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Understanding cultural losses and damages induced by climate change in the Pacific region: evidence from Fiji

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ABSTRACT

The global climate has undergone significant changes since the industrial revolution. These changes have been causing catastrophic consequences for life on Earth, disproportionately impacting the world's poorest communities despite their minimal contribution to the causes of climate change. The urgency of addressing this injustice has prompted international efforts, such as the United Nations (UN)-led loss and damage funding framework. However, current assessments of climate-induced losses and damages tend to focus merely on economic dimensions, often neglecting the cultural and social impacts. This study addresses this gap by assessing local communities' relative valuation of the losses and damages to cultural heritage compared to other sectors such as infrastructure and agriculture. Our study was conducted in 10 coastal villages in Fiji, involving 100 participants. Each participant was tasked with allocating a hypothetical climate change compensation fund of 100,000 Fijian dollars per village across five sectors, including cultural heritage. In addition, the participants rated the level of importance they attach to losses of cultural heritage compared to losses and damages in other sectors. Participants consistently allocated 19% of funds to cultural preservation, highlighting its importance alongside infrastructure, agriculture, and social services. This prioritization held steady across gender and age demographics, underscoring a shared cultural recognition within Fijian communities. Furthermore, 79% of participants ranked cultural heritage losses as equally or more important than losses in sectors like agriculture and infrastructure. Our findings emphasize the need to integrate cultural heritage losses and damages into climate impact assessments, adaptation strategies, and compensation frameworks, and challenge the conventional practice of prioritizing economic losses in climate change impact assessments. We argue for the adoption of a balanced, holistic approach in climate change policy that values cultural heritage alongside economic resilience of local communities.

Key policy insights

- Climate change impact assessments should include cultural heritage as a core aspect of community wellbeing.
- Policy makers (regional, national and international) should embrace losses and damages to cultural heritage as a central part of their climate change adaptation efforts.
- Local communities should be involved in the decision-making process to shape adaptation priorities and ensure the implementation of culturally relevant strategies.

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Introduction

The Earth's climate has undergone significant changes since the industrial revolution, with temperatures rising by approximately 1.36 degrees Celsius in 2023 compared to the 1850–1900 average (NASA, 2023) and global sea levels increasing by 210–240 millimetres since 1880 (Church et al., 2013; Church & White, 2011; Lindsey, 2023). In recent decades, the consequences of these shifts have become increasingly evident, posing significant challenges to ecosystems, economies, and societies worldwide (IPCC, 2022). Human activities are the primary drivers of these changes, mainly in terms of greenhouse gas emissions (GHG) into the atmosphere (USGCRP, 2017). Historically, advanced economies have been the major contributors to GHG emissions (Ritchie & Roser, 2019), while developing nations, such as those in the Pacific region, have borne the brunt of the resulting climate impacts (IPCC, 2022; Khalfan et al., 2023; www.earth.org).[1] This disparity can be highlighted by the fact that the wealthiest 1% of the global population is responsible for twice the emissions of the bottom 50% combined (Khalfan et al., 2023). While climate change affects everyone, the wealthy experience marginal losses and damages compared to their total wealth (Khalfan et al., 2023) and often have the means to protect themselves from the consequences of climate change. In contrast, the poorest segments of the global population often lose everything due to climate change, despite contributing minimally to the problem (Khalfan et al., 2023; www.earth.org). This glaring inequality makes the impacts of climate change and the resulting losses and damages a matter of justice.

Recognizing the urgency of climate injustice, the international community has sought to address it through mechanisms such as the UN-led loss and damage funding framework. A historic agreement was reached during the UN's COP27 summit in Sharm el-Sheikh, Egypt, in 2022, where developed countries committed to supporting vulnerable nations in coping with the consequences of climate change, and enhancing their resilience towards the impacts of climate change (UNFCCC, 2023).

However, existing estimates of climate change-induced losses and damages have mainly focused on economic aspects, particularly damages to agricultural production, infrastructure, and property (Brabec & Chilton, 2015; McNamara et al., 2021; Serdeczny et al., 2016; Steadman et al., 2022). Non-economic losses, such as those related to cultural heritage, are often excluded (Serdeczny et al., 2016; Tschakert et al., 2019).

The United Nations Framework Convention on Climate Change (UNFCCC) formally introduced the concept of loss and damage under the Warsaw International Mechanism in 2013. Subsequent agreements, including the Paris Agreement (Article 8), acknowledge loss and damage but lack binding commitments or clear guidelines for addressing non-economic losses, including cultural heritage (Broberg & Romera, 2020; Legal Response International, 2018; Tschakert et al., 2019). Moreover, most of the current loss and damage frameworks prioritize economic losses, with limited attention paid to the sociocultural dimensions of climate change impacts (Pearson et al., 2023; Schinko et al., 2019; Tschakert et al., 2019). Yet, the impact of climate change extends far beyond economic losses.

The few existing studies that have investigated the impact of climate change on social and cultural aspects, disproportionately centred in the Global North, particularly the United States and Europe (McNamara & Jackson, 2019; Orr et al., 2021; Thomas et al., 2020), and predominantly focused on tangible cultural heritage, such as historical buildings, monuments, and archaeological sites (Fatorić & Seekamp, 2017; Orr et al., 2021; Sesana et al., 2021). In the Pacific region, where cultural heritage plays a central role in community life, there is paucity of research on the impact of climate change on cultural heritage (e.g. McNamara et al., 2021b).

For Pacific communities, cultural heritage is more than tradition; it defines their identity. As these communities grapple with the harsh realities of climate change, such as sea-level rise, cyclones, coastal erosion, landslides, and floods, the threat to their cultural heritage becomes dire. Losing culturally significant sites, such as burial grounds, ancestral land and places of worship, would have profound emotional, psychological, and communal impacts on local communities (Clayton et al., 2021; Pearson et al., 2023; Tschakert et al., 2019), exacerbating climate anxiety (Gibson et al., 2020; Yale Sustainability, 2023).

[1] https://earth.org/climate-changes-unequal-burden-why-do-low-income-communities-bear-the-brunt/

Thus, it is imperative to acknowledge the holistic nature of the impact of climate change on societies, including their cultural heritage. However, quantifying the value of cultural heritage and its loss is inherently complex (Tschakert et al., 2019). Unlike infrastructure or agricultural production, cultural heritage lacks clear monetary equivalents, making it less visible in economic assessments (Morrissey & Oliver-Smith, 2013; Tschakert et al., 2019). Consequently, policies often fail to address the cultural implications of climate change adaptation strategies (e.g. relocation of affected communities), focusing instead on physical infrastructure without considering the spiritual and emotional ties societies have to their ancestral lands and communities (Charan et al., 2017). Cultural heritage, central to community identity and resilience, remains a policy blind spot, largely due to its intangible nature and the challenges in quantifying its value (Morrissey & Oliver-Smith, 2013; Thomas et al., 2020). Thus, by assessing the relative value of cultural losses compared to other sectors, our study aims to highlight the value of cultural heritage losses induced by climate change in the Pacific region and beyond.

