

The seawall helps but—: using “material registers” to understand coastal infrastructure for disaster risk management in an island community

Pamela Gloria Cajilig

*College of Architecture, University of the Philippines Diliman,
Quezon City, Philippines and
RMIT University, Melbourne, Australia*

Abstract

Purpose – This paper contributes to discourse about complex disasters by applying cultural lenses to the study of coastal infrastructure (such as seawalls and dikes), thus departing from studies that focus on characterising, assessing, and predicting the physical resilience of hard structural forms that dominate knowledge about coastal infrastructure.

Design/methodology/approach – This ethnographic study nuances Philippine coastal infrastructure through examining the material registers of a seawall bordering an island inhabited by artisanal fisherfolk. By “material registers”, this research refers to the socially informed ways of regarding and constructing material configurations and how the latter are enacted and resisted. Data collection was accomplished through focus groups with community leaders, on-site and remote interviews with homeowners, and archival research to further understand the spatial and policy context of the structure.

Findings – The discussion focuses on the seawall’s three material registers (protection, fragility, and misrecognition) and reveals how infrastructure built for an island community of fisherfolk simultaneously fulfils, fails, and complicates the promise of disaster resilience.

Research limitations/implications – This research demonstrates the potential of “material registers”, a term previously used to analyse architecture and housing, to understand the technopolitics of infrastructure and how materially informed tensions between homeowners’ and state notions of infrastructure contribute to protracted experiences of disaster and coastal maladaptation.

Practical implications – This research signposts the need for disaster risk reduction, climate adaptation, and sustainable development policies that legitimize the construction of infrastructure to recognize the latter’s relationship and impact on multiple spheres of coastal life, including housing and citizenship implications.

Social implications – This research highlights how infrastructure for coastal disaster risk management implicates geographically informed power relations within a community fisherfolk and between their “small” island community and more politically and economically dominant groups.

Originality/value – Whereas studies of coastal infrastructure are focused on quantitative and predictive research regarding hard structural forms in megacities, this study apprehends disaster complexity through examining the cultural and contested nature of infrastructure for coastal flood management in an island community of fisherfolk.

Keywords Disaster management, Coastal infrastructure, Flood management, Flood adaptation, Coastal adaptation, Culture, Disaster risk reduction, Fisherfolk, Community participation, Disaster citizenship, Anthropology of infrastructure

Paper type Research paper

© Pamela Gloria Cajilig. Published in *Southeast Asia: A Multidisciplinary Journal*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

The author would like to thank John Fien, Esther Charlesworth, Tim Smith, and Dana Thomsen for their constructive feedback as this manuscript was being developed. The author would also like to express gratitude to RMIT University for the generous financial support during her doctoral studies.



Climate hazards, including sea-level rise and cyclones, and their interrelationships with rapid urban development and population growth in coastal settlements have exacerbated inequalities that drive the uneven distribution of disaster risks. The challenges of protecting settlements from coastal flooding (Brinkmann, 2020) has prompted the proliferation of coastal infrastructure, specifically, hard infrastructural defense measures (such as seawalls, dikes, and revetments), due to their perceived effectiveness in protecting real estate and recreational activities; the popularity of hard structural protection measures among decision makers is likely why the former are the most frequently studied coastal adaptation measure (Malette, Smith, Elrick-Barr, Blythe, & Plummer, 2021). The ubiquity of hard coastal protection measures persists despite substantial evidence showing how these approaches create additional risks by engendering maladaptation, displacement, and disaster capitalism (Barnett & O'Neill, 2010; Klöck, Duvat, & Nunn, 2022; Cao *et al.*, 2021; Octavianti & Charles, 2018; Siriwardane-de Zoysa, 2020).

This paper contributes to the discourse on complex disasters by departing from quantitative studies that focus on characterising, evaluating, and predicting the physical resilience of hard structural forms that dominate knowledge about coastal infrastructure (e.g. Lansen & Jonkman, 2012; Kim, Nicholls, Preston, & Almeida, 2019; Tiggeloven *et al.*, 2020). Specifically, this ethnographic inquiry sheds light on disaster complexity by attending to the lived experiences of those most affected by disaster but least involved in disaster management decisions. In addition to showing how hard coastal protection measures can exacerbate the very coastal risks they aim to reduce, this research nuances disaster complexity by demonstrating how such measures contribute to protracted (re)construction processes and provoke the re-evaluation of one's stance within the politics of disaster management in an island context. Therefore, this study joins those who emphasize the multifaceted character of disasters by recognizing how the latter entangle multiple hazards, actors, and fields, create cascading consequences, and linger in the lives of those affected (Cajilig, 2022; Cutter, 2018; Lukaszewicz & O'Donnell, 2022; Wang, Zhao, & Liu, 2020).

As an archipelagic, monsoonal, and earthquake-prone country where sea level rise is four times the global annual average (Ng, 2020), the Philippines is a good place for studying disaster complexity. The country has repeatedly topped the World Risk Report (Bündnis Entwicklung Hilft and Institute for International Law of Peace and Armed Conflict, 2023) due to its exposure and vulnerability to multiple hazards, including climate hazards. These vulnerabilities are rooted in historically situated systemic inequalities that spiral due to rapid and market-driven urbanization, elite capture and corruption, lack of social protections, inconsistent coordination across various levels and branches of government during emergencies, among many other influences (Alcayna, Bollettino, Dy, & Vinck, 2016; Jha, Martinez, Quising, Ardaniel, & Wang, 2018; Takasaki, 2011; Yee, 2018). Learning from the many lessons of the COVID-19 pandemic, the World Disasters Report (International Federation of Red Cross and Red Crescent Societies, 2022) emphasizes the significance of "trust, equity, and local action" to preventing disasters (p. 6): communities and societies must believe that the public sector is looking out for their welfare, disaster risk reduction plans must not deepen existing inequities, and any effective disaster management measure requires recognizing the collective knowledge of local actors.

