Understanding and responding to climate-driven non-economic loss and damage in the Pacific Islands

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ABSTRACT

Communities throughout the Pacific Islands region have experienced, and will continue to experience, extensive non-economic loss and damage (NELD) from climate change. Assessments of loss and damage, however, often fall short on their coverage of these non-economic dimensions, which can distort our understanding of climate change impacts, discount the experiences of some and skew future decision-making. This paper explores how stakeholders in the Pacific Islands understand NELD and what they perceive to be the best ways of responding to it. An open-ended questionnaire was used to collect qualitative and quantitative data from representatives from governments, donors and development partners, civil society, intergovernmental organisations, and relevant others. This study found that NELD in the Pacific Islands is understood, perceived and experienced through the lens of intangible values, identity and cultural landscapes, and this is encapsulated by a typology with eight interconnected core dimensions. These eight dimensions include: health and wellbeing, ways of being, future ways of being, cultural sites and sacred places, Indigenous and local knowledge, life sustaining tools, biodiversity and ecosystem services, and connection to land and sea. NELD is complex, entangled and interconnected, thereby significantly undermining entire socio-ecological systems. Moving forward, responding to NELD in the Pacific Islands region will require a comprehensive approach that protects, conserves and restores complex socio-ecological systems, and provides opportunities to work through loss and damage by means of education and training, safeguarding knowledge systems, community activities, cultural connection and maintenance, and strong relationships with land and sea.

1. Introduction and study aim

Loss and damage research has had a long genealogy, and yet, studies (Magee et al., 2016) as well as governance efforts in practice (Broberg and Romera, 2020) have predominately focused on impacts that can be easily identified, quantified and monetised (see review by McNamara and Jackson, 2019). It is only in recent years that scholarship on non-economic loss and damage (NELD) – that is, the loss and damage that is irreducible to economic terms – in domains such as health, mobility, cultural heritage and biodiversity,
among others, has emerged (Serdeczny et al., 2018). The limited in-depth understandings of NELD and how it can be addressed, re-built and worked through is no surprise given that NELD is a relatively novel concept (Serdeczny et al., 2016) with “complex valuation and quantification challenges” (Benjamin et al., 2019: 497). It is, however, critical that this scholarship continues to grow.

In the context of climate change, ‘loss’ refers to the irreversible and negative impacts that occur despite mitigation and adaptation efforts (IPCC, 2014; Roberts and Huq, 2015; Warner and van der Geest, 2013). This is distinct to ‘damage’, which is often considered to be repairable, such as damages to homes or important sites, but ultimately the “thing [that] is damaged... it remains available” (Page and Heyward, 2017: 363). These losses and damages are already occurring and are only expected to continue, and indeed accelerate (IPCC, 2014, 2018), as the severity of climate change impacts continues to rise (IPCC, 2014) and effective adaptation, despite being prioritised, remains difficult to achieve with slow progress (McNamara et al., 2020; Nunn, 2013). We concur with Barnett et al. (2016: 976) that “loss can be planned for better or ignored for worse”. Yet if we are to better plan for loss and lessen its impact on people’s lives, then a comprehensive body of knowledge on NELD is required. Studies must explore extant and projected types of NELD, as well as the strategies that people are using or can use to manage and work through such. Given this context, the aim of this study is to explore how NELD is understood in the Pacific Islands region, while also identifying appropriate ways for planning for and responding to NELD now and in the future. Shedding light on the types of intangible loss and damage that occur ensures constructions of climate change (both slow-onset and acute disasters) are not distorted, future decision-making is not skewed, and people’s experiences are not discounted in or excluded from future planning efforts (Magee et al., 2016; McShane, 2017; Thomas and Benjamin, 2020).

This study is focused on the frontline region of the Pacific Islands. The Special Report by the Intergovernmental Panel on Climate Change (IPCC) on the impacts of 1.5°C global warming indicated that, for Pacific Small Island Developing States (SIDS), the observed impacts and projected risks include sea-level rise, increases in mean surface temperature, greater frequency of droughts and floods, increased threat to the existence of nearly all terrestrial animal and plant species, declining freshwater resources and a shortage of fish proteins (IPCC, 2018). A series of economic and, to a lesser extent, non-economic losses and damages have been reported across a range of domains because of the severity of changes in the Pacific Islands (IPCC, 2014, 2018; see review by McNamara et al., 2021). Growing concerns about climate-driven NELD in the region – which is expected to accelerate – has prompted several scholars to call for “a science of loss” (Barnett et al., 2016: 976) to help understand how losses arise, what people value, and how people can embrace and manage these losses and subsequent grief.

2. Literature review

A global systematic analysis of climate-related intangible harm (Tschakert et al., 2019) illustrated one thousand ways to experience loss from over 100 case studies from around the world. Losses ranged from those related to culture and traditions, physical and mental health, sense of place and social fabric as well as identity and dignity, among others. The study showcased the “numerous lived experiences with climate-related harm” from around the world to demonstrate how climate change is, ultimately, an issue of ethics and justice (Tschakert et al., 2019: 69).

At a regional scale, McNamara et al. (2021) conducted a systematic literature review to understand NELD in the Pacific Islands. They documented that: “[n]on-economic loss and damage induced by climate change in the Pacific Islands region has been reported as fears of cultural loss, deterioration of vital ecosystem services, and dislocation from ancestral lands, among others” (McNamara et al., 2021: 1). In particular, the review found that studies documenting losses in terms of human mobility and territory were the most prominent, followed by cultural heritage and Indigenous knowledge, then life and health, biodiversity and ecosystem services, and sense of place and social cohesion. Below, we draw on some of the work to date in a number of these areas.