To accomplish this, we used an innovative approach of a hypothetical climate compensation fund allocation game to estimate the relative value of cultural heritage to local communities compared to other sectors such as agriculture, infrastructure, environment, and social sectors. Common approaches in the literature often rely on semi-structured interviews, focus group discussions, or direct surveys (Charan et al., 2017; Ellis & Albrecht, 2017; Gibson et al., 2020; Pearson et al., 2023). Some studies also used choice experiments (Miller et al., 2015; Throsby et al., 2021), contingent valuation (Tuan & Navrud, 2007) and benefit transfer methods (Lawton et al., 2021). Most of these studies often focus only on a specific dimension of cultural heritage (e.g. historical buildings) in a specific site (Throsby et al., 2021; Tuan & Navrud, 2007). In contrast, our method integrates participatory and game-based techniques to reveal community preferences for cultural heritage preservation and the trade-offs they make in terms of infrastructure and economic benefits, in addition to focusing on specific components of cultural heritage. In our study, we also directly asked the members of local communities to rate the level of importance they attach to different dimensions of cultural heritage and express their opinions on how they compare cultural losses and damages induced by climate change to those in other sectors. The findings of our study provide evidence on the importance of cultural heritage in Fiji and supports the need to explicitly include cultural heritage in loss and damage assessments, compensation, and adaptation strategies in the Pacific region and beyond.

The remainder of the paper is structured as follows: The first section outlines the study's methodology, including study sites and data sources. The second section presents the results, beginning with findings from the face-to-face interviews, followed by results from the compensation game and focus group discussions. Finally, the paper concludes with a discussion of the findings, conclusions, and policy insights.

Methods

Study sites and data sources

Fiji, an archipelago in the South Pacific Ocean, has a population of 951,611 (The World Factbook, 2014), and consists of 330 islands. In recent decades, Fiji has made significant strides in human development, ranking 104th out of 193 countries and territories in terms of the Human Development Index in 2023/2024 (UNDP, 2024). The country has achieved an impressive adult literacy rate of 99.1% (The World Factbook, 2014), signifying a high literacy rate by global standards. The service sector plays an important role for Fiji's economy, accounting for 53.4% of the country's GDP and employing 68.3% of the country's labour force as of 2020 (World Bank, 2023). The agricultural sector also plays a pivotal role, employing 17.6% of the population and contributing 14.5% to GDP (World Bank, 2023). Fiji has 14 provinces (Figure 1), which are further administratively divided into 195 districts and 1193 villages (Fiji Budget Vacation, 2023). We collected the data for this study from 10 coastal villages located in the largest Island, Viti Levu (see Figure 1). From each village, we selected 10 households (n = 100) to participate in the survey. The focus of our survey was coastal villages, which are prone to the impact of climate change through sea level rise and coastal erosion.

We recruited the participants for our survey through the village chiefs and village headmen. Members of the research team visited village chiefs and village headmen prior to data collection and obtained permission to

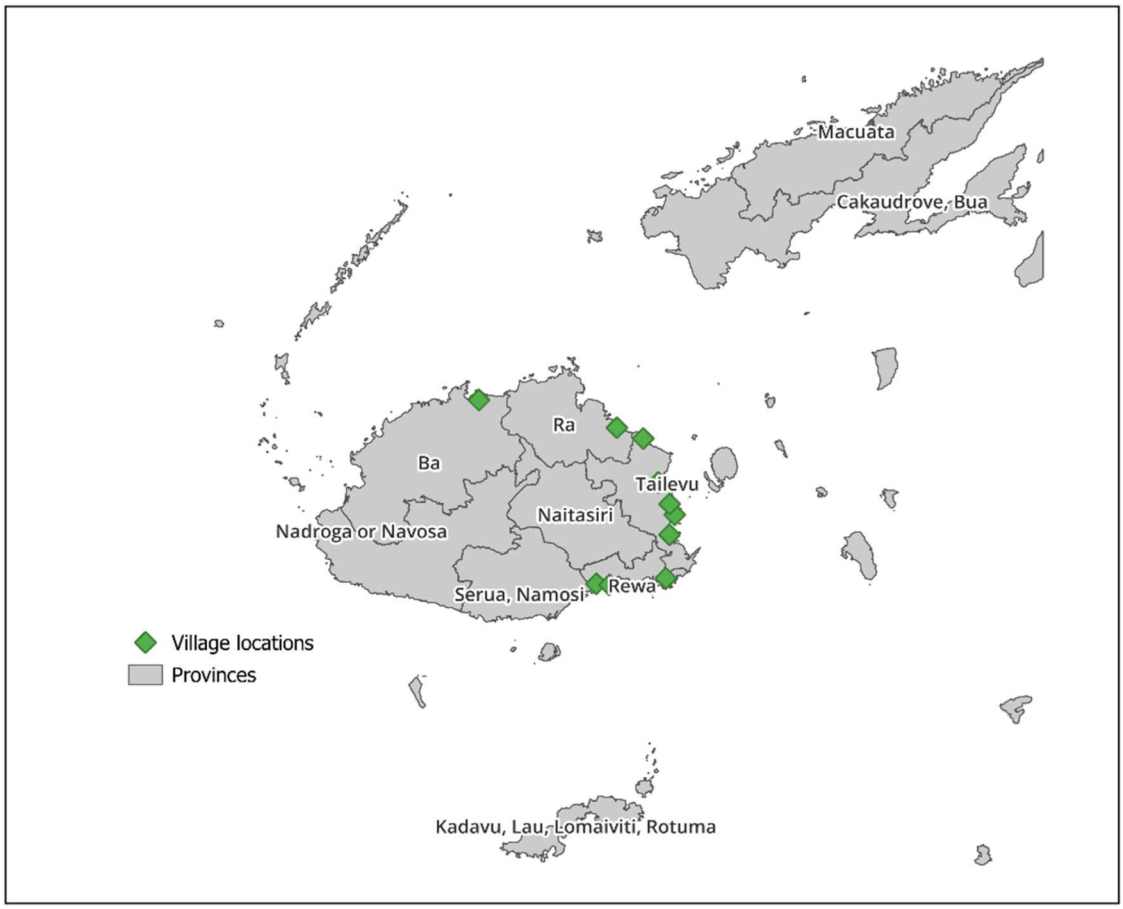

Figure 1. Map of the study provinces and villages

conduct the survey in their village and to identify households to participate in our survey. The participants identified by the village chiefs and/or headmen were, then, asked for their consent to participate in our survey. Depending on the willingness and availability of the household heads, they were asked to answer the survey questions in a face-to-face interview. In our survey, even though household heads are mostly men, in some cases we selected wives to fill in the questionnaire. Consequently, female participants represent 39% of our sample. To undertake the research, social ethics approval (NK29/2/2024) was obtained from Manaaki Whenua-Landcare Research, New Zealand.