The 2023 World Disasters Report further recommends "active listening and community engagement" to document needs, concerns, and recommendations at the local level. As such, attending to the material registers of the seawall through ethnographic research with an island community that is relentlessly struggling against the numerous and interrelated consequences of entangled disasters is one such mode of listening and engagement. Recent research on materiality in a Philippine disaster context (Cajilig, Santos, Cervantes, & Sicam, 2023) establishes that artifacts of disaster recovery (such as houses and housing) are discursive formations because they index lived experiences of disasters. Indeed, the

material registers discussed in this paper collectively show how the seawall signposts concerns raised in the World Disasters Report by revealing a disaster-affected community's shifting feelings of trust in the government's ability and inclination to address disaster risk, the socio-spatial inequalities that worsen due to the disintegrating structure, and possibilities for establishing further bases of local action for disaster management. Previous work on the material registers of post-disaster housing reconstruction in the concerned island community demonstrates how tensions between registers (i.e. differences in how reconstruction materials were regarded by state representatives versus those rebuilding their homes after a typhoon) become sites of agency at the household-level while further straining the already meager resources of affected families (Cajilig, 2022). This paper builds upon existing work by extending the application of material registers from housing to infrastructure, thus revealing the hopes, anxieties, broken promises, and materially-grounded tactics that constitute the island community's attempts to negotiate daily flooding.

The discursive power of artifacts goes beyond narrow lenses of semantics and signposts "questions of 'being'" rather than "questions of 'reference'" (Miller, 1997, p. 397). Artifacts, artificial or otherwise, enable us to develop an understanding of ourselves and abstract concepts as well as act upon these understandings. The understanding of materiality in this paper draws from Miller (2005) who asserts that:

...much of what we are exists not through our consciousness or body, but as an exterior environment that habituates and prompts us. This somewhat unexpected capacity of objects to fade out of focus and remain peripheral to our vision and yet determinant of our behavior and identity had another important result. (p. 5).

Key to Miller's grasp of the material world is the idea of "the humility of things" (p. 5). The prevailing dualistic understanding that things are merely tools for accomplishing human endeavours is precisely the source of the humble power of artifacts to frame daily interactions and shape behaviour and identity. Furthermore, the significance of artifacts to our lives is shifting and relative: given a specific context, an artifact may become more *monumental* to us than others (Meskell, 2005; Miller, 2005). There are other artifacts in the island that are used for disaster management such as tide calendars, maps, and mobile phones, and loudspeakers. However, the seawall was the artifact that prompted the most impassioned discussions about disaster management particularly in the context of flooding and typhoons. In this sense, the seawall is a monumental artifact not simply because of its enormous size but particularly because of its looming significance in the lives of the fisherfolk and its wide-ranging implications for the long-term viability of island life in Manila Bay.

This study grasps the lived experiences of disaster by examining the socio-materially grounded beliefs and meanings that co-constitute coastal infrastructure. This research aligns with studies in disaster management that apprehend disaster contexts as loci of difference, tension, and unevenness (e.g. Cajilig, 2022; Guyton, 2022; Dalisay & De Guzman, 2016; Petraroli & Baars, 2022; Vaughn, 2012). These studies emphasize the gaps between the assumptions of policymakers and the lived experiences of disaster-affected groups and individuals as well as unequal power relations within communities experiencing disaster; therefore, they highlight the need for disaster management to integrate ethnographic expertise: "the ability to gain a contextual and grounded understanding and to act on the basis of such experience" (Rajan, 2002, p. 47).

To further nuance the materiality of the seawall in a disaster context, I draw from the anthropological perspectives of infrastructure and architecture. Infrastructure is the thing and the relationship between things (Larkin, 2013). Infrastructure is the foreground for activities such as engineering for flood protection and the background for others such as housing (Bowker & Star, 1999; Frichot, Carbonell, Frykholm, & Karami, 2022; Jensen &

Morita, 2017). An awareness of the relational nature of infrastructure thus generates research possibilities for investigating the latter's entanglements, the emergent consequences on the worlds it sustains or destroys (Venkatesan, Bear, Harvey, Lazar, Rival, & Simone, 2018), and, by extension, opens up avenues for nuancing the complexity of disaster. Consequently, even though this study is framed as a contribution to the understanding of complex disasters, the discussions signpost the potential of infrastructure to engage in themes such as climate adaptation and state–society relations (Coates, 2022; Siriwardane-de Zoysa, 2020).

In addition, this study deploys Victor Buchli's (2013) notion of "material registers" to examine the shiftiness of the seawall and its implications for analysing complex disasters. "Material registers" refers to the socially informed ways of regarding and making material configurations and the mechanisms through which these ways are negotiated. Buchli's idea of material registers recognizes architecture's illusory character: houses, for example, may seem like neatly bounded objects, but their meanings are subject to contestation and change. Similarly, infrastructure is a "terrain of power and contestation" in which multivalent political promises and trajectories unfold or fizzle (Appel, Anand, & Gupta, 2018).

Furthermore, Kendall (2019) emphasizes the similarities between architecture and infrastructure: architects in particular fall into the trap of assuming that built forms will remain static over time. An infrastructural approach to the built environment assumes alteration and modification as soon as built forms are completed. As such, the concept of material registers opens up possibilities for apprehending the dynamic material, social, and political contours of slippery artifacts such as the seawall (no pun intended). Material registers can also be used to glean the implications of infrastructural technopolitics, the potential of technical expertise for infrastructure to provoke and embody political desire (Wade, 2019), for the management of complex disasters.

The application of material registers in this research stems from the shifting and contradictory ways in which an island community of fisherfolk discussed the seawall. "Material registers" is therefore used to ask: How does the seawall variedly *register* to the island community? What do the seawall's material registers reveal about its impact on those who face increasing vulnerability to flooding? How might a grounded relational analysis of coastal infrastructure contribute to understanding disasters as complex phenomena?

I begin by describing the hydrometeorological and geophysical conditions that justify the construction of the seawall and provide an overview of its significance to the island community. I then proceed to describe the research methods and techniques used in this study. The following discussion centres on three material registers of the seawall: protection, fragility, and misrecognition. I conclude by reflecting upon the intricate ways in which these material registers reveal how a hard engineering interventions to address coastal flooding simultaneously fulfils, fails, and complicates the promise of disaster resilience.