Although migration and mobility are central to Pacific Islander histories (Connell, 2010), the emerging types of climate-related mobility in the region are regularly discussed in the context of loss (e.g. Campbell et al., 2007; Mortreux and Barnett, 2009; Thomas and Benjamin, 2020). Climate-related mobility in the region has also been considered as a response to loss and damage when places, particularly low-lying coastal areas, become uninhabitable (Stege, 2018), but when not undertaken carefully, further losses can arise. These losses are significant, as deep-rooted cultural and spiritual attachments to ‘place’ and land means that these places are often considered an extension of ‘self’ in the Pacific Islands (Gharbaoui and Blocher, 2018; Havea and Forum, 2007). Campbell (2019) suggests that loss of land in Pacific Island societies risks material, social and cultural security, and ultimately ‘ontological security’ as well. ‘Ontological security’ relates to a “feeling of continuity in one’s life that is based on a sense of belonging and confidence in one’s identity”, and it “is a form of loss and damage that is impossible to compensate” and difficult to re-establish in the short-term (Campbell, 2019: 4). Studies have shown how the severing of physical, socio-cultural, spiritual and ancestral connections to land through displacement can impact people’s identity, wellbeing, community/social networks and sense of place in the Pacific Islands (Barnett and O’Neill, 2012; Charan et al., 2018; Perumal, 2018).

Losses to biodiversity and ecosystem services from climate change have been also documented in the Pacific Islands. Research to date has centred on the significant pressures that extreme weather events (Goulding et al., 2016; Sattler, 2017; Thomas et al., 2019) and droughts (Pearce et al., 2018; van der Geest et al., 2020) place on ecosystems and endemic biodiversity. These studies outline the inherent cascading effects that ecosystem and biodiversity losses have on people and livelihoods, reminding us that losses to the ecological system cannot be separated from the interlinked social system. An emerging research area in the Pacific Islands, for example, is the loss of reefs and the concomitant growing fragility of the Blue Economy that critically supports subsistence, fishing and tourism livelihoods (Fisher, 2011). Climate change, therefore, more accurately impacts a socio-ecological system – that is, a system with interacting and synergetic societal and ecological components (Gallopin, 1991). Material and intangible resources and services provided by ecosystems play a foundational role in Pacific peoples livelihoods, health and nutrition (Asch et al., 2018; Hanich et al., 2018) as well as culture, way of life, community and kinship (Charan et al., 2018; Piggott-Mckellar et al., 2019).
Loss and damage to biodiversity and ecosystem services must also be viewed through the lens of cultural landscapes and intangible cultural values (Morrissey and Oliver-Smith, 2013). This is because there are complex and mutual interactions and ties between people and their environments that are critical for cultural heritage, Indigenous ontological worldviews, place-based knowledge (see Couzin, 2007; Dei, 1993; Mustonen, 2013; Williams and Hardison, 2014; Yazzie et al., 2019), and for gaining learning platforms, sustenance, pride and a sense of identity (Movono et al., 2017). Although many studies to date, from around the world, have covered the impacts of climate change on physical cultural heritage (e.g., buildings, monuments and artefacts), the impacts on intangible cultural heritage such as cultural practices, traditions and identity (often tied to local environments) are a growing research area (see Cunsolo and Ellis, 2018; Ghahramani et al., 2020; Traore and Owiyo, 2013). In the Pacific Islands specifically, Câmara-Leret et al. (2019) illustrated how climate change threatens New Guinea’s biocultural heritage by causing local extinctions of wild foods, medicines and ritual foods, which then diminishes the wellbeing and cultural integrity of Indigenous peoples. Studies from other countries have also documented extensive losses to Indigenous and traditional knowledge (e.g., related to weather forecasting, agriculture, medicine and culturally-significant species) from climate change (see Ford et al., 2013; Nankaya et al., 2020; Tripathi and Singh, 2013; Voorhees et al., 2014), but this potential loss is yet to be explored in more detail in the Pacific Islands context. Losses like these are concerning because Indigenous and local knowledge as well as the intangible aspects of cultural heritage (e.g., cultural support networks, group identity and reciprocity) are critically important for the adaptive capacity and social resilience of Pacific communities (Dacks et al., 2019; Kuruppu and Liverman, 2011; McNamara and Prasad, 2014; Perkins and Krause, 2018), and losses in these domains can have a significant emotional toll (see du Bray et al., 2018; Gibson et al., 2019; McNamara et al., 2020).

In terms of physical health, ecosystems and biodiversity provide critical material resources (Asch et al., 2018; Hanich et al., 2018). Climate-driven ecosystem degradation can threaten physical health in several ways, including through food insecurity and poor nutrition (McIver et al., 2016) as well as water insecurity (van der Geest et al., 2020). Displacement (and anticipated displacement) from valued territory and ecosystems can also take a toll on psychological health, with instances of post-traumatic stress, sadness, anger, anxiety, depression and grief already being documented in the Pacific Islands region (Benjamin et al., 2019; Sattler et al., 2018). Health and wellness for Pacific Islanders, as in other Indigenous cultures (Mackean, 2009; McKendrick et al., 2021), require a balance of different aspects such as the spirit, body, mind and environment (Ihara and Vakalahi, 2011; Manuela and Sibley, 2013, 2015), and climate change, through NELD, threatens this balance. Other health-related impacts from climate change include heat-related illnesses, vector-borne diseases, zoonoses, respiratory illnesses, health system deficiencies as well as psychosocial ill-health (McIver et al., 2016).

Despite being critical areas of climate-driven NELD, there is little documentation on the impacts on sense of place and social cohesion (as a result of mobility), especially in the Pacific Islands region (McNamara et al., 2021). These kinds of social and cultural losses can be framed in the context of loss of dignity through a sense of loss of self, identity and self-esteem (which is usually derived from participation in community life and the maintenance of culture with others) (Benjamin et al., 2019). The communal orientation of Pacific peoples are critical to wellbeing and identity (Manuela and Sibley, 2013, 2015) as well as resilience in the face of climate risks (Dacks et al., 2019; Kuruppu and Liverman, 2011; Latai-Niusulu et al., 2020; McNamara and Prasad, 2014).