Data collection methods

Data on cultural heritage and impacts of climate change was collected in three ways – structured interviews, allocation game and focus group discussions.

We conducted a face-to-face interview using a structured questionnaire with the 100 participants. The participants were asked to rate the level of importance they attribute to different dimensions of cultural heritage, the level of threats posed by climate change, and relative importance of losses and damage to cultural heritage compared to other sectors.

The participants were also tasked with allocating a hypothetical climate loss and damage compensation fund across five sectors and six dimensions of cultural heritage in a two-stage process. In the first stage, participants were asked to allocate the climate loss and damage compensation fund among five sectors

affected by climate change – agriculture, infrastructure, environment, social services and cultural heritage. Specifically, they were asked to allocate 50 chickpeas representing the compensation fund (100,000 FJD) across these five areas. The participants were requested to place the number of chickpeas (or funds) they believe should be allocated to each sector on a board with a pie chart configuration where each of the five sectors was represented by a section (see Figure 2).

In the second stage of the task, participants were explicitly informed that the portion of the fund they assigned to preserving cultural heritage would be earmarked for preserving and safeguarding burial grounds, churches, ancestral land, historical buildings, archaeological sites, and totems in their community from the adverse effects of climate change such as rising sea levels, floods, and coastal erosion. Based on these instructions, the participants were asked to allocate the portion of the fund they allocated to cultural heritage in the first stage across these six dimensions of cultural heritage.

The compensation fund allocation exercise enabled us to gauge the relative value the local communities attach to preserving cultural heritage compared to other sectors such as infrastructure and agriculture, and the relative preferences of local communities towards different dimensions of cultural heritage.

To complement the interviews and allocation task, we convened a women's focus group in four of the villages. This was to gain a deeper understanding of how cultural heritage is valued, particularly from a women's perspective. The board from the allocation task was used in the focus groups to provide a mechanism to facilitate the discussion and to infer deeper insights into the generalised allocation choices from the compensation fund allocation exercise.

Figure 2. Allocation of the fund across the five sectors by one of the participants.

Results

Descriptive statistics

In our study, men comprised 61% of the participants and women 39% (Table 1). Almost one in four participants had primary education, over half had high school education and one in five had a diploma or certificate. One participant had a bachelor's degree. Majority of the participants (65%) were older than 45 years of age. In our sample, most participants were engaged in farming, fishing and hired farm or domestic work. Ten percent of the participants reported they were unemployed (Table 1).

Structured interviews

Important dimensions of cultural heritage for communities

The most important dimensions of cultural heritage identified by participants are churches, fishing grounds, connectedness to local community, cultural identity, totems, and traditional medicine (Figure 3); closely followed by cultural or traditional practices, connectedness to the sea and cultural ceremonies (e.g. Yaqona/kava ceremonies). Burial grounds, historical buildings and archaeological sites were rated as having relatively lower importance compared to other aspects of cultural heritage (Figure 3).

Threats of climate change to cultural heritage as perceived by local communities

Our data revealed that most participants believe their fishing grounds were at greatest risk from climate change induced hazards (83%) (see Figure 4). More than 55% of participants reported their cultural identity and connectedness to the local communities are highly or very highly threatened by climate change induced hazards. Around 45% reported their traditional practices and cultural ceremonies are highly threatened by climate change. In general, our results show that the dimensions of cultural heritage highly threatened by climate change are those dimensions of cultural heritage that are perceived to be most important by local

Table 1. Characteristics of the participants

Participant characteristics	% of participants
Gender	
Male	61
Female	39
Education level	
No education	0
Primary (1-8)	24
High school (9-12)	53
Diploma/certificate	22
Bachelor's degree	1
Age	
18–24	4
25–35	15
36–45	16
46–55	22
56–65	28
Above 65	15
Occupation	
Farmer/farm owner	16
Farmer/farm owner and other additional occupation	32
Hired farm/domestic worker	5
Hired farm/domestic worker and other additional occupation	15
Fisherman/ fisherwoman	4
Fisherman/ fisherwoman and other additional occupation	21
Teacher/nurse/police or other trained service worker	3
Student	1
Unemployed	9
Reported unemployed and other occupation	14
Retired	8
Technical/mechanical/skilled worker	2

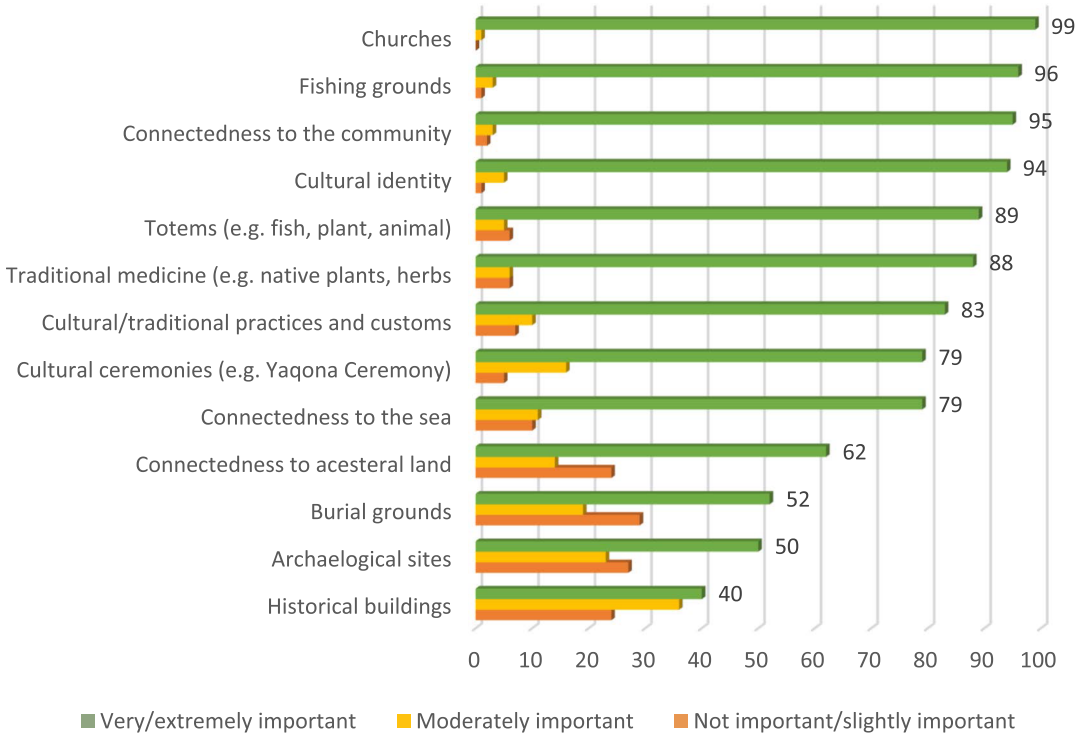

Figure 3. Level of importance attached to different dimensions of cultural heritage.

communities. Interestingly churches, while very important to local communities, were perceived to be less threatened by climate change. These findings suggest that climate change is not only endangering physical cultural sites in Fiji, but also jeopardizing intangible heritage, such as cultural identity, connectedness to the community, traditional practices, ceremonies, and rituals.

