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Research article

RAISED UNDER BAD STARS: NEGOTIATING A CULTURE OF DISASTER PREPAREDNESS

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Abstract: In efforts to prevent, respond to, and recover from disasters, what alternatives are available to top-down strategies for imposing expert knowledge on lay publics? How is the context of communities' socio-ecological context understood in the development of programs and policy on their behalf? What can be learned from community narratives and cultural practices to inform disaster risk reduction? The ways communities have regarded disasters and natural hazards in the cultural sphere can provide a lens to inform the understanding of their ability to withstand shocks and the factors that led to such conditions. Only by tracing the complexities of creating, transmitting, and preserving a culture of preparedness among disaster-vulnerable communities can we claim to be working towards a policy that is informed by their own experience. I collected examples of how different communities perceive, prevent, and respond to disaster through art, music, and literature and analyzed how these were embedded into local narratives and how historical context influenced such approaches. My findings show that communities use cultural practices to contextualize experiences of hazards into their collective narrative; that is, storytelling and commemoration make disasters comprehensible. By framing disasters as an anthropological inquiry, practitioners can better recognize the influence of a place's nuance in the disaster management canon–guided by these details, not despite them.

Keywords: culture, storytelling, folklore, climate adaptation, indigenous knowledge.

1. Introduction

What was it like then,
when the tsunami came to shore?
I look down and wonder –
Below me spreads the blue sea
Quiet and perfectly still.

- Emperor Akihito, New Year's Poem, 2012

To be alive is to be watchful.

- Pliny the Elder, Historia Naturalis, two years before his death at Pompeii

This is a story of survival and commemoration. Everything else is details.

It is not a new story by any stretch, and that, in many ways, is the point. Writer Neil Gaiman says "*we who make stories know that we tell lies for a living. But they are good lies that say true things […] because somewhere out there is someone who needs that story. Someone who will grow up with a different landscape, who without that story will be a different person. And who with that story may have hope, or wisdom, or kindness, or comfort*." We draw from our own experiences to create something that can be embraced by others, solace in whatever form it may take. Whether art, literature, music, or any other creative outlet, we create as a response to the things we see and hear and touch in the ways we know how to express ourselves, whatever artistic or narrative tradition that may be. How these reactions are reflected back onto our society, our institutions, and our decisions is a no less important aspect.

The ways at-risk communities prepare for and respond to disasters from a cultural point of view can reveal different ways that 'preparedness mentality' seeps into our social and political systems, and how to further improve them. Rather than assume how they function or import foreign approaches, seeing localized nuance as a core factor in disaster preparedness and resilience can present effective opportunities through which to support at-risk communities.

Disasters present a most visceral place for these expressions to form, grow, or change, exposing the ways in which "people construct or 'frame' their peril … and the ways they invent explanation, constitute their morality, and project their continuity and promise into the future" (Hoffman *et al,* 2002). Historical and contemporary reactions differ little: "ceremonies and rituals arise, old, wholly new, or with new matter in old form. Myths and legends spring up, and their efficacy becomes manifest" (ibid). Communities use the tools at their disposal to react and reform in ways that allow them to absorb their new normal in both traditional and novel manners. "Language and linguistic usages emerge to express events, name the peoples and parties involved, and manage the allegiances and contestations" that preceded or succeeded it (ibid).

The imagery around disaster "provides a compass of orientation on how to think about calamity and gives an orbit of persuasion on how to cope with and survive it (ibid). The blueprint we create between what we know about the world until that moment, and what we learn about ourselves or our community "enables the conservation of a sociocultural world, and also its transformation" (ibid). The human reaction to disasters is then just that: human, deeply so, in all of its complexity, chaos, and contradiction. The commemoration, transmission, and operationalization of these reactions as preparation and adaptation measures follow the same logic: innately tied to people and place. Without the right language, we cannot

react; without transmission, we cannot preserve our memories; without embedding events into our narrative, we cannot hope to build the systems that reflect our needs. We must have survival with commemoration, or neither.

Commemoration is a fragile thing, however, given that it may lose meaning over time, or physically disappear. In Figure 1 we see a memorial stone in the village of Ayewoshi, Iwate Prefecture, Japan reads: "*High dwellings are the peace and harmony of our descendants. Remember the calamity of the great tsunamis. Do not build any homes below this point*" (Hamblyn 2014). The latter had been erected following the 1896 Meiji Sanriku tsunami, whose maximum height was only 3 feet lower than 2011's. Others have stood over 600 years (ibid). Ayewoshi had committed stubbornly to keeping its population above the line, but within "a generation or two the population had recovered and the villagers began to build new houses further down the hill, closer to their fishing harbor" (ibid). Some coastal villages saw these warning stones as "relics from a bygone age" and ignored them, and still others actually had them washed away by previous tsunamis. The loss of physical commemoration is perhaps the easiest way to begin the process of forgetting.