The seawall in a multi-hazard environment

The seawall in question is located in Isla Sasa, an estuarine island in Manila Bay, a historically, culturally, and economically significant body of water in the Philippines [1]. Situated in the western portion of Luzon, Manila Bay opens up to the West Philippine Sea and drains approximately 17,000 km² of watershed, with the Pampanga River accounting for 49% of the influx of fresh water into the bay (Jacinto, Velasquez, San Diego-McGlone, Villanoy, & Siringan, 2006). The bay has long been a source of livelihood for coastal communities. However, the bay's natural resources have rapidly declined because of reclamation, industrialization, aquaculture development, and the encroachment of congested urban areas into marshes (Bankoff, 2003a, b; Jacinto *et al.*, 2006). These practices are legacies

of colonial interventions that introduced privatized land ownership as opposed communal land use and which contributed to the consolidation of settlements inland (into, for example, *pueblos*), thus leading to the neglect of coastal and riverine ways of life (Amano, Bankoff, Findley, Barretto-Tesoro, & Roberts, 2021; Fajardo, 2021; see also Ley, 2021a, b). Furthermore, even though communities living near the bay experienced regular flooding as early as the 19th century, these practices have prompted land subsidence, and, combined with deforestation in upper watersheds and conflicting views regarding land use, multiplied disaster risks in the area (Bankoff, 2003a, b; Rodolfo & Siringan, 2006).

Meanwhile, the increasing levels of tidal flooding in Manila Bay are likely caused by a sea level rise four times the global average and by surface runoff due to upstream flooding (Ng, 2020). My interlocutors, mostly fisherfolk, experienced unprecedented tidal flooding during June 2021, when tide levels reached as high as 5.2 ft (roughly 1.6m). As of writing, recovery from several typhoons that struck from 2020 to 2022 continues. Many of the island's 700 families have yet to fully recover from losses during Typhoon Glenda in 2014. The latter is the strongest typhoon in the island's recent history and one of the most destructive typhoons in the Philippines (Lara, 2020).

The construction of the seawall aligns with the emphasis on disaster risk reduction, climate change adaptation, and coastal resilience in the Manila Bay Sustainable Development Master Plan (National Economic and Development Authority, 2020). Certain islanders view the structure as the materialization of the government's recognition of their citizenship despite their status as a fisherfolk. However, the seawall's rapid decline also prompted the realization that the structure embodies the government's neglect of its citizens, thus emphasizing the dynamic and materially grounded techno-politics of infrastructure (See Plate 1) (Appel *et al.*, 2018; von Schnitzler, 2008). The seawall's shifting character also materializes the affective force of infrastructure (Larkin, 2013; Reeves, 2017). The structure was initially regarded with excitement by the island community who were eager for



Note(s): The seawall materializes both government recognition and neglect.
December 13, 2020

Source(s): Figure by author

Plate 1.
The seawall in
Isla Sasa

representation in the government's disaster risk reduction and management plans. As the seawall swiftly deteriorated amidst incessant coastal flooding, feelings of comfort and safety were soon replaced by anxiety, fear, anger, and resentment over the quality of the structure.

Research method and techniques

This doctoral research was attached to a larger project about leadership for community resilience that was a collaboration between universities based in the Philippines and the United States. My introduction to the community was facilitated by a researcher with long ties to the island via their role as head of a service-learning program of a Philippine university. This research also builds on my work in disaster response and recovery with typhoon-affected communities in the Philippines that spans more than a decade. This research also draws upon my personal experiences of disaster while growing up in the Philippines.

I co-conducted three focus group discussions with community leaders who were selected to participate either because of their role as elected officials or as active volunteers in the community representing various demographic segments such as senior citizens, youth, and mothers with schoolchildren. I also developed my ethnographic understanding of the seawall by conducting 14 informal interviews during walking probes around the island and during boat rides while travelling from my base in Metro Manila to the island and back (De Leon & Cohen, 2005). These informal interviews were conducted with focus groups participants who volunteered to taking me to sites within and around the island (by foot or by boat) which they felt "say" something about the community's experiences of typhoons and flooding. The Philippine COVID-19 lockdowns, unprecedented tidal flood levels on the island, and successive typhoons from 2020 to 2022 eventually prevented visits to Isla Sasa. Consequently, I remotely conducted an additional 31 semi-structured interviews with homeowners and with the help of a community contact, a health worker on the island. The homeowners represented the five neighbourhoods (*purok*) of the island which are differentially exposed to flood risks due to proximity or distance from the seawall. To understand the broader perspectives of coastal infrastructure, I also conducted remote semi-structured interviews with four disaster management practitioners based in the Philippines and Asia and with work in similar settings.

I supplemented informal and semi-structured interviews with observations of transformations in the built environment using digital photography and guided by the framework of "buildings-to-be, buildings-in-use, buildings-in-renovation, buildings-in-becoming" (Yaneva, 2017, p. 11). To take photographs during the remote phase of the research during pandemic lockdowns, I sought the assistance of a community contact, a community health worker with experience in conducting needs assessments for disaster response; this was one way to minimize my influence on the research project and centre community voices (Cajilig *et al.*, 2023).

I classified interview verbatims and photographs using thematic analysis (Braun & Clarke, 2006). I grouped 120 initial themes into four meso-level themes (ecologies of reconstruction; social capital and disaster citizenship; the temporality of disaster management; and the materiality of infrastructure) that reflect a degree of truthfulness applicable to wider contexts (Greene, 2008). Once the four overarching themes were established, I supplemented the interviews with archival research to further understand the respective policy contexts of each.

The material registers of the seawall

This section provides a brief overview of flooding and coastal infrastructure in Isla Sasa, followed by a discussion of its three material registers. Long-term residents of Isla Sasa

recalled that, by the 1960s, the island's seawall had already been built on its western side where their *pantalan* (wharf) is located. "It has been part of our life here on the island since I was young," said Lucio, a corral fisher in his late fifties during a remote interview on November 20, 2020. In the past, the relatively low height of the seawall did bother residents. "Flooding rarely happened," recalled Alma (during our mobile phone conversation on December 22, 2020) who was born in Manila and moved to the island in the sixties. Eventually, the islanders noticed an increasing frequency of flooding within the island. Flooding during high tide also began to overtake the main street and their homes.

The Manila Bay Sustainable Development Master Plan Annex 4–Community FGD Report states that a seawall was constructed on the island in 2017 through the Provincial Government (National Economic and Development Authority, 2020). Residents mentioned that the height of the original seawall on the western side of the island was increased for a second time (the first time being the late eighties), while additional portions were recently added to the eastern side of the island near the Isla Sasa Elementary School and the wharf on the island's western side. I observed these structures during my first visit to the island in early 2020. Accounts of who the seawall extension's proponents are vary and conflict based on resident and "expert" interviews.

