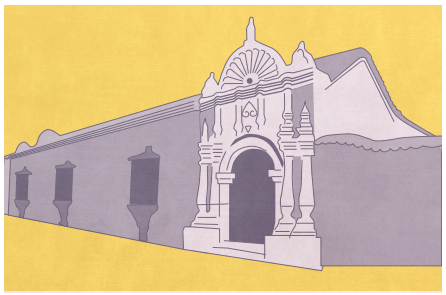
Where cultural loss and damage has occurred, it is necessary to address it. Lessons from transitional justice suggest that there are five options available:[105] (1) restitution, whereby cultural heritage is restored to its original condition to the extent possible; (2) rehabilitation, whereby those affected are provided with legal, medical, educational and other services to support their recovery; (3) satisfaction, whereby symbolic actions such as truth-seeking processes, apologies and memorials recognise both the loss itself, and responsibility for that loss; (4) material compensation, whereby those who have experienced loss and damage receive money or other benefits; and (5) guarantees of non-repetition, whereby measures are taken to avoid further harm. These five options vary in their relevance to cultural loss and damage due to climate change. For example, accompanying COP decisions make it clear that the article in the Paris Agreement concerning loss and damage does not involve or provide a basis for any liability or compensation. Guarantees of non-repetition of climate-induced loss and damage are difficult to disentangle from climate mitigation and adaptation pledges.

All of these response measures will require funding, even though the primary value of cultural heritage is not financial, and the scale of cultural

loss and damage looks daunting. Financial support is therefore central to averting, minimising and avoiding loss and damage, even if material compensation may not be likely. By learning from other sectors and adopting inclusive approaches, much more can be done to avert, minimise and address cultural loss and damage through a fair process for those most in need.

Appendix 1 Examples of loss and damage relating to cultural heritage

Heritage domain	Definition	Example of cultural heritage loss and damage
Intangible cultural heritage		
Oral traditions and languages 	Oral traditions include a variety of spoken forms, such as proverbs, legends, myths, and poems, that are used to pass on knowledge, cultural and social values, and collective memory. Language is a means of transmitting and expressing intangible cultural heritage.[i]	Minority languages such as Bimoba, Buli, Kantosi, Tampulma, Chakali, Anufo, and Hanga are spoken in semi-arid areas of Ghana. Climate-induced displacement is one factor contributing to their decline, and spread of dominant languages like Frafra, Hausa and Mossi instead.[ii]
Social practices, rituals, and festive events 	Habitual activities, such as wedding and funeral rituals, traditional legal systems, hunting, fishing, and gathering practices that structure the lives of communities and groups and that are closely linked to community's worldview.[iii]	Loss of the traditional practice of making the sweetgrass basket by the Gullah Geechee community in south-eastern USA.[iv]
Performing arts 	Performing arts include cultural expressions, such as dance and theatre, that reflect human creativity.[v]	Loss of songs, instrumental tunes, musical instruments by nomadic pastoral herders in Western Mongolia.[vi]
Religion and spirituality 	Religion can be a manifestation of culture.[vii]	Loss of rituals and practices associated with the Kit Mikayi Shrine in western Kenya, which the Seme people access for praying, taking oaths and undertaking rituals.[viii]

Heritage domain	Definition	Example of cultural heritage loss and damage
Intangible cultural heritage		
Traditional knowledge and skills 	Includes the knowledge, skills, practices, and representations developed by communities by interacting with the natural environment.[ix]	Loss of traditional weather prediction strategies and knowledge used by Inuit hunters to develop safe hunting routes.[x]
Tangible cultural heritage		
Movable heritage 	Paintings, sculptures, furniture, wall paintings.	Destruction of the Tombouctou Manuscripts (see Box 3).
Immovable heritage 	Historical buildings, monuments, and archaeological sites.	Degradation of the earthern buildings in Cora and La Vela, Venezuela.[xi]

i UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization

ii Addaney, M., Yegbelemanawo, S., Akudugu, J. A., & Kodua, M. (2022). Climate change and preservation of minority languages in the upper regions of Ghana: A systematic review. Chinese Journal of Population, Resources and Environment, 20(2), 177-189.

iii UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization

iv Pearson, J., Jackson, G., & McNamara, K. E. (2021). Climate-driven losses to Indigenous and local knowledge and cultural heritage. The Anthropocene Review.

v UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization

vi Pearson, J., Jackson, G., & McNamara, K. E. (2021). Climate-driven losses to Indigenous and local knowledge and cultural heritage. The Anthropocene Review.

vii Colvin, C. L. (2018). Culture and Religion. In An Economist's Guide to Economic History (pp. 223-229).

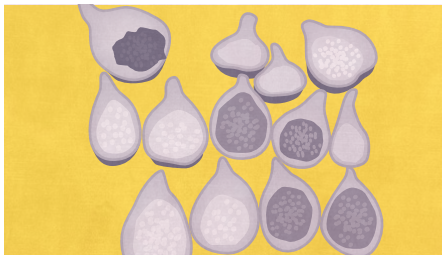
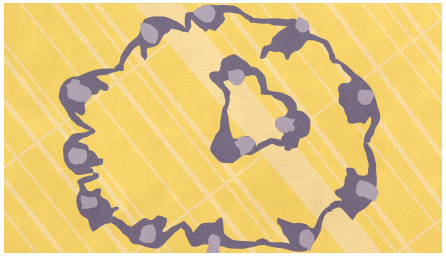
viii Intangible Cultural Heritage UNESCO. (n.d.) Rituals and practices associated with Kit Mikayi shrine. Available at: https://ich.unesco.org/en/USL/rituals-and-practices-associated-with-kit-mikayi-shrine-01489