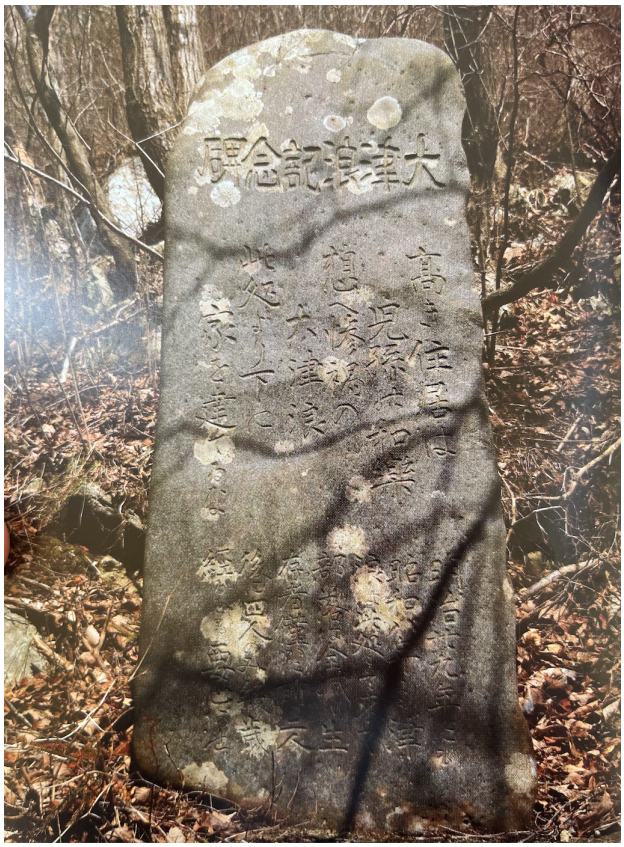

Figure 1. Tsunami marker in Aneyoshi, Japan

Even without the issue of physical loss, the issue of time looms large. When trying to gauge whether there might be "some kind of historical memory and folk wisdom that ensures that a community remembers about very extreme phenomena, such as catastrophic floods, and learns to establish new settlements in safer locations," research showed that the passage of time was a weak link that was difficult to supersede (Fanta *et al,* 2019).

2. Research Methods

The research design for this investigation was heavily influenced by fieldwork ethnography, structured surveys, and interviews done in previous work across Puerto Rico, Florida, and California. The pandemic compelled this investigation to lean into qualitative data analysis in remote, digital, and archival spaces. I collected a mix of stories across folklore, regional mythology, individual and community accounts, and institutional reports; museum/gallery catalogs and artist statements; fiction, nonfiction, and prose/poetry works; song lyrics and musical ethnography. These were supported by remote interviews with academic researchers, practitioners in disaster management and community organizing, and writers and artists from relevant regions.

These were further contextualized spatially and temporally as a means of secondary analysis for their development. This paper presents a selection focusing on Japan and Indonesia, with further available examples spanning over a dozen countries, as recent as 2023 and as far back as several millennia ago.

The questions this investigation is thus trying to frame are:

- How is any form of natural hazard-cognizant community narrative formulated?
- By whom is it developed, and in whose interest?
- How does such a community narrative become embedded in a transmissible, multi-generational way?
- How can embedded community narrative then become operationalized in an institutional or infrastructural way?
- How is this level of culture and narrative lost, and what might lead to this?

These questions ultimately help contextualize, if not answer, the overall inquiry:

What can we learn from different levels of community narrative and cultural practices such that we might keep disaster preparedness as a running cognitive baseline in at-risk communities?

3. Research Results

Connecting the dots between collective memory and community safety

Between the worldviews, temporal change of habits, and the actual pieces of culture manifested, it is worth discussing the very words used to speak of and describe misfortune, and how they are innately tied to the worldview from which they are derived. The word disaster is perhaps the most obvious, whose rough translation from latin is "de-starred"–"the loss of a protective star, [...] being abandoned by the stars and left to one's miserable fate among countless perils and calamities" (Huet 2012). There was no individual or community agency in catastrophe, entirely up to the cosmos, and humanity simply had to accept it. Worse, being "disowned by the stars that ensure a safe passage through life" under the assumption that divinity was infallible meant that both the abandonment and the disaster were our fault and that our despair here on earth was simply "chaos resulting from the distant power of cosmic agencies" (ibid). Disasters in their core conception were phenomena beyond our hands.

Even the ways we speak about disaster in a literal sense show how calamities have been understood in their respective regions around the world. The Hawaiian language has a variety of words for the sea in all of its many presentations. *Kai a Pele* is the equivalent of a tsunami wave, but rather than the whole phenomenon tidily packaged, it comes as a process, and here only refers to *'the sea of Pele',* the goddess of volcanoes and fire, the condition under which the wave itself occurs: *kai e'e* reads literally as the c*limbing sea* (Kamakau 1976). To get to the

climbing sea, first there is the *kai hoʻeʻe*, the *rising sea*, followed by *kai mimiki*, the *receding sea* (ibid). These are functional elements, fitting well with the dozens of other words in Hawaiian which make reference to the state of the sea and its every unique crease.