Severe storms/cyclones and coastal erosion are the major climate change-related hazards noted by participants as threatening the cultural heritage in their villages (Figure 5). Around 72% and 69% of participants, respectively, reported threats to cultural heritage from severe storms/cyclones and costal erosion as high or very high. Other climate change related hazards threatening the local cultural heritage were sea level rise (53%) and floods (49%). The severity of threats posed by droughts, heatwaves, and landslides were reported to be relatively low.

Anxiety related to climate change

The majority of participants (83%) reported they have never been displaced from their villages or houses because of extreme weather events (see Supplementary Online Material (SOM) Figure S1). The remaining 17% reported they had been displaced at least once from their homes or villages because of extreme weather events.

Despite the relatively low incidence of displacements in the past, most participants (52%) believe the likelihood of them being displaced from their homes or villages in the future is high or very high (see Figure 6). These findings suggest there is likely a high level of climate change related anxiety in Fijian villages.

Allocation task

Relative importance of cultural heritage compared to other sectors

Our analysis of the allocation of a hypothetical compensation fund across five sectors revealed significant importance attached by participants to each sector included in our study. Notably, infrastructure received

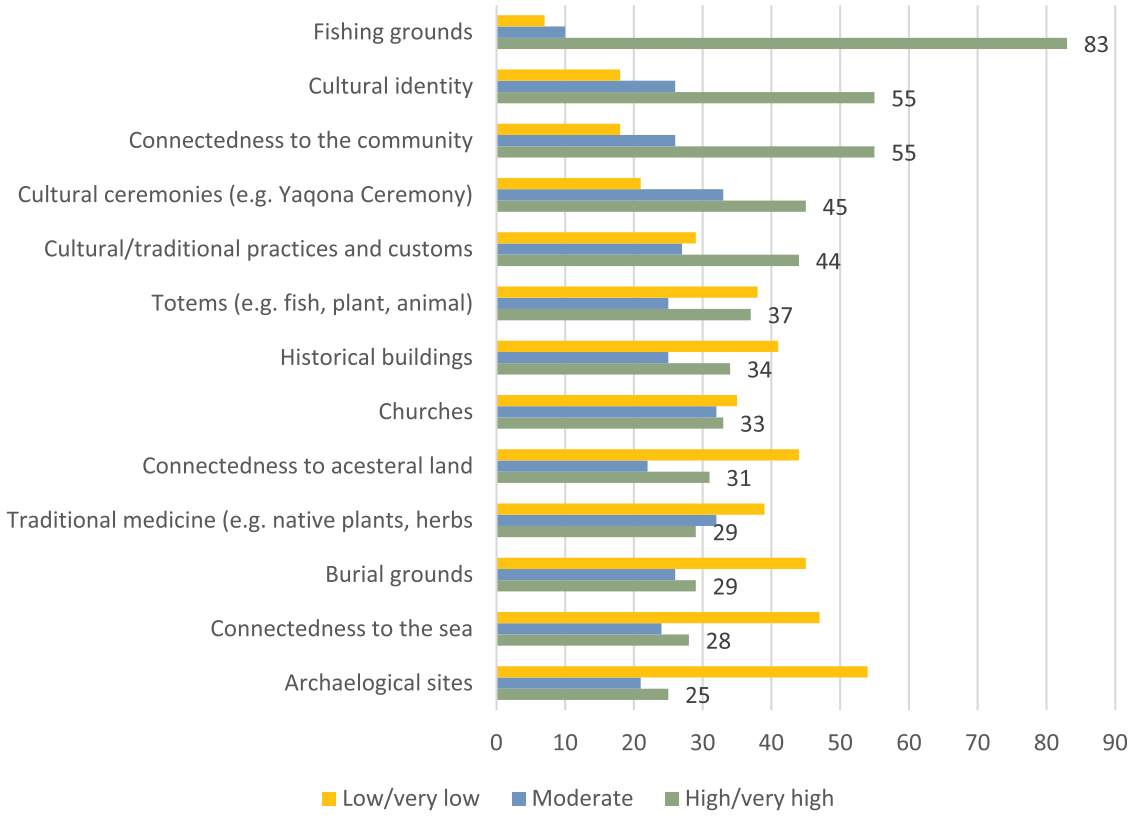

Figure 4. The severity of threats posed by climate change to different dimensions of cultural heritage

the largest share of the fund (22%), followed by agriculture (21%) and social sector (21%) (Figure 7). The cultural heritage sector received 19% of the funding and environmental damage receiving the least amount (17%). This distribution of the compensation fund highlights the importance local communities attach to the preservation of cultural heritage in their villages, alongside the infrastructure, agriculture, social services, and the environment.

There was no statistically significant difference between men and women in terms of the amount of funds they allocated to each of the sectors, including cultural heritage (see Figure 8). Both men and women were equally likely to allocate almost the same level of funds across all sectors. Strikingly, young people were equally likely to allocate a similar amount of funds to cultural heritage compared to older people in Fijian villages (see SOM Figure S2).

Our results revealed that local communities in Fiji highly value their cultural heritage. The allocation of nearly an equal amount of funding to cultural preservation compared to other sectors (regardless of one's gender or age) underscores the deep-rooted significance of cultural heritage to these communities.

** The red dots represent the mean allocation of compensation fund to different sectors and the tick black line represents the median. The black dots indicate outliers.

The results obtained from our structured interviews strongly support our findings from the compensation fund allocation game. An overwhelming majority (79%) of participants think the cultural losses and damages induced by climate change are equally important or more important than the losses and damages in other sectors such as agriculture, infrastructure, houses, and businesses (see Figure 9), regardless of one's age (see SOM Figure S3). Approximately 86% (18-35 years old), 89% (35-55 years old) and 72% (older than 56 years) of the participants think cultural losses are at least as important as the losses and damages to other sectors (see SOM Figure S3). This suggests that, for the majority of local communities in Fiji, the