The following discussion focuses on the seawall in its present iteration.

In *infrastructure as protection*, I explore how the fortified seawall created a sense of safety during intense flooding, particularly in the areas of housing and mobility. Meanwhile, *infrastructure as fragility* indexes how the seawall materializes disaster governance challenges. Finally, *infrastructure as misrecognition* refers to the shifting contours of citizen participation that have emerged through the fortification of the seawall.

Infrastructure as protection

Before the seawall extension, residents relied on a fishpond dam on the northern side of the island to protect their homes from severe flooding and storm surges. The dam collapsed during Typhoon Glenda in 2014. Inhabitants attributed their suffering during and after the typhoon to this collapse. Erwin, a local councilor, described the fear and anxiety of the community after the dam collapse and before the most recent fortification of the seawall:

When the seawall was not yet there, typhoons or rainy seas would arrive and we would all be afraid. Why? We did not have a barrier like the dam that would protect our houses. Each time they [typhoons and rain] come, the danger fills our hearts and minds. Why? Because when big waves strike, many of them destroy our homes (focus group discussion, February 15, 2020)

The seawall extension was valued for the safety it provided schoolchildren during their walks to and from Isla Sasa Elementary School, the only school on the island (see Plate 2). Before construction, parents transported their children to school during high tide flooding by, for example, carrying them or tugging them on makeshift rafts. With the extension, children could walk on the seawall to and from school to avoid the frequently flooded and slippery main street. According to April, a schoolteacher:

The [seawall] really helps because when it was not yet built, [the street] was slippery. Many children would slip. They would come to school drenched. Or they would arrive home drenched. (personal communication, December 22, 2020)

The general concern for the continuation of formal education is rooted in the desire of parents to lift their children and families out of poverty. While many parents prefer to stay on the island to continue fishing, they strive to provide their children with the capacity to leave for stable employment. According to Nina, who has four children:



Note(s): Before it was destroyed by flooding during the 2020 monsoon season, the seawall was a reliable alternative route for students walking to their elementary school whenever the island's main street was flooded. February 22, 2020

Source(s): Figure by author

Plate 2.
The seawall before the
2020 monsoon season

If it were up to me, I want all my children to finish college. . . I want them to have decent jobs. Not here in the sea, not here on the island. . . life is hard here. (personal communication, June 8, 2021)

When it was newly built, the seawall became the students' alternative route to their elementary school whenever the island's main street was flooded.

The seawall addresses specific flood-related concerns in tangible ways. Its height and materials (cement concrete and steel) prevented large waves and storm surges from applying direct force on certain houses in Isla Sasa. Meanwhile, the wide and flat surface of the seawall prompts residents, especially schoolchildren, to perceive and use the structure as a walkway during high tide. Therefore, residents nuanced coastal protection in two ways: protection from the size of the flood and protection from the force of large waves and storm surges.

Infrastructure as fragility

Hilhorst, van der Haar, and Weijs (2017) define "fragility" as a state's lack of ability, responsiveness, and willingness to safeguard the lives and well-being of its constituents. The authors highlight the spatiality of fragility: it is created from global and regional conditions, and its contours also vary locally. Indeed, this subsection demonstrates that fragility in Isla Sasa materializes from unequal hazard exposure and socioeconomic standing across Philippine municipalities (Piepora, Belarga, & Alindogan, 2020).

Fragility within the island is partly traceable to the difficulties in addressing land subsidence as a major cause of flooding within Manila Bay (Rodolfo & Siringan, 2006; see also Colven, 2017). According to the Municipal Planning and Development Officer [MPDO], the town of Isla Sasa currently defaults to groundwater overextraction, the cause of land subsidence, because it is located too far away from surface sources that prioritize supplying water to Metro Manila (which accounts for 36% of the country's gross domestic product) and

other nearby areas within the province (ABS-CBN News, 2019). Isla Sasa inhabitants therefore fully rely on the extraction of groundwater at the risk of exacerbating flooding on the island. These findings validate the assertion of Hilhorst *et al.* regarding the emergence of fragile settings from inequalities within states. In this case, the problem of land subsidence arises from economic and geographical inequalities between Metro Manila and surrounding areas.

The attribution of flooding primarily to land subsidence raises questions about the viability of hard structural solutions, such as the seawall, as a flood management strategy in Isla Sasa. Rodolfo and Siringan (2006), who studied the anthropogenic factors of flooding in Manila Bay, advised against downplaying land subsidence as a cause of flooding in the area. They also caution against assuming that flooding can be addressed through large infrastructural projects that are prone to ineffectiveness and corruption. Instead of relying on large-scale hard infrastructure to address flooding in Manila Bay, Rodolfo and Siringan (2006) recommend first resolving water supply concerns by providing sustainable and equitable water sources and revisiting land use plans.

Retreat, a frequently suggested coastal adaptation strategy for small islands (Jamero *et al.*, 2017), was previously identified by the town's 2011 to 2020 Comprehensive Land Use Plan as a potential climate change adaptation strategy for the Isla Sasa community (Barisky, Carter, & Crego-Liz, 2014). The Municipal Disaster Risk Reduction and Management Council (MDRRMC) held a workshop in early 2021 to update the town's disaster management plans considering a five-year planning horizon. Upon reviewing the town's disaster management performance vis-à-vis hazard projections, available funding, and lack of available land for relocation (due to the entire town's exposure to land subsidence), plans for the retreat are currently on hold. The MPDO summarized the council's decision to set realistic flood risk management goals despite awareness of the intensifying geophysical and hydrometeorological hazards in the area:

...having big flood control projects is ambitious. Therefore, this time, one of the discussions was about what was feasible in the next five years. That is what we should include in the plan. (Municipal Planning and Development Officer, personal communication, March 16, 2021)

The MDRRMC believes that responsible disaster governance entails only committing to projects that can be covered by the limited local disaster risk reduction budget.