While it has acquired a more emotionally-charged and fear-inducing meaning over time, the word *tsunami* is more akin to a technical term, just "harbor wave" in translation from Japanese (Simmons-Duffin, 2011). This offers another aspect of a normalized relationship with the locally destructive power of nature. The word hurricane has somewhat of the opposite history, borne from *Huricán*, a word from the original Taino peoples of the Caribbean meaning "god of the storm" or "god of the evil wind" (Shwartz, 2015). This intimates a wholly different relationship and cosmology that would have developed over time, something inherently malevolent about its source–we also find references throughout ancient and contemporary history to disasters as monsters–earthquakes as "roaring dragons, tornados as devils, floods as ghouls" (Hoffman *et al*, 2002).

A difficulty here, like with *disaster*, is in setting up that relationship as something otherworldly, unknowable, or unmanageable strengthens the notion that nothing can be done, or could have been done. Each reveals a different cultural quirk and relationship with the geophysical hazards that societies have evolved around, and further strengthens the idea that context matters most when trying to find ways to better understand why communities respond the ways they do, and what can be done to support them organically, on their own terms (MacGillivray, 2018).

Whole worldviews, community narratives, and spiritualities have sprung up around a long history of geophysical phenomena, enough to develop a particular psychological mindset or geomentality for a particular area (Ong, 1969; Henshall, 2014). That is, a community's relationship with its environment and ecology underlines the ways it responds to changes, and the ways it chooses to adapt (Yoon, 1991; Starrs, 2014).

Social structures, cultures, traditions, and priorities embedded in community narratives are deeply attuned to the places where they exist and the ways they have adapted to them (Hoffman et al 2002). The varied ways in which communities respond to natural disasters, both historically and in recent decades, can give us insight into what it takes to develop cultures of preparedness and resilience. "No single knowledge form can be a panacea for disaster risk reduction, but, [...], indigenous knowledge has the potential for contributing far more than is usually permitted" (Kelman *et al*, 2012). An anthropological inquiry of the ways these phenomena manifest themselves at the community level can give us insight into the gaps that infrastructural, ecological, policy, and institutional-level inquiries may overlook about effective adaptation (Hoffman *et al,* 2002).

When hazards threaten and disasters occur, they both "reveal and become an expression of the complex interactions of physical, biological, and sociocultural systems. [They] not only manifest the interconnections of these three factors, but also expose their operations in the materials and cultural worlds" (ibid). Our communities do not exist in a vacuum, and cannot be seen as such: "the premises upon which human beings make basic productive decisions […] emerge from direct environmental stimuli, social organizational forms, and ideological mandates (ibid). There has been a slow "cultural turn" in disaster research, recognizing the importance "in understanding how disasters are framed and interpreted, remembered and memorialized, and represented and portrayed through folklore, songs, movies, and other media" (Webb *et al*, 2018).

To achieve common goals around preparedness and risk reduction, vernacular knowledge can be a useful resource, and a number of efforts have been initiated in the region to preserve such knowledge in imaginative forms to pass it on to future generations (Nakai, 2021). Taking these into account, "it is important to look beyond the structural components and to-

wards sociocultural components of disaster resilience and preparedness (Perilla *et al,* 2002). These cultural adaptations include innovation and persistence in memory, cultural history, worldview, symbolism, social structural flexibility, and religion; within the cautionary nature of folklore and folk tales, "disasters often reveal the deeper social grammar of a people that lies behind their day to day behavior" (Hoffman *et al*, 2002). It is only in recognizing and understanding the reasons behind the ways this manifests in particular communities that we can look to better support them in the years to come *(*Jogia *et al,* 2014*).* It is not only that the ways that memory, worldview, and culture presented become suddenly more valued or pronounced, neither within the communities themselves nor in their projection to the world at large, but that they can "converge with institutions, becoming a "catalyst for readjusting the character of relations and interactions between local communities and the structures of the larger society" (Hoffman *et al,* 2002). By positing community reactions to natural hazards as a continuum of formulation, strengthening, operationalizing, and degradation, we can better understand how and when preparedness may manifest itself and how this knowledge can then be used to better encourage preparedness principles at the hyperlocal and institutional levels.

In places where hazardous natural phenomena are commonplace, like Indonesia and Japan, we see spiritual and artistic worldviews that evolved alongside them, rather than despite them (Hamblyn, 2014; Jones, 2018). Others saw them as freak events. This varies within and across geographic regions based on worldview, religion, cosmology, and other local cultural factors. It is in trying to understand this community nuance that we must try to contextualize artistic reactions and ways of coping, art that offers "an alternative in how to see things and how to resist simplistic understandings of what is a very complex political and social reality" (Dafoe, 2022).