To work through NELD that has already occurred and/or cannot be avoided, we draw critical insights into coping and healing from studies around the world documenting diverse struggles with loss in the past. Research shows that working through loss must occur at all levels (e.g. individually, collectively, publicly and privately) and, as learnt from First Nations people, holistically – that is, socially, emotionally, culturally, spiritually and physically (Cunsolo and Ellis, 2018; Mackean, 2009; McKendrick et al., 2021; Westoby et al., 2021). Community can provide the critical support systems in times of need (Platt et al., 2016; Sattler et al., 2018), especially in collectivist societies such as those in the Pacific (Dacks et al., 2019; Gharbaoui and Blocher, 2018). At the collective level, revival of participation in culture and cultural practices also provides avenues to work through loss and improves adaptive capacity (Hill, 2014; McKendrick et al., 2021), especially by nurturing sense of self and dignity (Benjamin et al., 2019) and reinvigorating critical features of intangible cultural heritage (e.g. group identity and reciprocity) (Perkins and Krause, 2018). Other pertinent strategies include turning to religion and collective religious ceremonies or rituals (Kuriansky, 2012; von Vacano and Schwarz, 2014), as well as avenues for sharing stories such as archiving, storytelling, theatre as well as art and other creative practices (Bickford et al., 2009; Rathwell and Armitage, 2016). It is critical that people identify ways to find meaning and a sense of togetherness (Kuriansky, 2012; von Vacano and Schwarz, 2014), maintain cultural identity (Hill, 2014; McKendrick et al., 2021; Rigby et al., 2011), find mediums to share stories (Rothman, 1992; Saul, 2014), re-envision their futures (Bickford et al., 2009) and, for some, find a sense of justice (Atkinson, 2002) to work through loss.

3. Method and overview of participants

This study set out to explore and summarise stakeholder perspectives on NELD in the Pacific Islands. The knowledge, perspectives, experiences and practices of stakeholders were gauged through an online questionnaire that was carried out between 18 September and 30 October 2020 (6 weeks). Of the 27 questions in total, the majority were open-ended (yielding substantial qualitative data), while the remaining few were closed-answer (yielding quantitative data). The questions were centred on knowledge gaps, especially around understandings of what NELD is in the Pacific Islands, experiences of NELD and strategies to respond to NELD.

The design of the questionnaire was supported by a review of existing literature. To help structure questions around NELD types (experienced and anticipated) in the Pacific Islands, we used 12 categories that were identified in existing literature: human life, human health, human mobility, territory, culture and heritage, Indigenous and local knowledge, biodiversity, ecosystem services, place attachment and sense of place, social cohesion, agency, and identity (Morrissey and Oliver-Smith, 2013; UNFCCC, 2013). Questions around existing and potential strategies used to work through NELD in the Pacific Islands were also informed and shaped by
a review of existing literature. This included literature from peace studies, disaster studies and First Peoples to gain an understanding of what strategies have been used to cope with and heal from past struggles (e.g. Kuriansky, 2012; McKendrick et al., 2021; Watkins and Shulman, 2008). From this, we identified 23 strategies that helped shape our questions around coping, healing and working through climate-driven NELD now and into the future. To ensure the research was appropriate and responded to the needs of the region, the questionnaire was piloted in August 2020 with two experts from regional organisations who work directly in loss and damage policy and programming. The two experts provided feedback relating to the questions, knowledge gaps, potential stakeholders and methods for data analysis. Based on the feedback, the questionnaire was revised.

A broad sampling strategy was used: we identified 360 potential stakeholders who are engaged in the climate change (adaptation, mitigation, loss and damage), development and disaster risk reduction sectors in the region. These stakeholders were identified through online searches and from our own networks in the region. Our list of potential participants represented five different stakeholder groups: 1) government (at all levels); 2) donors and development partners; 3) civil society (i.e. non-governmental organisations, faith-based organisations, community-based organisations, youth groups); 4) intergovernmental organisations including regional agencies; and 5) relevant others (i.e. universities, student associations, research-based organisations). Our methods and questions were designed to ascertain the views of these professional ‘expert’ groups, rather than laypeople’s views. This was largely a result of limitations to fieldwork due to COVID-19, which restricted our choice in method and ability to access laypeople. A future study on laypeople’s views, using different methods, is critical for building upon the findings of this study.

The questionnaire was created using Checkbox survey. It was emailed to the 360 stakeholders, along with background information on the research. Potential participants were assured of the confidentiality and anonymity of their responses and prior to undertaking the questionnaire were asked to consent to participating. This followed ethical protocols as part of the approval from the University of Queensland (approval number 2020000640). To help garner a high response rate, two reminder emails were sent to potential participants, encouraging their participation. Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS) (v27) and qualitative data were analysed through content analysis to help capture core themes and storylines.

There were forty-two responses (13% response rate) from stakeholders who have either experienced or worked directly with those impacted by NELD in the Pacific Islands. While this might appear to be a low n-value for a questionnaire, our sampling frame was very specific – only stakeholders working in this area, which is limited – and, as such, we believe we gained a rich source of responses with robust representation. There were slightly more male than female respondents and most were also in the middle-aged group with the mean age of participants being 42.6 (youngest was 19 and oldest was 63 years) (Fig. 1a and 1b). Most participants were from Fiji (as both country of origin and residence), followed by those from the Cook Islands (as both country of origin and residence) and Australia (as country of residence) (Fig. 1c and 1d). Despite there being representation of participants (as country of origin) from Fiji, Cook Islands, Papua New Guinea, Samoa, Vanuatu, Federated States of Micronesia (FSM), Solomon Islands, American Samoa and New Caledonia, several other Pacific Island countries were not represented by participants in this study, which is a key limitation.

![Fig. 1. Summary of the socio-demographics of participants.](image-url)
There was a good representation of participants from different institutions (Fig. 2a), scales (Fig. 2b) and types of work (Fig. 2c). While a large proportion of participants work for national governments in policy development (Fig. 2a and 2c), particularly in relation to adaptation and sustainable development (Fig. 2d), there was still adequate representation from non-governmental organisations and intergovernmental organisations. Some participants also indicated (as ‘Other’) that they work either on all areas described, or more specifically on infrastructure or protection measures, raising awareness or community level work (Fig. 2c). ‘Other’ was also frequently selected in terms of how participants’ work relates to climate change, and this was largely because participants could not select one specific area but considered their work to be related to “all aspects of climate change” (participant 16; Fig. 2d).

4. “The harm incurred by climate change”: Understanding NELD in the Pacific Islands

Participants’ understandings of NELD in the Pacific Islands typically revolved around the unavoidable “harm” caused by the impacts of climate change (participant 39), particularly the harm that could not be monetised. As expressed by one participant, “NELD relates to things we hold dear but cannot put a clear monetary value on” (participant 16). This is because NELD is “difficult to measure or quantify” and cannot be valued in “traditional economic metrics” or “recompensed in any way” (participants 41, 28, 22). There were strong views that NELD is the “…effects of climate change that are often overlooked or ignored by the outside world” (participant 36). Participants lamented that “using the term ‘non-economic’ undermines the significance and importance of these values to Pacific Islanders, Pacific Island countries and the Pacific region” (participant 40).