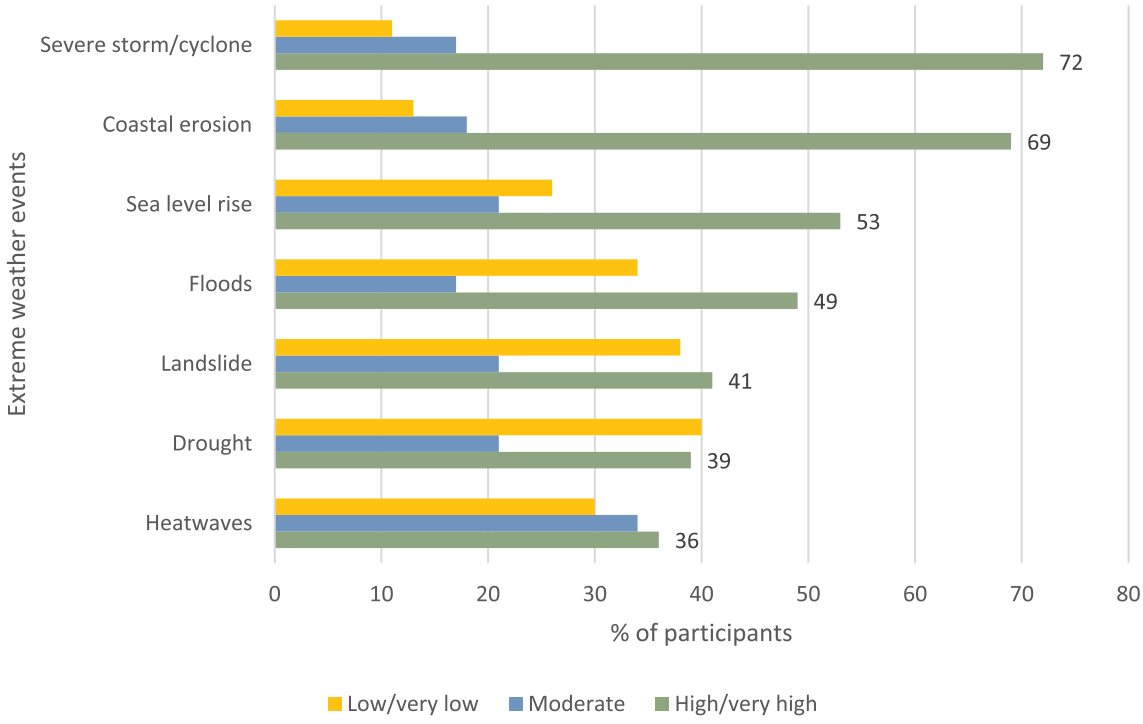

Figure 5. Severity of different climate change induced hazards

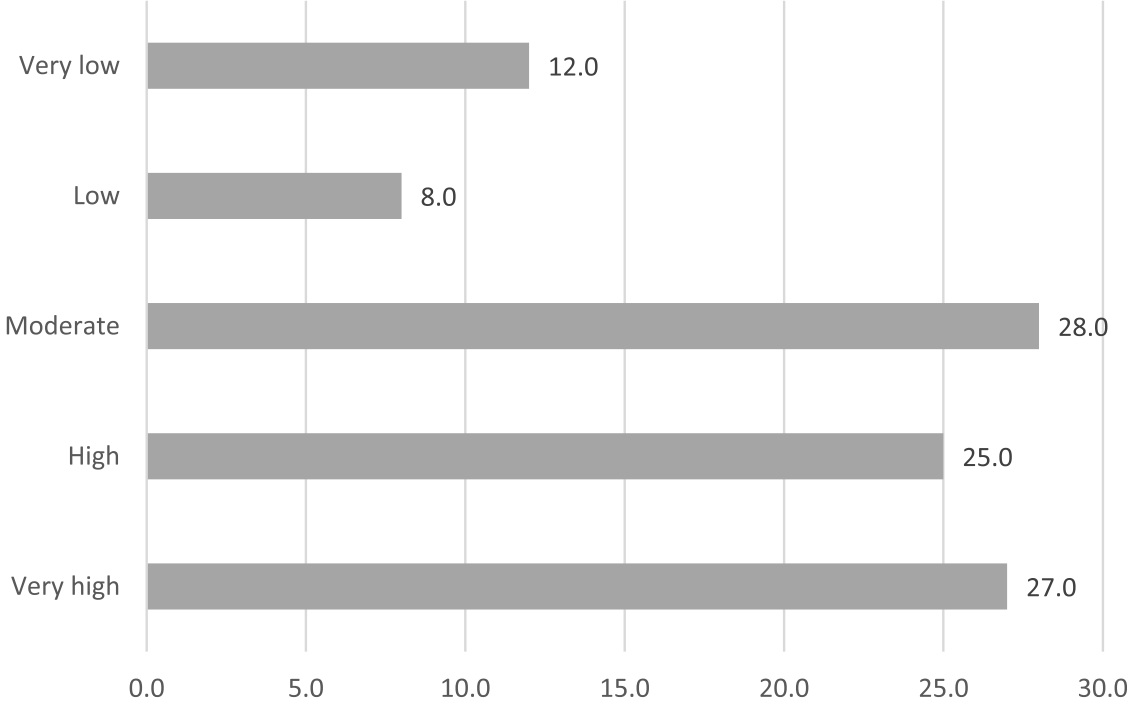

Figure 6. The likelihood of being displaced in the future.