The words used and the symbols conjured not only reflect historical and contemporary geophysical worldviews, but also how different communities are able to mobilize those traditions as a coping mechanism in their aftermath (MacGillivray, 2018). "*Myths and legends, both new and revived, routinely appear in the aftermath of disasters, with storytelling playing a vital role in the process of collective recovery. In the case of especially traumatic disasters, these stories can persist for centuries, reverberating down the years as a form of spoken memory, a bulwark against the dangers of forgetting*" (Hamblyn, 2014). It is in the attempts to avoid forgetting calamity that we find semblances of adaptation under the guise of culture, and education under the guise of tradition.

3.1 Research Results

Namazu-e and the Power of Localized Languages of Expression

> What, well? If I shake like this you will have to give up everything.
> Now, the money hoarded so far, none of that may be left. Spit out every bit of it.
> In that way the masses will have pleasure out of it!
>
> *-Namazu the Earthshaker speaking to businessmen, 1855 print, anonymous artist*

In areas where disasters are common, it is important to formalize their comprehension in regional or national tradition: a vernacular. This is particularly poignant if a disaster coincides in a moment of social upheaval, as is found in Japan towards the end of the Edo period in the 1850s. While Japan had a long history of earthquakes, it resisted the notion that disasters could strike at random times, just "like every human society before and since" (Hoffman *et al*, 2002). Instead, Japan considered earthquakes to be a result of societal ills. Up until that

point, the government had been seen as aligned with a level of divinity, and so when "divergence between cosmic and moral principles and the state of government increased, strange atmospheric phenomena, crop failures, epidemics, earthquakes, and other disasters became the concrete manifestations of cosmic displeasure" (Jones, 2018).

Japanese folklore holds that there is a giant black catfish named Namazu "buried in the mud beneath the main island of Honshu, restrained by the thunder god Kashima, who occasionally loses control of the temperamental fish" (Quin, 2021). When the fish tries to wriggle free, that is when earthquakes occur (ibid). While the story had been part of the established Japanese mythology for centuries, and images of Namazu had been in circulation since the 17th century, following the 1855 Edo earthquake there was an outpouring of thousands of woodblock prints depicting Namazu– referred to as the *Namazu-e* –around the Edo (now Tokyo) region, bought and sold in various talismanic capacities (Smits 2006). These prints used Namazu as a character through which they could provide social commentary, satire, apology, or veneration to what they had witnessed, showing him at times malevolent and others benevolent, depending on who would have been benefiting from his behavior (ibid). They used *Namazu-e* to express "an emerging consciousness of Japanese national identity and to make veiled political statements" in the wake of the earthquake's destruction (ibid).

These prints provide us with a "window into the consciousness of Japan at a time when the country was edging ever closer to immense political and social change. For the people of Edo, this earthquake was seen not as some random event but, instead, was seen as an act of *yonaoshi*, a type of rectification" (Kennedy, 2016). The country had already had two great earthquakes the year before, and where some felt that Edo had become a complacent society, others felt it was the opposite, that the government and the divinities from where their power derived had been negligent in protecting the people (Smits, 2006). The "violent rumbles of Namazu served as a way to shake up a world that had slipped into imbalance" (Kennedy, 2016). Many prints are straightforward reflections of grief and anger, with whole communities attacking the fish (see Fig. 2), but a deeper look at others reveals both the biting social commentary and the satire that came out of it (Smits, 2006).

Figure 2. Community attacking Namazu, following Edo earthquake

In Figure 3, the giant catfish unleashes destruction on the city while its protector sleeps on the job as the city burns–here the obvious focus is Namazu as a malevolent force destroying

the city. In other scenarios Namazu is portrayed as benevolent, neutral, or even apologetic, reflecting the fear that residents needed to placate that which causes earthquakes, rather than critically analyze it (Smits, 2006). This duality reflects the differing opinions in a rapidly changing society, with Japan on the edge of opening to the world (Quin, 2021). Some bought the prints "for their humour and social commentary; others believed that buying them provided some kind of protection against future earthquakes. Some professions even began to worship Namazu in response, either thankful for providing work, or fearful of retribution (Smits, 2006). In this way we see a society with a clear language to engage an event but with a wide variety of applications and competing perspectives.

Figure 3. Namazu destroying Edo while a lesser god sleeps, failing to provide protection

In another style, the catfish has been killed by the god Kashima, but onlookers are specifically divided into two groups (see Fig. 4): *"the people in the top half of the picture are labeled as "smiling" (those who benefit from the earthquake) and the people at the bottom are labeled as "weeping" (those who are harmed by the earthquake)* (ibid). Celebrating with or praying to Namazu is another common motif, demonstrating an already fragile socioeconomic dynamic before the earthquake took place. These sociocultural dynamics are put on clear display in Figure 5, where "a group of earthquake victims root for Kashima, while those who typically profit from earthquakes (construction workers, firemen, news publishers, etc.) root for the catfish" (ibid).