Based on participants’ responses around experienced and anticipated NELD, we developed a typology (see Fig. 3) of NELD in the region, which revolves around eight interconnected dimensions. This NELD typology, based on stakeholders’ views specific to the Pacific Islands region, is important to ensure that these perspectives, values and experiences are not “overlooked or ignored” (participant 36). The typology offers empirical and policy-relevant insights into the uniqueness, complexity and depth of NELD understandings and experiences in the region. It reveals new insights into how NELD is understood and experienced for those living and working in communities at the frontline of climate change impacts.

The first dimension of the typology is health and wellbeing: “Human health systems will erode whereby resilience building will slow dramatically, resulting in high wellbeing cost, particularly for vulnerable groups on atolls” (participant 27). Participants detailed their
experiences of NELD in terms of deterioration in physical and mental health. In terms of physical health, there was a growing concern around greater “disease incidence and prevalence” (participant 20) and the “inability to get medical care” due to destroyed infrastructure (participant 37). Several participants expressed concern about the health implications of greater food insecurity, as explained by one participant:

As temperatures rise and weather events become more extreme, people move away from their traditional foods and are less able to rely on subsistence living through farming and fishing. Already some areas of the Pacific are entirely dependent on imported foods to survive (participant 9).

Participants also emphasised how people’s emotional and mental health have been deeply affected by the impacts of climate change, particularly acute-onset climatic events. As one participant explained: “there is enormous stress already being felt by the higher frequency of El Niño and La Niña, inundation events, droughts etc. people are barely recovering from one when another hits” (participant 32). The deterioration of emotional wellbeing can be linked to the impacts of climate change on the environment and way of life: “the impact of climate change on the mental health of people who see their environment changing and their way of life being very affected” (participant 31). Additionally, participants highlighted the long time-lag between extreme weather events and mental health impacts: “trauma or the impact is not seen until a few or many years later” (participant 15).

Based on participant descriptions about health and wellbeing, it became clear that they are understood holistically in the Pacific Islands, whereby cultural and social health are considered important alongside emotional, mental and physical health: “If we are healthy then we must be physical, mental, emotional, social and cultural healthy or fit” (participant 19). Health and wellbeing, therefore, also encapsulates the impacts of climate change on social health, including social cohesion, tribal/extended family networks and family dynamics. Changes to these aspects are significant as family is a key component that “makes a person whole” (participant 15). Several participants explained these changes:

Social cohesion is disintegrating not only because of the physical/geographic fragmentation of the community but also because of increasing individuality as every family strives to fend for themselves economically rather than adopting the traditional communal approach. Climate change brings out the disparities in social and economic conditions in a community and those who are more vulnerable are made more vulnerable and stuck in misery while those who a better able to cope usually move forward. This increases the social divide, sometimes resulting in conflict and social instability (participant 29).

[There are] changing family dynamics as parents or older siblings are displaced from rural communities to urban centres or overseas for seasonal work due to collapse of rural agriculture after cyclones/flood/droughts… (participant 26).

Another poignant dimension of the NELD typology is ways of being. There are multiple different climate change impacts that accumulate and interact to result in irreversible losses to ways of being, including: “loss of non-tangible, value-based assets such as culture, heritage, language”, “language, cultural practices, community activities”, “loss of life, culture, history, language, Indigenous knowledge”, and the “loss [of] our cultural sites and medicines and place of practicing our custom songs and dances” (participants 10, 16, 14, 19). For numerous participants, NELD was about the disruptions and impacts on “way of life” (participants 14, 21, 29, 31, 32,

Fig. 3. Typology of NELD in the Pacific Islands region (© Copyright PresentationGO.com).
The interconnections between people and nature are significant here as ways of being, with one participant expressing:

"Climate change is also about human being with their relation to their surroundings and how they live with it. Our culture is also being impacted, loss of traditional values and customs. The failure to practice some traditional knowledge to our resources have been impacted by climate change. People are finding it hard to live to date compare to what it is like before (participant 6). This results in a deterioration of what makes Pacific Islanders uniquely ‘us’ – that is, the “way of life of Pacific Island communities” and “values and beliefs” (participants 29, 42). The aforementioned impacts to social cohesion are also relevant here, as shifts from traditionally communal to individualistic approaches to community also represent shifts in ways of being as a result of climate change. Participants were equally concerned about how loss and damage to ways of being would transcend across generations. There were concerns that future generations would be unable to maintain future ways of being and the diverse expressions of unique Pacifica identities. As one participant provocatively questioned: “They [young people] must wonder, ‘will I be able to live in my home when I am older, and if not, how can I prepare to live elsewhere? Will I be welcome?’” (participant 32). One participant drew from a study that they conducted for UNICEF to illustrate how damaged reef systems gave rise to generational changes that affect children’s and adults’ ways of life:"

One government official in Tuvalu lamented the loss of games that he played as a child, where children would sneak out at night as a group and find shellfish on the reef to eat as a common feast. Now, with changing reef ecology, those shellfish are no longer found near the village and the children stay at home: ‘Something that’s good for the kids has been lost. This thing was part of our lives because it taught us about sharing, about being together’ (participant 26).

NELD therefore presents itself in many and diverse ways across generations. As one participant surmised: “loss and damage can mean impact to people’s lives and the sustainability of future generations” (participant 9).