While the question of long-term disaster governance lingers, residents struggle with the diminishing protection offered by the seawall. Erwin, one of the local councillors, recalled that a few children recently slipped from the seawall because of the accumulating moss on its surface due to incessant flooding. "...we were able to save them, but they broke their bones," he said (focus group discussion, February 15, 2020). Meanwhile, according to focus group findings by the National Economic Development Authority (2018), a resident noticed that holes in the seawall allow water to seep through. Furthermore, Alma, who lives near the western seawall, also finds little value in the structure, especially after flooding during the 2020 monsoon season severely destroyed the structure. "My house is still submerged. It's like the seawall helps the water go straight through," she relayed during our remote interview on September 28, 2021 (see Plate 3). Alma began funding the construction of the family home in 1992 while working as a domestic helper in Saudi Arabia. Thirty years later, the house remains unfinished yet also in disrepair, despite modifications (such as building a concrete flood barrier by the house's entrance) to stop the flooding from flowing into the home.

Infrastructure as misrecognition

This material register concerns the seawall as a central figure in the politics of recognition within Isla Sasa. I draw upon Lynch (2004) to posit that this politics partly stems from the islanders' collective sense of identity as "little people" from a small island who are



Plate 3.
Housing vulnerability
in Isla Sasa

Note(s): Alma's home continues to be in disrepair as the flood barrier by its entrance and the seawall prevent floodwater from inundating the island. December 13, 2020

Source(s): Figure by author

undeserving of adequate disaster risk reduction support. "We are not given assistance by the government because we are such a small population considering the expense," said Don, a retired corral fisher, when asked whether it is worth voicing out the lack of post-disaster recovery assistance for the island during our conversation in home on February 22, 2020. The limited influence of Isla Sasa residents on disaster resilience initiatives was echoed by a provincial government representative who worked on the distribution of shelter assistance for the community after Typhoon Glenda in 2014. In response to residents' comments regarding the mismatch between the construction materials distributed and the actual materials of the destroyed houses, "the representative remarked that the destruction came from nature and not from the provincial government; the provincial government was the one that gave materials, and so residents should just be thankful" (field note, February 12, 2021).

The provincial representative's outlook indicates the misrecognition of the Isla Sasa inhabitants as charity cases who ought to be grateful for any assistance instead of citizens whose rights have been affected by disaster (Carver, 2018). Misrecognition by others can lead to the suffering of an individual or group, especially if society reflects an undignified or deplorable image of the misrecognised (Taylor, 1994).

To a limited extent, the seawall's planning process departs from the provincial representative's narrative of misrecognition. Certain community members felt that they were given a rare opportunity to relay their concerns to authorities and access technical expertise for flood adaptation. Linda, a community leader who actively participates in disaster response, recalled her excitement over the prospect of being consulted regarding the seawall:

Along with the Mayor, there were engineers from all sorts of places. They asked us to come, [to let them know] whether we agree with that seawall. Of course, we, the poor, want that. (Linda, personal communication, September 28, 2020)

However, the arrangements for the community consultation session on the seawall reflected problems in recognition. Community leaders said that participation in the consultation meeting was limited to only the local officers and beneficiaries of the Philippines' *Pantawid Pamilyang Pilipino Program* (4Ps), a social protection program focused on meeting health and education objectives through conditional cash transfers. According to Linda, a community volunteer:

The mistake was that only 4Ps beneficiaries were asked to attend. It should be the whole community. Because the 4Ps [beneficiaries] are not the only people here. It should have not been that way. The mayor was the main guest. (focus group discussion, March 7, 2020)

In addition to highlighting the non-recognition of non-beneficiary residents, the group further revealed that the 4Ps beneficiaries likely attended the “consultative” meeting out of fear. During a focus on group on February 15, 2022, Lanie, one of the community volunteers who assists in the implementation of the 4Ps said, “They were afraid [not to attend] because they will be reported. They could be removed from the program.” In [Arnstein's \(1969\)](#) foundational work on citizen participation, such circumstances could be classified as “manipulation” rather than “consultation” considering the climate of anxiety around the consequences of non-attendance, which was likely exacerbated by the mayor's presence during the session.

The completed structure perplexed members of the community who felt that the “improvements” failed to address their growing anxieties regarding the intensifying flooding on their island. They were surprised that the seawall only protects the eastern and western sides of the island. “We wonder why the seawall does not encircle the entire island,” said Pat, a retired fisher and active community volunteer during a remote conversation on November 13, 2020. Additionally, upon viewing video footage showing that the seawall was only constructed at the eastern and western sides of Isla Sasa, an environmental planner who was interviewed for this study inferred that the structure may have been built to prevent erosion. “It somehow is maybe not entirely about flood control,” said the planner (personal communication, February 8, 2021). Second, the seawall's uneven height prompted concerns that some *purok* (neighbourhoods) would be more protected than others. The structure's height was also lower than expected. Don, a homeowner whose house beside the Eastern Seawall is perpetually flooded, asserted:

If the wishes of the community were followed, the seawall would not be this low. Based on my observations, it appears that they scrimped on the materials. (personal communication, August 14, 2020)

Indeed, the quality of the seawall has been a major concern for residents who observed signs of damage after just one year of construction. “[The concrete] cracked then it became a hole. This seawall that they built is completely ruined,” said Alice, a homeowner who has lived on the island since birth, during our interview on December 22, 2022 (see [Plate 4](#)). Both portions of the seawall were further destroyed in July 2021, when two typhoons struck the island. Meanwhile, Linda, who was present as a community volunteer during the consultation meeting, was also surprised at how “ugly” the seawall was after construction; she believes this to be a sign of corruption. Linda further stated:

[The seawall] should be well-built because it is for the safety of the citizens. It really should be well built because there are many of us citizens here, more than two thousand [residents]. If they bother to build it, hopefully it will not include corruption. (personal communication, September 28, 2020)

Linda's statement emphasized the government's misrecognition of the entitlements of Isla Sasa residents as a disaster-affected community. Critical views of the government prompted by the seawall's disrepair are significant, particularly since many residents believe that



Plate 4.
The seawall
completely destroyed
After July 2021
typhoons

Note(s): The destroyed seawall materialises the misrecognition of the island’s citizens as well as generates possibilities for collective rights claiming. December 11, 2022

Source(s): Figure by author

expecting anything beyond limited disaster risk reduction assistance (i.e. relief goods) is futile. “There are too many processes. You will feel bad, if, in the end, [the government] will not give you anything,” remarked Lito, a transport boat operator (during a remote interview on February 7, 2021) who feels that relying on *sariling sikap* (self-help) for disaster recovery is better than trusting the government.