Figure 4. Kashima vanquishing Namazu with onlookers separated by trade

Figure 5. Namazu in tug-of-war with Kashima with segments of community cheering

The Namazu character ranges widely in how he is depicted, sometimes dragon-like, alternatively extremely anthropomorphic, depicted as priest or samurai, and in varying size. This variation is interesting given that the prints were typically unsigned and anonymous, as there still remained a latent fear that images with "a political subtext [...] during an era of strict military governance" could have obvious negative consequences for those in the public sphere (Quin, 2021). The tense relationship between society, government, Namazu, and the outside world is perhaps best depicted in Figure 6, below, where we see a "massive steamship-like Namazu approaching the city. The creature is spouting money, and people on shore beckon for it to come closer" (Smits 2006). This particular depiction refers to "Commodore Perry's black ships, which arrived in Japan in 1853 and eventually forced the country to open its ports to Western commerce" by way of military blockade (ibid). The steamship Namazu thus becomes a representation of the disaster but also that of the community's reception to the outside world arriving in Japan.

Figure 6. Namazu as steamship spouting coins, Japan 1855

Residents used "*cultural norms to build a language everyone knew how to understand in response to something deeply entrenched in their story–they pulled an old story into a contemporary story when the moment needed it. It spread quickly because not only were they biting social commentary, they were art, and they were public. It was also a moment in which people were opening up to the modern world and previous systems were under heavy public scrutiny. It gave them an opportunity and a language to retrofit and evolve how they wanted to see themselves against the world*" (ibid). This was a sharpened tradition built on centuries of experience, quickly utilized and shared, and well-understood across a much broader national culture. Earthquake destruction itself was something well-known, as was Namazu's place in their pantheon, and helped set up an opportunity to speak freely about their experience, to better define their global identity through their geophysical identity (Starrs, 2014). The 1855 Edo Earthquake was "just one of the destabilizing forces that presaged the collapse of the Japanese government during the Meiji Restoration of 1868, and many Namazu-e reflect the attitudes of a time when the government seemed less and less in control of the Japanese archipelago" (Smits, 2006).

Namazu as a character has remained "a ubiquitous feature of disaster lore", and is still featured across Japanese earthquake warning signage, as seen in Figure 7 (Hamblyn, 2014). There continues to be a (lesser) circulation of catfish imagery *following* earthquakes, but they have primarily served within the sphere of response, rather than preparedness.

Figure 7. Contemporary Japanese earthquake warning signage and alarm system

The rise and quick fall of the prints as visual language for ecological and sociopolitical response hints at a need for a different way of embedding such an approach into the community, specifically so that such a medium may remain viable in contemporary use before events happen and in the education of those who may not know or understand them otherwise. It shows a clear, comprehensible vernacular with a rich potential for being better integrated into the rigorous operation of Japanese earthquake and tsunami work.

3.2 Research Results

Operationalizing Community Narrative in the Boxing Day Tsunami

A logical next step in a hazard-cognizant culture is to put that embedded identity to work–not only as a response to government missteps but to operationalize local understanding into formal and informal DRR practices and behavioral change. This was seen following the 2004 Indian Ocean tsunami in Indonesia, where a variety of communities used previous experiences with tsunamis to create hyper-localized cultures that knew how to prepare (McAdoo 2006). The development of new stories and re-articulation of older ones is fundamental to making previous experience part of identity that survives time, and various communities affected by the 2004 tsunami (and others) did so in accordance with their own local traditions (McAdoo 2006, McAdoo 2009). That is, legends, poems, and songs arose around their initial experience–in some places decades earlier, in others centuries earlier–and they were able to retain that knowledge generations later because it had been sewn fully and seamlessly into their narrative. More importantly, such communities recognized the existential risks of forgetting. This phenomenon showed a regional approach that had used songs, storytelling, and even lullabies to cement a certain level of understanding not only around the risks of tsunamis, but signs of their arrival and what to do in response. As a result, dozens of documented communities had some level of oral history attached to their tsunami-prone ecological existence and past.

The Boxing Day tsunami's effect on Indonesia was the largest sudden loss of urban life in a generation. More than 60% of Banda Aceh's buildings were destroyed, more than 150,000 were killed, and entire coastal communities were swept away (Vale, 2014). In many villages, the vast majority of residents were killed, survivors left homeless, and children orphaned

(ibid). Aid agencies estimated that 90,000 housing units would need to be replaced (ibid). Along a single city's coast, some 70 square kilometers were left barren (ibid).

What was less clear at the outset, however, was the difference between Aceh and nearby Simeulue, which survived nearly unscathed, a mere 7 fatalities for a population of over 80,000 (Athukorala, 2006). On its face, it seemed straightforward that Aceh's 35-year civil war with the Indonesian government simply created a vicious cycle of sociopolitical strife that left it predictably bound for disaster. This glosses over the fact that the Aceh story was largely avoidable, though, and so much of the exposed risk was man-made: it was largely without tsunami education, federal support, or ecological protection (Smith, 2006).