‘People’s way of life is also intertwined with cultural sites and sacred places. Losses to cultural sites and sacred places were described by participants as the loss to “traditional and sacred grounds such as burial grounds, old village sites, cultural sites” (participant 29). Inundation, coastal erosion and relocation were perceived as the key driving forces of these losses: “destruction of sacred places, or places with high spiritual values, in coastal areas becoming eroded or inundated. Cemeteries that are washed away in Kiribati or RMI (Republic of the Marshall Islands), “damage to graveyards from rising sea level, flooding or coastal erosion” and “loss of burial grounds and access to ancestral lands of communities relocated” (participants 31, 26, 14). One participant also raised a concern about how people could lose access to these sites and places: “loss of usage rights for non-landowners, due to changes in coastal fisheries or forest environments” (participant 26). Another participant also highlighted how it is very difficult to quantify NELD related to sacred sites and places, cultural heritage and traditional ways of life, highlighting this through hypothetical examples:

"For example, if there is a cyclone that cause severe damage to our cultural site or known as “Tambu” site then how do we categorise and quantify those damage as there is no proper or standard value for it but for us it is a very important place and it holds our cultural respect and beliefs. Another example is our traditional way of living (fishing) has been affected due to climate change, then there is no way to retrieve it again. This will cause impact to our livelihood and we cannot quantify this damage (participant 17)."

Indigenous and local knowledge is another key dimension of the NELD typology. Participants noted various significant concerns around loss and damage to Indigenous and local knowledge because of climate change impacts, including:

The changing climate conditions will affect the reliability of some of the local knowledge which can lead to their disappearance as locals will find them to be useless. For example, the use of flora and fauna as climate and weather indicators (participant 36).

ILK [Indigenous local knowledge] is extremely important, in particular for isolated Pacific communities in rural areas or on remote islands. Some aspects of this knowledge, in particular local knowledge will be affected by changes in the environments linked to increasing temperatures and change in rainfall. For example, traditional agriculture seasonal calendars are changing and that affects food security for these communities (participant 31).

Climate change would lead to the death of people and most likely the older generation in which they would not be able to pass knowledge and culture from one generation to another (participant 13).

Indigenous knowledge is at high risk for loss and damage because climate change is violence/aggression on the environment which are the spiritual temple for the Fa’aSamoa (participant 1).

The material manifestations of Indigenous and local knowledge are the life sustaining tools such as techniques for fishing or planting, cultural and social norms, and using traditional plants. Examples of losses to life sustaining tools, as the next dimension of the typology, include the “disparition of emblematic species”, “loss of… sacred fishing grounds, traditional trees and plants, traditional habitation”, and “fishing grounds impacted by sea warming/loss of fishing species and grounds… [and] the loss of a fishing technique and traditional knowledge accumulated by living is gone with the fishery and species” (participants 4, 29, 8). With deep sorrow, one participant expressed how: “Entire ways of life collapse when the material manifestations of deeply grounded Indigenous knowledge, science, and philosophy are deleted by the effects of climate change” (participant 1). And therefore, if climate change continues to cause loss to life sustaining tools – as the material manifestation of Indigenous and local knowledge – there will be devastating and cascading impacts on life itself.

Loss and damage to biodiversity and ecosystem services, which support people’s livelihoods and wellbeing in these island nations, were also of notable concern for participants:
Climate change will slowly modify ecosystems and lots of species will no longer be able to live in the same place, populations will move, disappear or change and ecosystem composition will be different (participant 4).

Biodiversity is at risk because economic development and climate change are simultaneously killing species en masse (participant 1).

...greatly worried about biodiversity tipping points, for example, climate change impact on fish stocks will have both economic and cultural effects (participant 26).

The particularly high concern for losses to biodiversity and ecosystem services stemmed from their links with, and cascading effects on, other aspects of livelihoods, culture, knowledge and wellbeing: “Pacific communities rely heavily on terrestrial and marine ecosystems to provide services, including food security, water security, traditional medicine, building material, material for handicraft, coastal protection, etc” (participant 31). Poignant statements on the interconnectedness between loss types were articulated by participants:

Climate change is impacting biodiversity and ecosystem services (drinking water, sources of food etc) everywhere (near the coast and in highlands all the same) and impacts a lot more people in the Pacific than the others [loss types]. These contribute to loss of ILK [Indigenous local knowledge] and reducing quality of human life (participant 23).

Additionally, the interconnections between biodiversity, sustenance and cultural practices were also detailed in responses:

The yam harvesting period was one of the cultural events that happened each year in the Pacific for the last thousands of years. However, these practices of harvest have been changing and lost because of the shifting of the period of the development of the yams because of the change occurs by climate change (participant 22).

The importance of land and sea to Pacific Islander ways of being, sovereignty and identity were made clear by participants as another prominent dimension of the NELD typology given concerns about migration, displacement or relocation. “Climate change is a growing driving factor of migration and displacement across the region” (participant 9) as village sites, fishing grounds and resources dwindle. One participant expressed: “In the Indigenous mindset, sovereignty, land, and water are all connected and are one” (participant 1). The interconnections of land and sea with other social and cultural losses were made clear:

Pacific examples of NELD include: 1. Losing your land ownership and sacred places when relocating; 2. Having to give up your cultural identity if you have to relocate to another country (participant 23).

If the next decade the climate migration in the Pacific will become more significant if we don’t reduce the GHG [greenhouse gas] emissions. That will cause loss and damage to the livelihood and the cultural and heritage loss. This impact is related to the sea-level rise, causing losses of the low-lying islands (participant 22).

The impacts of displacement on family ties were also prominent because they “decimate tribal/extended family networks that were custodian to traditional titles, family lands etc” (participant 8). The intergenerational impacts of displacement were also noted:

Young people are especially sensitive to this when they feel like they are the “outsiders”. As mentioned, even if they move within their own country the loss of sense of place is still significant especially in cultures where tie to land is so important (participant 32).

The interdependencies between these different dimensions of loss were emphasised by participants. Many participants had difficulty separating specific loss types, especially in terms which loss was most valuable or important to them: “All of them are important to our living”; “I value all of them. All the types focus on the person in relation to her/his environment, their identity, resources and wellbeing” (participants 17, 39). Instead, participants emphasised how NELD types cannot be separated: “We cannot value one over the other and be more concerned about one at the expense of the other – all are linked to each other” (participant 15). The inherent links between loss types act as the foundation of Pacific Islander culture, spirituality and identity:

My culture, identity and traditions are tied to my land and my ocean, this is inseparable. You can’t ask a Pacific Islander to choose what is important and what is not when it comes to the environment, given our cultural and spiritual ties to it (participant 35).

It was therefore clear how interlinked and interconnected all these dimensions of NELD are, and how important it is to consider them together in one typology:

Land, Family (Home), Spirituality, and Culture (Identity) are what makes a person whole. Remove any one of these elements and the equilibrium will be tipped or swayed to one side more than another causing an imbalance in how things are played out in society (participant 15).