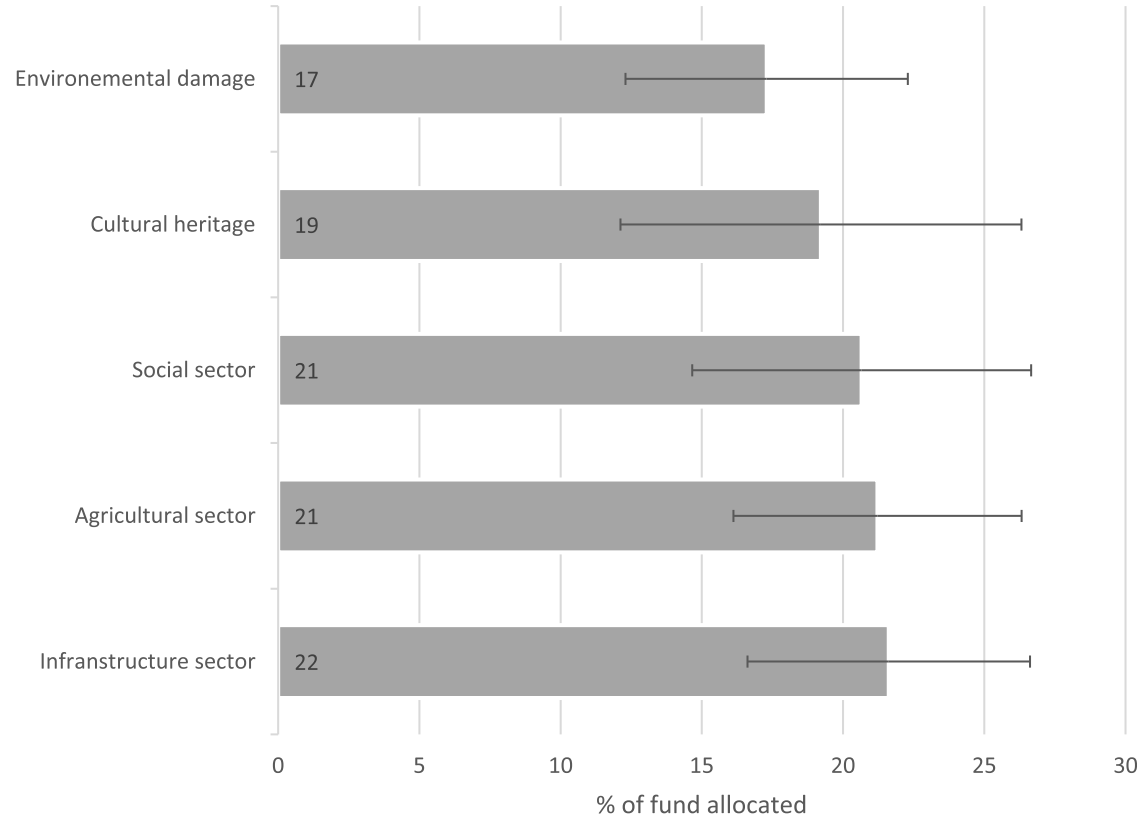

Figure 7. Compensation fund allocated (in %) to different sectors.

impact of climate change on cultural heritage is considered just as important as the impact on other key sectors, regardless of age. These findings challenge the conventional prioritization of economic and infrastructure losses in climate change impact assessments. Our results emphasise the centrality of cultural heritage for local communities in Fiji and the need for more balanced approaches for climate change adaptation, assessment and planning.

Allocation of funds to different dimensions of cultural heritage

Among the different components of cultural heritage, local communities attach higher importance to churches followed by historical buildings and burial grounds, archaeological sites, totems, and ancestral land (see Figure 10). Around 27% of the funds were allocated to churches, which was almost double the amount of funds allocated to other dimensions of cultural heritage. This is consistent with the findings from the structured interviews (see Figure 3).

There was no statistically significant difference between men and women regarding the amount of the fund allocated to different dimensions of cultural heritage, except for burial grounds. In the case of burial grounds, men allocated a significantly higher amount of funding to preserving burial grounds than women ($t = -3.27$, $p = 0.0015$) (see SOM Figure S4).

Almost one in four participants allocated no funding to archaeological sites, burial grounds, and totems (see SOM Figure S5), while only 2% of participants did not allocate any funding to churches. This provides further evidence of the high reverence attached to churches by participants and aligns with other studies that show the importance of religion and churches to Fijian communities (Shaver et al., 2021). Two participants allocated all the funds they allocated to cultural heritage in the first stage of the game to churches in the second stage of the game. No participant allocated all their funds to any other dimension of cultural heritage.

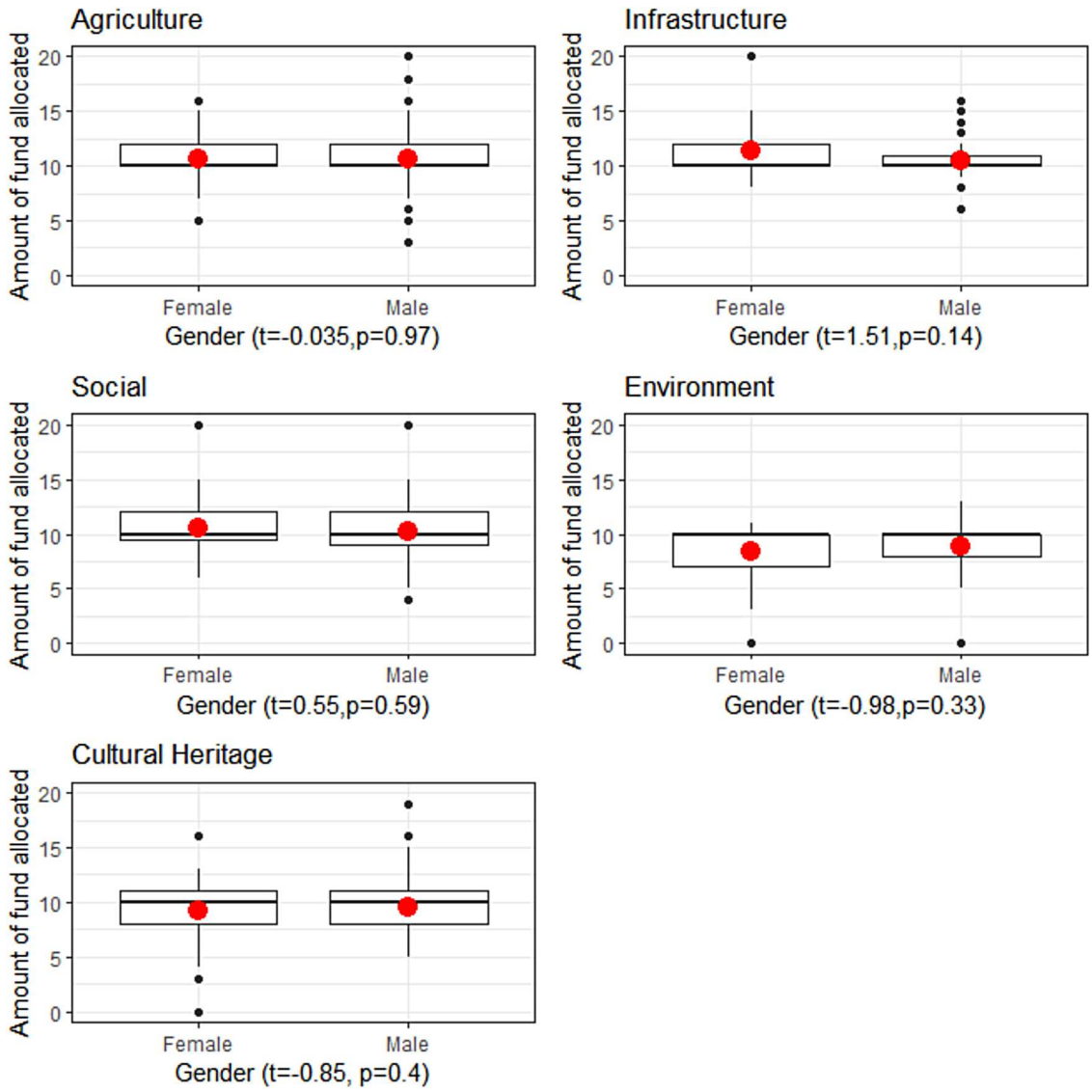

Figure 8. Allocation of compensation fund to different sectors by gender

Insights from women's focus group discussions

Focus groups with women were conducted in four villages to gauge the importance of culture heritage to women compared to other sectors, and to provide deeper insights into why this may be the case. The allocation game board was used to prompt discussion where the women in the focus group discussed between themselves how they would collectively allocate the funds.