Simeulue's stability allowed it an opportunity at the far opposite end of the spectrum. Local, traditional, and indigenous knowledge in Simeulue was long established and highly regarded: even housing was more commonly built higher up on the hills or on raised platforms in engineering styles that were built to flex with and withstand the elements (Gadeng *et al,* 2018). The 1907 Sumatra tsunami–whose earthquake epicenter was just a few miles off the coastline and killed 2,000–became a part of the oral indigenous knowledge that has been embedded and passed down ever since; it is known locally as the *Smong* story, and the mix of resilience and trauma that it enmeshed intergenerationally directly contributed to the area's quick reaction (McAdoo, 2006). As a result of the cultural embrace, the islanders "hold annual practice drills and so fled to inland hills after the initial shaking" (Rahman *et al,* 2017).

The story of *Smong* "naturally becomes an early warning system anytime earthquakes occur in this island. In other parts of Aceh in Sumatra, stories and messages about tsunamis that occurred in the past can be found in some oral literatures, poems and songs; but the community did not recognize them" (Syafwina 2014). Those pieces of culture that are left unused are a lamentable loss when disaster management could benefit tremendously from it, but in order to do so, it needs to be recognized as such. "Indigenous knowledge can be a powerful tool for disaster risk reduction; but, without recognition and utilization, it is merely a part of common things in community" (ibid). The integration of local wisdom is necessary, but before that can happen, it must be valued for what it truly offers. In an example of Smong songs (see Fig. 8), it is easy to see the combination of poetic turn and didactic instruction.

Please listen to this story
One day in the past

A village was drowning
That's what's been told
Starting with an earthquake

Followed by a giant wave
The whole country was
drowning
Suddenly
If there is a strong earthquake
Followed by the lowering of
seawater
Hurry to find a place
A higher place

This is called smong
A story of our ancestors.

Remember this always
This message and exhortation
Smong is your bath

Earthquake is your cradle
Thunder is your drum

Lightning is your lamp

Figure 8: Song lyrics from *Smong* tradition

The Free Aceh conflict went hand in hand with "decades of resource exploitation during the Suharto years and after, [which] have left Aceh's forests, mangrove coasts and fisheries in a state of crisis" (DTE, 2000). The compounded issues of resource depletion, poverty, and military pressure set an unsurprising baseline for Aceh's inability to prepare; the status quo preparedness issues were legion. Rather than have develop tools around natural hazards, it only did so for military hazards, and its identity was thus centered around separatism.

The opportunity for recognizing indigenous wisdom like the success story of Smong in Simeulue is one that cannot be wasted, given the chance to "capitalize indigenous knowledge in order to improve disaster management and reduce the risk through the community" (ibid). Certainly aspects of it may need to be retrofitted to fit the perspectives from other local communities, but it is not meant to be a standalone solution. "Recognized indigenous knowledge should be adaptable, transferable and modified according to the community and environment conditions" (ibid). There is a balance to be found of supporting local use of existing mechanisms like Smong and of co-opting at scale, but it shows great potential in its integration with the broader DRR canon. In encouraging a higher self-valuation of their own existing cultural tools, such an opportunity may create further opportunities for advocacy, empowerment, and leadership in the context of disaster preparedness.

Where Simeulue focused on cultural memory, Aceh is an unfortunate example of the inability to organically develop an identity around natural hazards when the community priorities are elsewhere. Simeulue also presents an interesting counter to the *Namazu-e* prints given the Smong story's continuity seemingly without it growing into a more formal or institutionalized preparedness mechanism, compared to Japan's evolution as a leader in earthquake work. This may be a question of frequency, loss of life, or of shared connection across multiple islands and their respective communities.

4. Discussion and Conclusion

There is a latent power in understanding community reactions and narratives around disaster specifically in that they may be functional and transmissible under the looming threat of hazard. The harnessing of this power, though, lies in operationalizing and institutionalizing a nuanced, localized worldview into a way of protecting a community that is both reflective of a community's values in addition to being particularly well-suited for that community's geophysical and ecological situation. That is, putting culture to work works.

These examples show that culture and cultural reactions can function as an incredibly important component of how we craft/implement disaster preparedness practices and understand different approaches to disaster response. By letting local nuance take a greater role, and by understanding culture and reaction in its own context, we can better empower communities to use all the formal and informal systems at their disposal to 1) respond in a way that feels beneficial and organic and 2) set up a system where there is a stronger element of ecological identity embedded into community life. Ultimately, it is this type of approach that will lead to a more equitable and comprehensive disaster management system. Only by recognizing the relevance of localized assumptions, story, behavior, mentality, and ecological past in these scenarios can we begin to also understand the value of artistic responses in the wake of calamity, and how it puts a magnifying glass on our existing practices and the relationship between communities, infrastructure, power, and broader systems.

This follows the tenets of citizen science and indigenous/local knowledge as valuable and underutilized tools for disaster risk reduction. There is already a notable push from applied anthropologists for "cross-scale, multistakeholder, and interdisciplinary approaches" in

what is termed *climate ethnography*, recognizing that their findings reveal much about "island-based knowledge, global causes of vulnerability, local perceptions of risk, and islander agency channeled into adaptive capacity and resilience" (Crate, 2011; Lazrus, 2012).