While the typology features eight interconnected dimensions of NELD, it also became clear that identity is the central element and binding force of the typology. As expressed poignantly by one participant: “… loss of traditional ways of living, cultural heritage and biodiversity. In the Pacific Islands context, this could simply mean the loss of one’s identity” (participant 18). These important interlinked socio-cultural, spiritual and environmental factors, bound up in Pacific Islander identity, make NELD in the Pacific Islands difficult to measure, market, trade or quantify using traditional economic metrics.
Table 1
Appropriateness and usefulness of strategies for responding to and working through NELD in the Pacific Islands region (where 1 = not appropriate or useful and 5 = extremely appropriate and useful). Overall mean is first displayed (column 1), which is then also split by gender (column 2), age (column 3), institution (column 3), scale of work (column 4) and type of work (column 5).

<table>
<thead>
<tr>
<th>Ways for people to work through loss</th>
<th>Mean</th>
<th>Gender</th>
<th>Age</th>
<th>Institution</th>
<th>Scale of work</th>
<th>Type of work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>18-39 (n = 15)</td>
<td>Over 40 (n = 22)</td>
<td>Pacific Island Government (n = 13)</td>
<td>Other institutions (n = 27)</td>
</tr>
<tr>
<td>Education and training</td>
<td>4.6</td>
<td>4.5</td>
<td>4.65</td>
<td>4.79</td>
<td>4.45</td>
<td>4.79</td>
</tr>
<tr>
<td>Documenting and recording traditional and local knowledge</td>
<td>4.33</td>
<td>4.38</td>
<td>4.35</td>
<td>4.5</td>
<td>4.27</td>
<td>4.21</td>
</tr>
<tr>
<td>Engaging with the natural environment</td>
<td>4.15</td>
<td>4.45</td>
<td>4.04</td>
<td>4.29</td>
<td>4.09</td>
<td>4.07</td>
</tr>
<tr>
<td>Community activities</td>
<td>4.1</td>
<td>4.25</td>
<td>4.09</td>
<td>4.07</td>
<td>4.14</td>
<td>4</td>
</tr>
<tr>
<td>Direct action and activism</td>
<td>4.1</td>
<td>4.19</td>
<td>4</td>
<td>4.14</td>
<td>4.05</td>
<td>4</td>
</tr>
<tr>
<td>Cultural practices and activities</td>
<td>4.1</td>
<td>4.19</td>
<td>4.13</td>
<td>4.43</td>
<td>4</td>
<td>3.86</td>
</tr>
<tr>
<td>Strong relationship with the land and sea</td>
<td>4.03</td>
<td>3.94</td>
<td>4.09</td>
<td>4</td>
<td>3.95</td>
<td>4</td>
</tr>
<tr>
<td>Documentaries and movies</td>
<td>3.95</td>
<td>4.19</td>
<td>3.83</td>
<td>4</td>
<td>3.91</td>
<td>3.71</td>
</tr>
<tr>
<td>Social bonds and cohesion</td>
<td>3.92</td>
<td>3.93</td>
<td>3.96</td>
<td>4.14</td>
<td>3.77</td>
<td>3.79</td>
</tr>
<tr>
<td>Faith and religion</td>
<td>3.85</td>
<td>3.88</td>
<td>3.91</td>
<td>4.07</td>
<td>3.76</td>
<td>3.85</td>
</tr>
<tr>
<td>Storytelling and talking circles</td>
<td>3.77</td>
<td>3.87</td>
<td>3.74</td>
<td>3.69</td>
<td>3.82</td>
<td>3.93</td>
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<tr>
<td>Advocacy on behalf of vulnerable groups</td>
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<td>3.87</td>
<td>3.52</td>
<td>3.93</td>
<td>3.45</td>
<td>3.14</td>
</tr>
<tr>
<td>Community theatre</td>
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<td>3.69</td>
<td>3.52</td>
<td>3.5</td>
<td>3.59</td>
<td>3.36</td>
</tr>
<tr>
<td>Photography</td>
<td>3.48</td>
<td>3.56</td>
<td>3.52</td>
<td>3.79</td>
<td>3.32</td>
<td>2.93</td>
</tr>
<tr>
<td>Relocating or moving away from the loss</td>
<td>3.45</td>
<td>3.63</td>
<td>3.43</td>
<td>3.5</td>
<td>3.41</td>
<td>3.29</td>
</tr>
<tr>
<td>Music, folk songs and dance</td>
<td>3.38</td>
<td>3.47</td>
<td>3.39</td>
<td>3.54</td>
<td>3.27</td>
<td>3.07</td>
</tr>
<tr>
<td>Artwork</td>
<td>3.26</td>
<td>3.19</td>
<td>3.26</td>
<td>3.62</td>
<td>3.05</td>
<td>3.62</td>
</tr>
<tr>
<td>Books</td>
<td>3.2</td>
<td>3.31</td>
<td>3.17</td>
<td>3.07</td>
<td>3.23</td>
<td>3</td>
</tr>
<tr>
<td>Psychology and therapy</td>
<td>3.15</td>
<td>3.19</td>
<td>3.22</td>
<td>3.36</td>
<td>3.05</td>
<td>3.07</td>
</tr>
<tr>
<td>Memorials</td>
<td>3.15</td>
<td>3.44</td>
<td>3.04</td>
<td>3.5</td>
<td>3</td>
<td>3.23</td>
</tr>
<tr>
<td>Ceremonies and rituals</td>
<td>3.05</td>
<td>3.19</td>
<td>3.04</td>
<td>2.93</td>
<td>3.09</td>
<td>2.79</td>
</tr>
<tr>
<td>Poetry</td>
<td>2.55</td>
<td>2.44</td>
<td>2.7</td>
<td>3</td>
<td>2.32</td>
<td>3.07</td>
</tr>
<tr>
<td>Body-based therapies</td>
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<td></td>
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</tr>
</tbody>
</table>
5. Responding to, and working through, NELD

For one participant, “it is emotional and crippling to think through some of the NELD issues” (participant 16). It is certainly far from easy to think about, plan for and work through these losses. For participants, education and training were considered the most appropriate and useful way for addressing and working through NELD in the region (Table 1, column 1). As a participant emphasised: “[there is] not much awareness on NELD in the Pacific region” (participant 20). As such, understanding NELD more, creating awareness about it, and educating people so that they can be equipped with the knowledge and skills to respond and reduce the risks of NELD was critical. Documenting and recording traditional and local knowledge was the second most appropriate and useful way for addressing and working through loss in the region. This makes sense as participants identified the loss of Indigenous and local knowledge as a concerning impact that is currently occurring in the region. There is a critical need to safeguard these knowledge systems that are deeply embedded in the unique cosmologies and worldviews of Pacific Islanders. Other noteworthy ways of dealing with loss included engaging with the natural environment, community activities, direct action and activism, cultural practices and activities, and strong relationships with the land and sea. Lower ranked ways of dealing with loss focused on more therapeutic and creative avenues such as psychology and body-based therapies, as well as poetry, ceremonies, memorials and books.