Responding to drone footage of flooding on the island, Dr Missaka Hettiarachchi, a global flood risk management expert from the World Wildlife Fund USA Environment and Disaster Management program with experience Philippine in disaster management, asserts that that a hard engineering approach to flood adaptation has “clearly not worked” for the island community. Instead of relying on large-scale hard infrastructure to address flood adaptation in Manila Bay, [Rodolfo and Siringan \(2006\)](#) recommend first resolving water supply concerns as well as using non-structural methods (methods that do not require the alteration of the built environment), including revisiting land use plans (see also [World Wildlife Fund, 2016](#)). Similarly, Hettiarachchi is critical of the tendency to default to hard engineering without forming flood risk management objectives in a participatory manner:

In most cases, decision-makers jump into the solutions and the methods. In most cases, those methods are hard engineering. In a case like [Isla Sasa], if you have strong community engagement and have a very comprehensively engaged process of first developing flood risk management objectives, I think that might be a good point of departure. (personal communication, September 4, 2020)

As such and in the case of Isla Sasa, citizen misrecognition is rooted in the misrecognition (intentional or otherwise) of the root causes of flooding and the appropriate mix of solutions, as reflected by arguably knee-jerk and performative flood risk management (Wade, 2019). Hettiarachchi's views in particular signpost the need for citizen recognition at the beginning of the flood risk management process (i.e. the identification of flood management objectives). Such steps in recognition would not only index attention to procedural justice (in the form of citizen participation) but also epistemic justice, the recognition of the knowledge of those most affected by flood management decisions (Macalandag, 2024; See, 2023).

However, because the residents view the seawall as a public good, there are indications that accountability for disaster resilience has shifted, at least temporarily, from the private realm to the public realm. Whereas the transport operator earlier viewed the community's small population size and marginal stature as unworthy of voicing a critique of the government, the politics of misrecognition around the seawall as a public facility germinated the idea that three thousand poor citizens are worth a certain calibre of social protection. Residents' remarks about the collective disappointment of the community over the seawall index the potential of infrastructure to cultivation of "voice" within settings characterised by resignation to the misrecognition and indifference of others (Appadurai, 2013). Whereas residents recover their housing and livelihood through mostly private resources, the monumentality (Meskell, 2005) of the seawall drives the perception that it is a complex technology that only the government can provide—and therefore only the government could be held accountable for its failings (see also Malm, 2013).

Summary and conclusions

This ethnographic study of coastal infrastructure primarily draws on the concept of material registers (Buchli, 2013) to understand the materially grounded technopolitics of infrastructure (Colven, 2017; Larkin, 2013; Wade, 2019). The analysis expounds on the ways of perceiving and making hard structural coastal "protection" that involve specific modes of sociality and the ways through which the latter are mobilized and negotiated (Buchli, 2013). The three material registers (protection, fragility, and misrecognition) were discussed in the context of the seawall bordering an estuarine island that is also exposed to multiple disaster risks.

The analysis of the seawall's registers draws from a relational understanding of infrastructure that highlights its potential to implicate both tangible and intangible aspects of lived experiences of disaster. The relational ontology used to frame the seawall in this investigation highlights the structure's contradictory and affective nature (Frichot *et al.*, 2022). This ontological grounding has therefore demonstrated that, while infrastructure *can* be about the management of coastal risks, it can *also* be about other things, such as socioeconomic mobility, collective identity, inequality, citizen participation, and coercion.

Flux is inherent in the nature of infrastructure. Especially in a world overwhelmed by socio-ecological crises, infrastructures shift and break down as soon as they are built (In Kendall, 2019). Despite initial feelings of hope and safety when Isla Sasa's seawall extensions were built, islanders soon needed to undertake constant and burdensome infrastructural work to repair and alter domestic material surfaces that entangle with the fragile seawall soon emerged (see also Ley, 2021a, b). Infrastructural vulnerability then becomes part of disaster vulnerability and the experience of chronic disaster, where flooding, though

recognised as part of the island community's lifeworld, often results in feral consequences that limit agency and foreclose possibilities for recovery and sustainable life in Isla Sasa (Cajilig *et al.*, 2023; Ley, 2021a, b; Lukaszewicz & O' Donnell, 2022; Tsing, Deger, Saxena & Zhou, 2020). Therefore, the discussion of the seawall's material registers shows how the promise of disaster resilience that justifies the construction of hard coastal infrastructure can easily become a false one that exacerbates vulnerabilities and risks.

The world of chronic disaster indexed by the material registers in this research challenges the conventional phases of disaster risk reduction and management—preparation, response, recovery, mitigation (Neal, 1997; Boshier, Chmutina, & van Niekerk, 2021)—which inform domestic and international policy frameworks such as the Philippine Disaster Risk Reduction Management Act and the Sendai Framework for Disaster Risk Reduction. The limited relevance of such phasing is rooted in dissonances between, on one hand, situated realities underpinned by (in this case) perpetual and household-funded infrastructural work, and, on the other, official narratives and assumptions about disaster as exceptional events (Easthope, 2018). As such, experiences of chronic disaster within a global context of rapidly evolving hazards, where risk creation outpaces risk reduction, need to be regarded as impetus for urgent and widescale recalibration of how disaster ought to be defined and managed (Barnes, 2022; UN Office for Disaster Risk Reduction, 2023). Reframing official discourses about disasters in ways that better reflect lived experiences would help in assisting disaster-affected communities to thrive, not just survive.

Collectively, the material registers discussed in the paper also beg the question: why was the seawall built and who is it ultimately for? The seawall was presented to the island community as a means to minimize the risks of tidal flooding, however, one of the urban planners interviewed for the project believes that the structure may have more to do with the prevention of coastal erosion. The clearly substandard quality of the structure and the islanders' suspicions of corruption raises doubts regarding the sincerity of either objective. Meanwhile, determining accountability for the structure has been a challenge throughout the research. The proponents of the seawall's most recent extensions remain unclear, with various stakeholders giving conflicting accounts (involving different state agencies and politicians) of how proposals for their construction originated. Institutional attachments to the seawall have shifted as the structure deteriorated, thus indicating the seawall's potential for political (in)utility and the community's vulnerability to patronage politics, as discussed in a related paper about the island's post-disaster housing reconstruction context (Cajilig, 2022). The political vulnerability of the island community and the ambiguity that cloaks the seawall extension's origins may ultimately limit possibilities for collective action based on the citizenship discourses provoked by the structure.