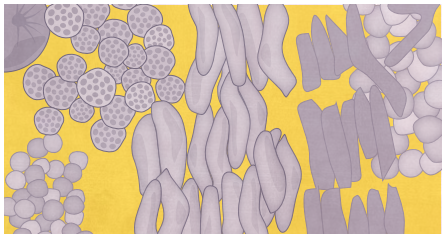
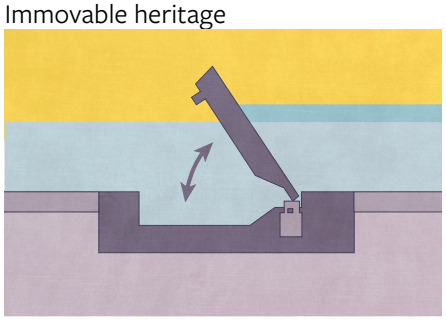
ix UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization

x Pearson, J., Jackson, G., & McNamara, K. E. (2021). Climate-driven losses to Indigenous and local knowledge and cultural heritage. The Anthropocene Review.

xi UNESCO. (n.d.) Coro and its Port. Paris: United Nations Educational, Scientific and Cultural Organization. Available at: https://whc.unesco.org/en/list/658/

Appendix 2 Examples of avoided loss and damage relating to cultural heritage

Heritage domain	Definition	Example of averting or minimising loss and damage
Intangible cultural heritage		
Oral traditions and languages 	Oral traditions include a variety of spoken forms, such as proverbs, legends, myths, and poems, that are used to pass on knowledge, cultural and social values, and collective memory. Language is a means of transmitting and expressing intangible cultural heritage.[i]	The whistled language of kuş dili in Turkey has been used to communicate across valleys and long distances for centuries. When it began to be displaced by mobile phones, its speakers worked hard to record, promote, and integrate into formal and informal education schemes to ensure the distinctive tradition was not lost.[ii]
Social practices, rituals, and festive events 	Habitual activities, such as wedding and funeral rituals, traditional legal systems, hunting, fishing, and gathering practices that structure the lives of communities and groups and that are closely linked to community's worldview.[iii]	The elders of the Tharaka in Kenya have been bringing together younger people to share cultural practices concerning rituals to honour the land and the cultivation of ancestral foods.[iv]
Performing arts 	Performing arts include cultural expressions, such as dance and theatre, that reflect human creativity.[v]	Revival of the joik, the traditional vocal music of the Sámi people of Scandinavia, through performances at festivals and competitions (including Eurovision), as well as dissemination of both state-funded and commercial recordings.[vi]
Religion and spirituality 	Religion can be a manifestation of culture.[vii]	The Subanen in the Philippines have been working to document and transmit to younger people the Buklog thanksgiving ritual system, in which they ask the spirits for permission to gather materials from the forest, present coin offerings, and invite spirits of the departed to feast.[viii]

Heritage domain	Definition	Example of averting or minimising loss and damage
Intangible cultural heritage		
Traditional knowledge and skills 	Includes the knowledge, skills, practices, and representations developed by communities by interacting with the natural environment.[ix]	In collaboration with scientists and community groups, efforts were made to inventory traditional foods in Kenya, to document their use in recipes and in ceremonies, and to promote the foods and raise awareness of them among primary school children.[x]
Tangible cultural heritage		
Movable heritage 	Paintings, sculptures, furniture, wall paintings.	Abu Simbel is an ancient site in Egypt, home to two historical temples carved out of the rock face in the reign of Pharoah Ramses II. The façade and key rooms of Abu Simbel had to be relocated in 1968, as they would otherwise have been flooded by the construction of the High Dam in Aswan.
Immovable heritage 	Historical buildings, monuments, and archaeological sites.	Venice in Italy is distinguished by its network of canals and bridges that connect its 118 islands. Venice has always been vulnerable to water, first sinking due to groundwater extraction and now subject to rising sea levels from climate change. Mobile flood gates have now been constructed in Venice lagoon to protect against high tides and storm surge.

i UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization.

ii Intangible Cultural Heritage UNESCO. (n.d.) Whistled Language. Available at: https://ich.unesco.org/en/USL/whistled-language-00658.

iii UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization.

iv Chumvi, M. (2019). Sacred River, Sacred Land: A community goes 'back to its roots' in Kenya. Society for Alternative Learning and Transformation (SALT). Available at: https://saltnet.org/chumvi/2019/11/08/sacred-river-sacred-land-a-community-goes-back-to-roots-in-kenya/

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viii Intangible Cultural Heritage UNESCO. (n.d.) Buklog, thanksgiving ritual system of the Subanen. Available at: https://ich.unesco.org/en/USL/buklog-thanksgiving-ritual-system-of-the-subanen-01495

ix UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: United Nations Educational, Scientific and Cultural Organization.

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5 **Serdeczny, O.** (2019) 'Non-economic loss and damage and the Warsaw international mechanism' in R. Mechler et al (eds) *Loss and damage from climate change: Concepts, Methods and Policy Options*. Cham: Springer, pp. 205-220.

6 **UNFCCC** (2016) *Shining the light on non-economic losses – Challenges, risks and lessons learned for addressing them*. Summary Note. Bonn: UNFCCC (https://unfccc.int/files/adaptation/groups_committees/loss_and_damage_executive_committee/application/pdf/nels_side_event_summary_note.pdf).

7 **Serdeczny, O.** (2019) 'Non-economic loss and damage and the Warsaw international mechanism' in R. Mechler et al (eds) *Loss and damage from climate change: Concepts, Methods and Policy Options*. Cham: Springer, pp. 205-220.

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