There were several differences in the appropriateness and usefulness of strategies when split by gender, age, institution, scale of work and type of work (Table 1, columns 2–5). For example, female respondents rated community activities, social bonds and cohesion, and ceremonies and rituals higher than male respondents. The high value placed on these strategies by women may be reflective of women’s central role as the fabric of familial and social cohesion, and responsibilities. Younger respondents (under 40 years old) rated education and training, engagement with the natural environment, and ensuring a strong relationship with land and sea as much higher than older participants. Respondents working for Pacific Island governments favoured education and training more than those working at other institutions. Participants working at other institutions were more in favour than their government counterparts for relationships with land and sea, social bonds and community theatre. Respondents working at other scales other than national level (i.e. regional, district, local) were more in favour of documenting traditional knowledge, relationship with land and sea, documentaries, social bonds and faith. In terms of type of work, those not working in policy development were more in favour, predictably, of direct action and activism, and advocacy on behalf of vulnerable groups.

When asked about ‘good practice examples’ of minimising or preventing NELD in the region, many examples provided by participants related to addressing biodiversity and ecosystem losses through conservation and restoration. More specifically, examples included the planting of mangroves, locally managed marine area networks, clean up campaigns and re-afforestation projects (participants 6, 23). Other prominent examples of good practice in the region related to engaging in activities that support cultural continuity. Specific examples included “cultural performances during annual celebrations, herbal medicines for regular detoxing, fishing competitions using traditional instruments and tools” and the “Wan Smolbag Theatre in Vanuatu” (participants 3, 16). Other examples more specifically related to the passing down of cultural practices and knowledge to children and youth. For one participant, this included: “instilling traditions and cultures in the daily livelihoods of young Pacific children, youths, and people. Practice and celebration of cultures and traditions. Documentation of these practices and way of life” (participant 42). Other participants highlighted “the development of a curriculum on climate change including ILK (Indigenous local knowledge) in Fiji” (participant 31) and the reinstating of practices such as ‘tutunap’, which is when “an elderly relative would tell stories... to instil in children social mores and culture norms” (participant 32).

Good practice policy approaches for dealing with NELD were also shared. These involved establishing “legal status in national policy for nature and natural components” and developing “guidelines following the collective experiences of relocating a number of communities” (participants 4, 40). Additionally, participants encouraged the need for “frequent tabletop exercises with the relevant agencies that has roles and responsibility in disaster management with the states and local governments to improve the gaps and lessons learned” (participant 38).

6. Discussion

Stakeholder perspectives on, and experiences of, NELD in the Pacific Islands region are diverse, reflecting the different social, cultural, political and economic dimensions of climate change. The documentation of different perspectives on NELD, grounded in local experiences and expertise, can be used by practitioners and policymakers to inform efforts to avert, minimise and address NELD from climate change. Regional level analyses of NELD can also support national and regional co-operation and partnerships focused on climate risk assessment, reduction and transfer, and for when considering new and emerging opportunities to address NELD. We acknowledge, however, that in a region that is as diverse as the Pacific Islands, the typology is somewhat reductionist and may not be representative of the perspectives or experiences of all communities or stakeholders, but instead act as a reference point that can be built upon and continually evolve over time.

The typology demonstrates how stakeholders understand, perceive and experience NELD in the Pacific Islands region through the lens of identity, intangible values and cultural landscapes that are immeasurable. NELD in the Pacific Islands region is not understood or experienced as occurring to people and ecosystems separately, but as occurring to a complex and interconnected socio-ecological system (Gallopín, 1991; Movono et al., 2017). As for Indigenous people across the world (see e.g. Couzin, 2007; Mustonen, 2013; Williams and Hardison, 2014; Yazzie et al., 2019), the socio-ecological system for people in the Pacific Islands encapsulates the complex and dynamic interactions between people and their local environments which give rise to Indigenous ontological worldviews, cultural heritage but also wellbeing, learning, self-esteem, substance, pride and a sense of identity (Cámara-Leret et al., 2019; Movono et al., 2017).
Our findings demonstrate how, through NELD, climate change is a powerful force disrupting the pre-existing and embedded social, cultural and ecological structures of an interconnected system that form the foundation of identity, way of life and wellbeing. Losses and damages from climate change are disrupting people-ecology interactions (e.g. through deteriorating biodiversity and ecosystems or destruction of life sustaining tools), which is then resulting in weakened knowledge transference and changed ways of being now and into the future. Disruptions to the socio-ecological system and losses to cultural elements (e.g. knowledge, traditional customs, cultural practices and ways of life) can mean that people are less able to gain the learning, self-esteem and sense of identity that they once could from their natural resources and ‘place’ (Ford et al., 2020; Movono et al., 2017). This diminishes Indigenous wellbeing, cultural integrity and ‘ontological security’ (Campbell, 2019). The importance of balance in the system was also made clear by participants, who emphasised how disruption from climate change in one part of the socio-ecological system can create cascading disruptions that unbind the broader and highly embedded Indigenous socio-cultural system. It is hardly a surprise, therefore, that biodiversity and ecosystem conservation and restoration, as well as cultural continuity and the safeguarding of local knowledge were considered good practice and critical approaches to responding to NELD in the Pacific (see discussion below), as these attempts to help restore and maintain people-ecology interactions, thereby protecting the system as a whole.