The ensuing discussions provided some valuable insights into the importance of different dimensions of cultural heritage and how a village's physical and social context influences how the villagers see the different dimensions of cultural heritage. The importance of churches to the villagers was evident in all but one focus group. In most of the focus groups, the importance of churches was articulated as 'the church is our way of living today', and 'Christianity and the church brought light to Fiji; without Christianity we would be living in the past like the elders'. The focus group which did not put as much importance on churches as other

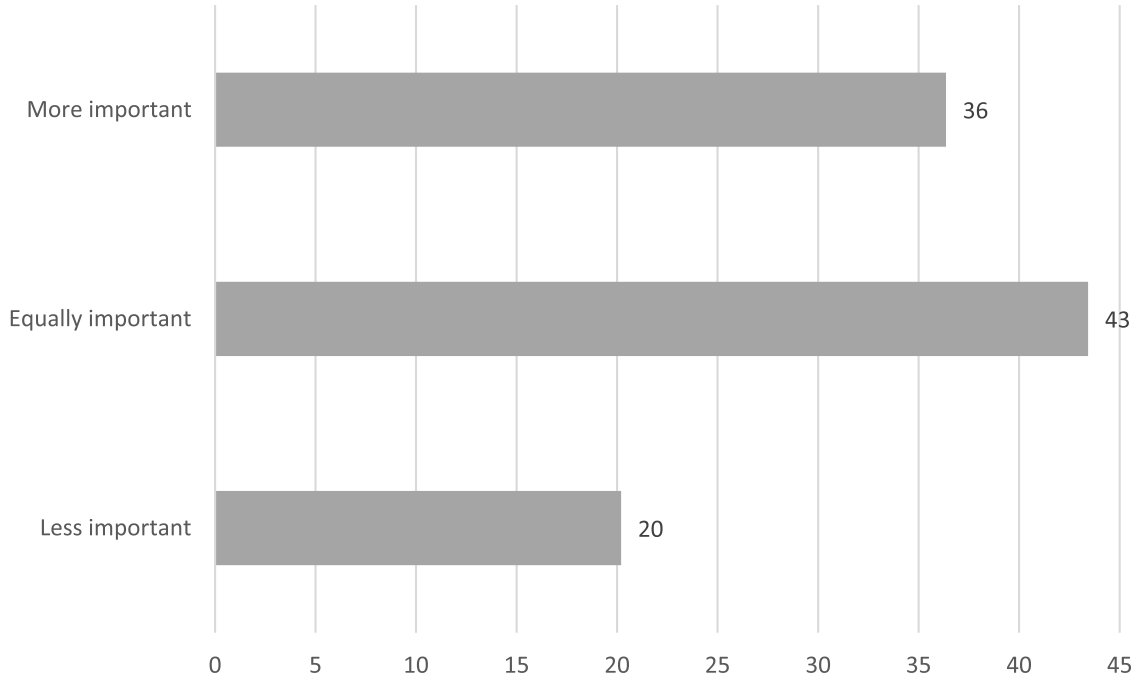

Figure 9. Relative importance of losses of cultural heritage compared to other sectors

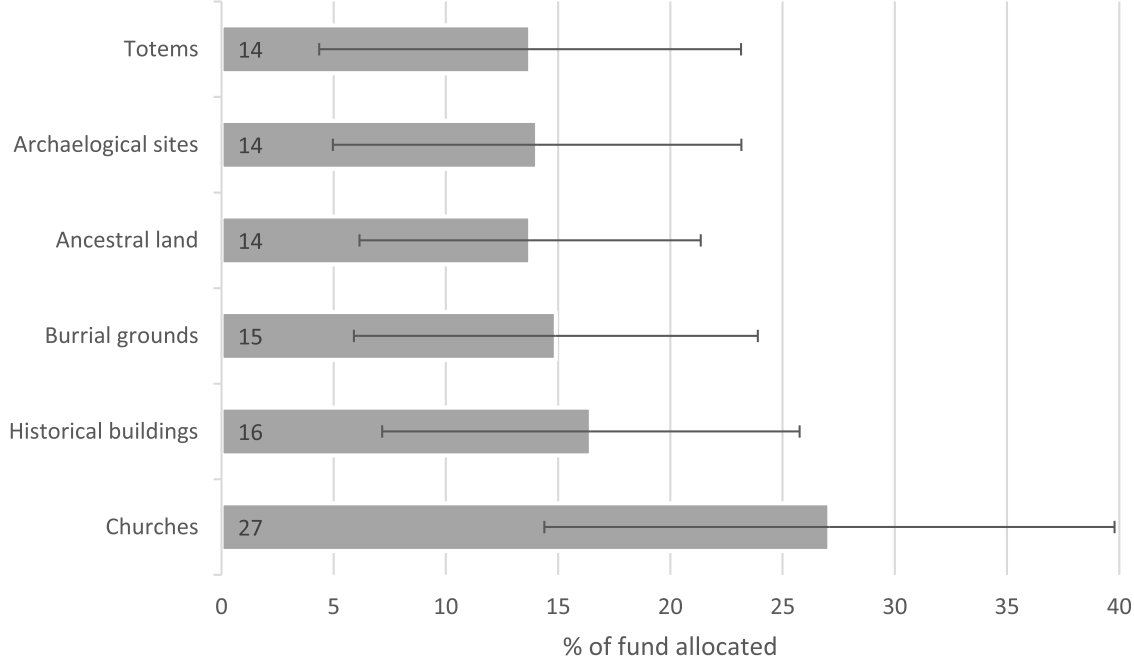

Figure 10. Compensation fund allocated (in %) to different components of cultural heritage

dimensions of cultural heritage noted the church was important, but it could always be rebuilt. This focus group put more importance on totems and burial grounds.

Burial grounds had some importance for all focus groups and appeared to be at risk of damage/loss in all focus group villages. There are important traditional ceremonies tied to the burial grounds where the villagers (including those who live elsewhere) come together to clean the grounds. One focus group acknowledged the challenges with relocating burial grounds (both spiritual/cultural and financial), while another group noted that if the graves washed away, the site would become a sacred site instead.

Another interesting finding from the focus groups was that often the women said the men were more familiar with the village's ancestral land as the women have often come to the village from other villages/provinces. The relative importance of historical sites was often related to whether the village had a site they considered to be important. For example, one village had a site where Methodist missionaries first landed in Fiji and was considered very important to the women in that focus group. These focus group discussions emphasise that the local context plays a crucial role on how cultural heritage is perceived and valued.

Discussion

The Pacific Island nation of Fiji is renowned for its cultural heritage, yet it is facing unprecedented challenges due to climate change. Rising sea level, extreme weather events, and coastal erosion are threatening Fiji's cultural heritage (FBC NEWs, 2023), which is deeply intertwined with the identity and legacy of its communities (McNamara et al., 2021; Yee et al., 2022), connecting individuals to both their ancestral past and their collective future. Climate change is not only endangering physical cultural sites in Fiji, but also jeopardizing intangible heritage (such as traditional ceremonies, fishing practices, and rituals).