By framing disasters as an anthropological and cultural inquiry, it is my considered conclusion that communities will be better equipped to express their collective needs as they adapt to a changing climate, and that practitioners will recognize the importance of a place's anthropological and cultural nuance as a factor in developing appropriate measures that are guided by these details, not despite them. By positing community reactions to natural hazards as an integral part of the DRR canon, we can more appropriately and effectively employ this knowledge to better encourage preparedness principles, healthy coping practices, and a longer view of time at the hyperlocal and institutional levels.

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References

Athukorala, Prema-chandra. "Indian Ocean Tsunami: Disaster, Generosity and Recovery: Indian Ocean Tsunami." *Asian Economic Journal*, vol. 26, no. 3, Sept. 2012, pp. 211–31. *DOI.org (Crossref)*, https://doi.org/10.1111/j.1467-8381.2012.02083.x.

Crate, Susan A. "Climate and Culture: Anthropology in the Era of Contemporary Climate Change." *Annual Review of Anthropology*, vol. 40, no. 1, Oct. 2011, pp. 175–94. *DOI.org (Crossref)*, https://doi.org/10.1146/annurev.anthro.012809.104925.

Dafoe, Taylor. "The Whitney Museum Will Stage a Landmark Show of Puerto Rican Art Made in the Five Years Since Hurricane Maria." *Artnet News*, 8 Feb. 2022, https://news.artnet.com/art-world/puerto-rican-art-hurricane-maria-2069854.

Dahdouh-Guebas, F., et al. "How Effective Were Mangroves as a Defence against the Recent Tsunami?" *Current Biology*, vol. 15, no. 12, June 2005, pp. R443–47. *DOI.org (Crossref)*, https://doi.org/10.1016/j.cub.2005.06.008.

de Freitas, Nancy. "Geomentality: Reframing the Landscape." *Visual Representations and Interpretations*, edited by Ray Paton and Irene Neilson, Springer London, 1999, pp. 62–75. *DOI.org (Crossref)*, https://doi.org/10.1007/978-1-4471-0563-3_7.

Ellis, Erle C., et al. "People Have Shaped Most of Terrestrial Nature for at Least 12,000 Years." *Proceedings of the National Academy of Sciences*, vol. 118, no. 17, Apr. 2021, p. e2023483118. *DOI.org (Crossref)*, https://doi.org/10.1073/pnas.2023483118.

Fanta, Václav, et al. "How Long Do Floods throughout the Millennium Remain in the Collective Memory?" *Nature Communications*, vol. 10, no. 1, Dec. 2019, p. 1105. *DOI.org (Crossref)*, https://doi.org/10.1038/s41467-019-09102-3.

Gadeng, A. N., et al. "The Value of Local Wisdom *Smong* in Tsunami Disaster Mitigation in Simeulue Regency, Aceh Province." *IOP Conference Series: Earth and Environmental Science*, vol. 145, Apr. 2018, p. 012041. *DOI.org (Crossref)*, https://doi.org/10.1088/1755-1315/145/1/012041.

Gaiman, Neil. The View from the Cheap Seats: Selected Non-Fiction. Headline, 2017.

Hamblyn, Richard. *Tsunami: Nature and Culture*. Reaktion Books, 2014.

Henshall, Kenneth. "Observations on Geomentality in Japan and New Zealand." *When the Tsunami Came to Shore*, edited by Roy Starrs, BRILL, 2014, pp. 179–92. *DOI.org (Crossref)*, https://doi.org/10.1163/9789004268319_010.

Hoffman, Susannah M., and Anthony Oliver-Smith, editors. *Catastrophe & Culture: The Anthropology of Disaster*. School of American Research Press ; J. Currey, 2002.

Huet, Marie-Hélène. *The Culture of Disaster*. The University of Chicago Press, 2012.

Japan's Success in Risk Reduction Highlighted on March 11 Anniversary. https://www.undrr.org/news/japans-success-risk-reduction-highlighted-march-11-anniversary. Accessed 24 Apr. 2022.

Jogia, J., et al. "Culture and the Psychological Impacts of Natural Disasters: Implications for Disaster Management and Disaster Mental Health." *Built and Human Environment Review*, vol. 7, no. 1, Nov. 2014, p. 1. *publications.aston.ac.uk*, https://publications.aston.ac.uk/id/eprint/24422/.

Jones, Lucile M. *The Big Ones: How Natural Disasters Have Shaped Us (and What We Can Do about Them)*. 2019.

Kamakau, Samuel Manaiakalani. *The Works of the People of Old =: Na Hana a Ka Poʻe Kahiko*. Bishop Museum Press, 1976.

Kelman, Ilan, et al. "Indigenous Knowledge and Disaster Risk Reduction." *Geography*, vol. 97, no. 1, Mar. 2012, pp. 12–21. *DOI.org (Crossref)*, https://doi.org/10.1080/00167487.2012.12094332.

Lazrus, Heather. "Sea Change: Island Communities and Climate Change." *Annual Review of Anthropology*, vol. 41, no. 1, Oct. 2012, pp. 285–301. *DOI.org (Crossref)*, https://doi.org/10.1146/annurev-anthro-092611-145730.