Critical analyses of infrastructure for coastal adaptation emphasize neoliberalization of coastal defense, specifically, the use of hard engineering to protect of private property rather than the safety of citizens (Colven, 2017; Malm, 2013). Without clarity on the seawall's proponents, establishing the structure's formal links to neoliberal planning objectives has likewise been a challenge. However (and as a postscript to this research) in a conversation with one of the community leaders in December 2023, one of the most discussed topics in the island has been the looming 16,000-ha Manila Bay Integrated Flood Control Coastal Defense Expressway (MIBFCCDE). The controversial reclamation megaproject, positioned as a contribution to both disaster mitigation and economic development, has been decried as illegal and environmentally destructive by many civil society groups, including fisherfolk organizations (Bello, 2022). MIBFCCDE is emblematic of hyper-planning that is marketed as a silver bullet to resolve multiple and complex urban challenges and which tends to draw upon the symbolic and performative power of infrastructure to evoke global competence, if not dominance (Wade, 2019).

The potentialities of MIBFCCDE have provoked new discussions in Isla Sasa about the insecurity of the island's future. Initial reclamation work has destroyed remaining mangrove forests in Manila Bay, vital breeding grounds for marine life, and further exacerbated flooding on the island, thus prompting renewed calls to reinforce the seawall. My interlocutor, who opposes reclamation, attended a "consultation" meeting for MBIFCCDE, which turned out to be a mere venue for convincing local stakeholders of the economic viability of the project. Once again, misrecognition in infrastructural politics prevails.

Crucially, a substantial portion of remote data collection for this research was conducted during the months leading up to the 2022 Presidential Elections and during the Duterte administration, a politically polarizing time. This politically charged environment made it difficult for me to delve deeper into the electoral politics in Isla Sasa as it relates to the seawall, with my interlocutors generally hesitating to discuss their preferred candidates and expound on their views of candidates' entanglements with infrastructural projects in the area. Establishing a deeper level of trust with most members of the community was also a challenge given the remote nature of the research. As such, this paper raises many more questions about the materiality of infrastructural technopolitics in Manila Bay. These questions could be taken up by further research and under more politically conducive research conditions.

To conclude, this study contributes to the discourse about complex disasters by examining the intricate materiality of infrastructure associated with coastal flood management. The material registers discussed collectively demonstrate that, despite initial experiences of hope and safety, the dynamic nature of coastal infrastructure, especially when nested within a disaster context characterized by political marginality, ambiguity, and volatility, can rapidly fail to deliver promises of resilience. In the case of this paper, this failure is constituted by the chronic exacerbation of the multi-layered, interrelated, and materially grounded vulnerabilities of a disaster-affected island community of fisherfolk. In conclusion, the seawall helps but—flooding on the island has worsened, residents feel unheard and mistreated, and the government has been unable to answer the question of long-term viability of island living in Manila Bay. Perhaps the seawall does not help after all.

Note

1. Isla Sasa and names of research interlocutors are pseudonyms.

References

- ABS-CBN News (2019). *NCR makes up 36 percent of PH economy, Bicol growing fastest [News]*. ABS-CBN News. Available from: <https://news.abs-cbn.com/business/04/25/19/ncr-makes-up-36-percent-of-ph-economy-bicol-growing-fastest>
- Alcayna, T., Bollettino, V., Dy, P., & Vinck, P. (2016). Resilience and disaster trends in the Philippines: Opportunities for national and local capacity building. *PLoS Currents*, 8. doi: [10.1371/currents.dis.4a0bc960866e53bd6357ac135d740846](https://doi.org/10.1371/currents.dis.4a0bc960866e53bd6357ac135d740846).
- Appadurai, A. (Ed.) (2013). *The future as cultural fact: Essays on the global condition*. Verso Books.
- Appel, H., Anand, N., & Gupta, A. (2018). Introduction. In N. Anand, A. Gupta, & H. Appel (Eds.), *The promise of infrastructure*. (pp. 1–38). Duke University Press.
- Amano, N., Bankoff, G., Findley, D. M., Barretto-Tesoro, G., & Roberts, P. (2021). Archaeological and historical insights into the ecological impacts of pre-colonial and colonial introductions into the Philippine Archipelago. *The Holocene*, 31(2), 313–330. doi: [10.1177/0959683620941152](https://doi.org/10.1177/0959683620941152).
- Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216–224. doi: [10.1080/01944366908977225](https://doi.org/10.1080/01944366908977225).