Local communities' need for the preservation of cultural heritage

Our study, conducted across 10 coastal villages in Fiji, demonstrated that local communities place a high value on their cultural heritage. Participants were asked to allocate portions of a hypothetical climate change compensation fund among various sectors, including cultural preservation, infrastructure, agriculture, social services and the environment. The results showed that cultural preservation received allocations on par with other critical needs, indicating the intrinsic value Fijians place on maintaining their cultural heritage. This prioritization was shared across different demographics, with no significant variation in value allocation between genders or age groups. Such widespread appreciation underscores that cultural heritage is a universally recognized priority within Fijian communities, rooted in a shared understanding of its role in their lives and legacy.

These findings challenge the conventional climate change assessment methods and adaptation strategies, which often emphasize infrastructure and economic assets over cultural considerations (see also Crowley et al., 2022; Tschakert et al., 2019). They highlight the need for policy frameworks that align with community priorities, preferences and experiences, rather than simply focusing on only parameters that are relatively easy to quantify (Serdeczny et al., 2016); Tschakert et al., 2019). Failing to address cultural losses in climate change impact assessments risks marginalizing significant aspects of communities' identities and wellbeing (McNamara & Jackson, 2019), making climate adaptation efforts incomplete, potentially inadequate and incompatible with local contexts.

Climate change-related anxiety among Fijian communities

In addition to the tangible threats to their cultural heritage, Fijian communities are also grappling with a less visible, but equally important, impact of climate change: climate anxiety. Climate anxiety can be understood as the distress that people feel about the environmental and societal changes brought about by climate change (Gibson et al., 2020; Yale Sustainability, 2023). In our study, although less than 20% of participants reported having been displaced in the past due to extreme weather events, around 50% of the participants indicated that they believed there is a high or very high likelihood of future displacement due to these events. This

anticipation of forced relocation signals a deep sense of insecurity and anxiety, particularly as displacement threatens to sever communities from their cultural roots, places of worship, ancestral lands, and social networks.

This widespread climate-related anxiety among Fijian communities implies the psychological toll of climate change on communities who feel their very way of life is under threat (see also Ellis & Albrecht, 2017; Willox et al., 2012; Yale Sustainability, 2023). The fear of displacement and the potential loss of community connectedness add a psychological dimension to climate-induced losses, reinforcing the argument that climate impact assessments must account for both tangible and intangible impacts to fully capture the lived realities of affected communities (see also The Union of Concerned Scientists, 2013; Tschakert et al., 2019).

Conclusion

Our study underscores the necessity of a holistic approach to climate change impact assessments, adaptation planning, and compensation frameworks that integrates both cultural sensitivity and socioeconomic needs of the affected communities. It is essential for climate change adaptation and mitigation efforts in Fiji and other vulnerable regions to move beyond purely economic indicators and recognize the intrinsic value of cultural heritage. Climate change is not only an environmental or economic challenge but also a cultural one, posing threats to the core identities of communities.

By incorporating cultural dimensions into adaptation and compensation strategies, policymakers can better support communities in enhancing their wellbeing, maintaining their resilience and continuity in the face of climate change. Only through such comprehensive approaches can we hope to address the full scope of climate change impacts. Recognizing and valuing cultural heritage within climate policy is not merely a symbolic gesture but a crucial step towards protecting the identity and enduring legacy of communities who are deeply connected to their environments and cultural heritage.

While this study focuses on Fiji, its findings have universal relevance, as climate change poses a growing threat to cultural heritage and identity worldwide, affecting both developed and developing nations, and indigenous and non-indigenous peoples. Climate-induced disruptions are not confined to vulnerable island nations; they extend to long-standing traditions in regions historically perceived as 'climate-resilient'. For instance, the tradition of ice skating on natural canals in the Netherlands, once a hallmark of winter culture, is becoming increasingly rare due to rising temperatures (Brinkhof, 2023; Visser & Petersen, 2009). Similarly, the expectation of a 'white Christmas' in parts of Europe, Canada, and the United States is fading as snow patterns shift and winter seasons become warmer and shorter (CBC, 2020; Helmholtzklima, 2021; The Guardian, 2022; The Local dk, 2024; USATODAY, 2024). These examples underscore a broader, global challenge: climate change is not just an environmental or economic issue but a profound cultural and social one, eroding traditions, identities, and ways of life that have been cherished for generations.

Policy insights

Our findings highlight a critical gap in the current assessment approaches of climate change losses and damages, which traditionally and largely focus on quantifiable economic impacts and often ignore the non-economic losses that are integral to the identity and cohesion of local communities (see Brabec & Chilton, 2015; McNamara et al., 2021b; McNamara & Jackson, 2019; Steadman et al., 2022; Thomas et al., 2020; Tschakert et al., 2019). If global adaptation and compensation frameworks (including the UN loss and damage framework) are to be truly effective, they must adopt a more comprehensive lens that includes cultural heritage as a central component of loss and damage evaluations. Our results strongly advocate for a shift towards culturally inclusive climate policies, especially in regions like Fiji, where community identity is profoundly tied to the environment and cultural traditions, customs and practices (Tuwere, 2002; Yee et al., 2022).

The recognition of cultural heritage within climate policies would not only provide more accurate compensation but also empower communities by acknowledging the full extent of their losses. International and national climate adaptation strategies must integrate concrete metrics for assessing cultural loss, ensuring that cultural heritage is systematically considered in climate risk assessments and funding allocations. Incorporating cultural loss and damage within frameworks such as the UN loss and damage fund would help address

current policy blind spots, strengthening both adaptation and compensation mechanisms. In addition, the methodologies and results from our study could be used to inform international climate-finance negotiations, providing evidence to support policy interventions aimed at addressing both economic and non-economic losses caused by climate change.

Our findings provide yet another reason for the urgency of more ambitious global mitigation efforts. Beyond economic damages, climate change is eroding the very fabric of communities worldwide, from the erosion of traditions in the Pacific region to the loss of winter cultural practices in Europe and North America. Addressing the challenges posed by climate change is not just about protecting economies and environment – it is also about safeguarding the cultural identities, histories, and ways of life that define humanity. By integrating these insights, climate funding schemes could develop more nuanced and inclusive funding criteria that reflect the holistic impacts of climate change on vulnerable communities (see also The Union of Concerned Scientists, 2013).

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Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Tsegaye T. Gatiso, Suzie Greenhalgh, Isoa Korovulavula, Teddy Fong, Ratu Pio Radikedike. The first draft of the manuscript was written by Tsegaye T. Gatiso, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data availability statement

The datasets generated during and/or analysed during the current study are not publicly available due to data privacy, but anonymized data are available from the corresponding author on reasonable request.

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