MacGillivray, Brian H. "Beyond Social Capital: The Norms, Belief Systems, and Agency Embedded in Social Networks Shape Resilience to Climatic and Geophysical Hazards." *Environmental Science & Policy*, vol. 89, Nov. 2018, pp. 116–25. *DOI.org (Crossref)*, https://doi.org/10.1016/j.envsci.2018.07.014.

Mano, R., A, K., & Rapaport, C. (2019). Earthquake preparedness: A Social Media Fit perspective to accessing and disseminating earthquake information. *International Journal of Disaster Risk Management, 1*(2), 19-31.

McAdoo, Brian G., Lori Dengler, et al. " *Smong* : How an Oral History Saved Thousands on Indonesia's Simeulue Island during the December 2004 and March 2005 Tsunamis." *Earthquake Spectra*, vol. 22, no. 3_suppl, June 2006, pp. 661–69. *DOI.org (Crossref)*, https://doi.org/10.1193/1.2204966.

Nakai, Senjo. "Vernacular Knowledge, Natural Disasters, and Climate Change in Monsoon Asia." *ETropic: Electronic Journal of Studies in the Tropics*, vol. 20, no. 2, Sept. 2021, pp. 114–37. *DOI.org (Crossref)*, https://doi.org/10.25120/etropic.20.2.2021.3810.

Ong, Walter J. "World as View and World as Event." *American Anthropologist*, vol. 71, no. 4, Aug. 1969, pp. 634–47. *DOI.org (Crossref)*, https://doi.org/10.1525/aa.1969.71.4.02a00030.

Quarantelli, E. L. *Disaster Studies: An Analysis of the Social Historical Factors Affecting the Development of Research in the Area*. Nov. 1987. *udspace.udel.edu*, https://udspace.udel.edu/handle/19716/1335.

Quin, Markela. "Geomyths and Catfish Prints: An Analysis of the 1855 Ansei Earthquake in Japan." *Locus: The Seton Hall Journal of Undergraduate Research*, vol. 4, no. 1, Oct. 2021, https://scholarship.shu.edu/locus/vol4/iss1/11.

Rahman, A., et al. "Indigenous Knowledge Management to Enhance Community Resilience to Tsunami Risk: Lessons Learned from *Smong* Traditions in Simeulue Island, Indonesia." *IOP Conference Series: Earth and Environmental Science*, vol. 56, Feb. 2017, p. 012018. *DOI.org (Crossref)*, https://doi.org/10.1088/1755-1315/56/1/012018.

Simmons-Duffin, Selena. "History Of Tsunami: The Word And The Wave." *NPR*, 18 Mar. 2011. *NPR*, https://www.npr.org/2011/03/18/134600508/history-of-tsunami-the-word-and-the-wave.

Smith, Neil. "There's No Such Thing as a Natural Disaster." *Items*, https://items.ssrc.org/understanding-katrina/theres-no-such-thing-as-a-natural-disaster/. Accessed 24 Apr. 2022.

Smits, G. "Shaking Up Japan: Edo Society and the 1855 Catfish Picture Prints." *Journal of Social History*, vol. 39, no. 4, June 2006, pp. 1045–78. *DOI.org (Crossref)*, https://doi.org/10.1353/jsh.2006.0057.

Starrs, Roy, editor.. *When the Tsunami Came to Shore: Culture and Disaster in Japan*. Global Oriental, 2014.

Sutton, Stephen A., et al. "Nandong Smong and Tsunami Lullabies: Song and Music as an Effective Communication Tool in Disaster Risk Reduction." *International Journal of Disaster Risk Reduction*, vol. 65, Nov. 2021, p. 102527. *DOI.org (Crossref)*, https://doi.org/10.1016/j.ijdrr.2021.102527.

Syafwina Syafwina. "Recognizing Indigenous Knowledge for Disaster Management: Smong, Early Warning System from Simeulue Island, Aceh." *Procedia Environmental Sciences*, vol. 20, 2014, pp. 573–82. *DOI.org (Crossref)*, https://doi.org/10.1016/j.proenv.2014.03.070.

Vale, Lawrence, et al. "Tsunami + 10: Housing Banda Aceh After Disaster." *Places Journal*, no. 2014, Dec. 2014. *DOI.org (Crossref)*, https://doi.org/10.22269/141215.

Webb, Gary R. "The Cultural Turn in Disaster Research: Understanding Resilience and Vulnerability Through the Lens of Culture." *Handbook of Disaster Research*, edited by Havidán Rodríguez et al., Springer International Publishing, 2018, pp. 109–21. *Springer Link*, https://doi.org/10.1007/978-3-319-63254-4_6.

Yoon, Hong-Key. "On Geomentality." *GeoJournal*, vol. 25, no. 4, Dec. 1991, pp. 387–92. *DOI.org (Crossref)*, https://doi.org/10.1007/BF02439490.