Central to this socio-ecological system and people-ecology interactions is ‘place’ – that is, the spiritual environments such as land and sea (Ford et al., 2020). When it comes to climate change in the Pacific Islands, a major disruption to the socio-ecological system is the detachment from ‘place’ due to displacement and relocation. Participants reflected on how Pacific Islanders have deep-rooted cultural and spiritual attachments to their land, with homelands and customary lands largely considered an extension of the ‘self’ (Gharbaoui and Blocher, 2018; Havea and Forum, 2007). In the Pacific Islands, loss of land is associated with implications for culture, way of life, spiritual and traditional wellbeing, family connections, and ultimately ‘ontological security’, identity and belonging (see also Campbell, 2019; Charan et al., 2018; Neef et al., 2018; Perumal, 2018; Piggott-Mckellar et al., 2019). It is, therefore, hardly a surprise that relocation and moving away were ranked quite low as a response to NELD by participants. Relocation may attend to ‘risk across space’ (i.e. risks to physical landscape from climate change) but exacerbates ‘risk across place’ (i.e. risks to identity, history and belonging) which is the lens through which our participants understand NELD (Agrawal and Perrin, 2008; Neef et al., 2018).

In many countries in the Pacific Islands region, there is also a communal identity that NELD, especially through detachment to land and sea, and changed ways of being, threatens to disrupt (Charan et al., 2018). Family, which generally refers to wider extended family as opposed to immediate families, is incredibly important as part of the collectivist orientation of Pacific peoples (Manuela and Sibley, 2013, 2015). Losses to social cohesion and family risks disruption to sense of self, identity and self-esteem as these factors are often derived from participation in community life and the maintenance of culture with others (Benjamin et al., 2019). There is also the risk of losing cultural support networks, group identity and reciprocity which are aspects of cultural heritage that are critical for adaptive capacity and resilience (Dacks et al., 2019; Kuruppu and Liverman, 2011; McNamara and Prasad, 2014; Perkins and Krause, 2018; du Bray et al., 2018) as well as wellbeing for many Pacific Islanders (Ihara and Vakalahi, 2011; Manuela and Sibley, 2013, 2015).

Pacific Islanders are not passive actors in the face of climate change and NELD but are active and conscious actors that adapt and find ways to cope with stresses and losses. Approaches that use education and training to respond to NELD were considered most useful and appropriate, highlighting participants’ strong preference for knowledge and capacity building in the region. Equally important for responding to NELD was the recording and safeguarding of Indigenous and local knowledge, as well as conserving and restoring important environmental sites and maintaining cultural practices. Cultural reconnection and reinvigoration in these ways has previously been emphasised for recovery, and this is largely because features of intangible cultural heritage (e.g. cultural support networks, group identity and reciprocity) are critical for social resilience and mitigating climate change impacts (Perkins and Krause, 2018). Reviving traditional foods, music and dance while sharing history, language and culture will also be particularly critical for those who are displaced, as often there is not just nostalgia for ‘home’ in a geographic sense, but also for “memories of home” and “comfort of the way things used to be” (Hill, 2014: 152). Partaking in and maintaining one’s culture with others can also foster a sense of dignity, sense of self (Benjamin et al., 2019) as well as reconstruct or improve the sense of community (Hill, 2014). The latter is then also critical for post-disaster recovery and rehabilitation in its own right (e.g. by providing support systems in times of need) (Dacks et al., 2019; Gharbaoui and Blocher, 2018; Sattler et al., 2018). Cultural reconnection can also improve overall health and wellbeing (another significantly valued and impacted NELD type), as “cultural health” (participant 19) is critical to people living in a healthy, balanced manner. First Peoples across the globe, including in the Pacific Islands region, show that optimum health and wellbeing necessitates a holistic approach, considering the social, emotional, spiritual, physical but also cultural aspects of wellbeing, and the importance of living in balance with nature (Ihara and Vakalahi, 2011; Mackean, 2009; McKendrick et al., 2021).

7. Conclusion

This study has illustrated how NELD in the Pacific Islands are having, and will continue to have, extensive and devastating impacts on people. NELD has interconnected impacts for human systems and development in the region and should no longer go unacknowledged and be sidelined from constructions of, and decision-making around, climate change. Of particular concern are the interlinked NELD of health and wellbeing, ways of being, future ways of being, cultural sites and sacred places, Indigenous and local knowledge, life sustaining tools, biodiversity and ecosystem services, and connection to land and sea. These demonstrate how NELD is understood and experienced through the lens of identity, intangible values and cultural landscapes, and is not occurring to people and ecosystems separately. Instead, NELD is occurring to the larger complex and interconnected socio-ecological system in which identity, culture and way of life is embedded.

Identifying ways to minimise the impact of loss on people is critical, and central to this will be the need to collectively work through the impacts on Pacific intangible values, identities and culture. The Pacific Islands region must continue to prioritise biodiversity
conservation and restoration, as well as activities that ensure cultural continuity and revival. These can help restore and maintain the people-ecology interactions that are so crucial to the broader socio-ecological system that supports learning, self-esteem and a sense of identity. The role of education and training as well as safeguarding traditional knowledge for responding to NELD in the region must be bolstered alongside comprehensive risk management efforts.

Moving forward, we need transdisciplinary expertise to catalogue comprehensive data on present and future NELD, the interrelated nature of such, and the diverse and nuanced ways of maintaining identity, belonging and culture. As part of this, future studies must focus on ascertaining laypeople’s views and experiences of NELD to complement and build on the findings of this study which focused on ‘expert’ stakeholder views. Insights from both ‘experts’ and laypeople should be translated into priority areas. Good practice and policy for responding to, and working through, NELD should be further developed and shared as a matter of urgency, for the Pacific Islands and beyond. National governments, regional organisations and other stakeholders in the Pacific Islands have been and continue to be critical for continued advocacy around NELD at the international level (especially around displacement and loss of territory), but there is also a need for growing international support for working through NELD in the Pacific, especially from those nations that hold the responsibility for the crisis. Given what is at stake, we can no longer base our constructions of, and responses to, climate change on narrow and simplified views of the harm imposed but, instead, understand its complex, interconnected and unbounded nature.

8. Disclaimer

The views expressed herein are those of the author(s) and do not necessarily reflect the views of the United Nations.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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