- Bankoff, G. (2003a). Constructing vulnerability: The historical, natural and social generation of flooding in metropolitan Manila. *Disasters*, 27(3), 224–238. doi: [10.1111/1467-7717.00230](https://doi.org/10.1111/1467-7717.00230).
- Bankoff, G. (2003b). Cultures of coping: Adaptation to hazard and living with disaster in the Philippines. *Philippine Sociological Review*, 51, 1–16.
- Barisky, T., Carter, C., & Crego-Liz, E. (2014). *Towards a local climate adaptation plan*. University of British Columbia. Available from: https://issuu.com/christopherj.carter/docs/9.20.14_lccap_hagonoy.compressed
- Barnes, P. (2022). What's in a name? Deconstruction risk and resilience. In Lukasiewicz, A., & O'Donnell, T. (Eds.), *Complex Disasters* (pp. 37–55). Springer Nature Singapore.
- Barnett, J., & O'Neill, S. (2010). Maladaptation. *Global Environmental Change*, 20(2), 211–213. doi: [10.1016/j.gloenvcha.2009.11.004](https://doi.org/10.1016/j.gloenvcha.2009.11.004).
- Bello, R. (2022). Philippine reclamations: Spreading, posing dangers. *Rappler*. Available from: <https://www.rappler.com/environment/reclamations-philippines-spreading-posing-dangers/> (Accessed 09 October 2024).
- Bosher, L., Chmutina, K., & van Niekerk, D. (2021). Stop going around in circles: Towards a reconceptualisation of disaster risk management phases. *Disaster Prevention and Management: An International Journal*, 30(4/5), 525–537. doi: [10.1108/DPM-03-2021-0071](https://doi.org/10.1108/DPM-03-2021-0071).
- Bowker, G. C., & Star, S. L. (1999). *Sorting things out: Classification and its consequences*. New York: MIT Press.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. doi: [10.1191/1478088706qp0630a](https://doi.org/10.1191/1478088706qp0630a).
- Brinkmann, R. (Ed.) (2020). Wicked Problems and Disasters. *Environmental Sustainability in a Time of Change* (pp. 55–82). Springer International Publishing.
- Buchli, V. (2013). *An anthropology of architecture*. London: Bloomsbury.
- Bündnis Entwicklung Hilft & Institute for International Law of Peace and Armed Conflict. (2023). *World Risk Report 2023*. Bündnis Entwicklung Hilft.
- Cajilig, P. G. (2022). Kinship as cultural citizenship in post-disaster housing reconstruction: Narratives from fisherfolk in the Philippines. In A. Lukasiewicz, & T. O'Donnell (Eds.), *Complex Disasters*. (pp. 265–287). Singapore: Springer Nature. doi: [10.1007/978-981-19-2428-6_14](https://doi.org/10.1007/978-981-19-2428-6_14).
- Cajilig, P. G., Santos, M. F., Cervantes, S., & Sicam, O. A. (2023). Understanding the materiality of disaster injustice in post-disaster housing reconstruction. *Philippine Studies: Historical and Ethnographic Viewpoints*, 71(4). doi:[10.13185/PS2023.71404](https://doi.org/10.13185/PS2023.71404).
- Cao, A., Esteban, M., Valenzuela, V. P. B., Onuki, M., Takagi, H., Thao, N. D., & Tsuchiya, N. (2021). Future of Asian Deltaic megacities under sea level rise and land subsidence: Current adaptation pathways for Tokyo, Jakarta, Manila, and Ho Chi Minh city. *Current Opinion in Environmental Sustainability*, 50, 87–97. doi: [10.1016/j.cosust.2021.02.010](https://doi.org/10.1016/j.cosust.2021.02.010).
- Carver, R. (2018). Shelter as a human right. In *The state of humanitarian shelter and settlements 2018 beyond the better shed: Prioritizing people* (pp. 15–18). Global Shelter Cluster. Available from: <https://sheltercluster.org/resources/documents/state-humanitarian-shelter-and-settlements-2018pdf>
- Coates, R. (2022). Infrastructural events? Flood disaster, narratives and framing under hazardous urbanisation. *International Journal of Disaster Risk Reduction*, 74, 102918. doi: [10.1016/j.ijdrr.2022.102918](https://doi.org/10.1016/j.ijdrr.2022.102918).
- Colven, E. (2017). Understanding the allure of big infrastructure: Jakarta's Great Garuda sea wall project. *Water Alternatives; Montpellier*. 10(2).
- Cutter, S. L. (2018). Compound, cascading, or complex disasters: What's in a name?. *Environment: Science and Policy for Sustainable Development*, 60(6), 16–25. doi: [10.1080/00139157.2018.1517518](https://doi.org/10.1080/00139157.2018.1517518).
- Dalisay, S. N., & De Guzman, M. T. (2016). Risk and culture: The case of typhoon Haiyan in the Philippines. *Disaster Prevention and Management: An International Journal*, 25(5), 701–714. doi: [10.1108/DPM-05-2016-0097](https://doi.org/10.1108/DPM-05-2016-0097).

- De Leon, J. P., & Cohen, J. H. (2005). Object and walking probes in ethnographic interviewing. *Field Methods*, 17(2), 200–204. doi: [10.1177/1525822X05274733](https://doi.org/10.1177/1525822X05274733).
- Easthope, L. (2018). *The recovery myth*. London: Springer International Publishing. doi: [10.1007/978-3-319-74555-8](https://doi.org/10.1007/978-3-319-74555-8).
- Fajardo, K. (2021). Aquapelagic Malolos: Island-water imaginaries in coastal Bulacan, Philippines. In K. D. Wolff, R. Faletti, & I. Lopez-Calvo (Eds.), *Hydrohumanities* (pp. 141–158). University of California Press.
- Frichot, H., Carbonell, A., Frykholm, H., & Karami, S. (2022). Our infrastructural loves. *Journal of Architectural Education*, 76(2), 52–69. doi: [10.1080/10464883.2022.2097509](https://doi.org/10.1080/10464883.2022.2097509).
- Greene, D. O. N. (2008). Categories. In L. M. Given (Ed.), *The SAGE encyclopedia of qualitative research methods* (pp. 71–72). Sage Publications.
- Guyton, S. T. (2022). National disaster imaginary: Mediatized disaster and Filipino subjectivity. In J. P. Telles, J. C. Ryan, & J. L. Dreisbach (Eds.), *Environment, Media, and Popular Culture in Southeast Asia* (pp. 291–304). Springer Nature.
- Hilhorst, D., van der Haar, G., & Weijs, B. (2017). Facing fragilities: The socially embedded nature of socio-economic recovery. In D. Hilhorst, & G. van der Haar (Eds.), *People, aid and institutions in socio-economic recovery: Facing fragilities* (pp. 1–15). Routledge.
- International Federation of Red Cross and Red Crescent Societies (2022). *2022 world disasters Report. (World Disasters Report)*. International Federation of Red Cross and Red Crescent Societies.
- Jacinto, G., Velasquez, I., San Diego-McGlone, M. L., Villanoy, C., & Siringan, F. P. (2006). Biophysical environment of Manila Bay – then and now. In E. Wolanski (Ed.), *The environment in Asia Pacific harbours* (pp. 293–307). Springer.
- Jamero, M. L., Onuki, M., Esteban, M., Billones-Sensano, X. K., Tan, N., Nellas, A., . . . Valenzuela, V. P. (2017). Small-island communities in the Philippines prefer local measures to relocation in response to sea-level rise. *Nature Climate Change*, 7(8), 581–586. doi: [10.1038/nclimate3344](https://doi.org/10.1038/nclimate3344).
- Jensen, C. B., & Morita, A. (2017). Introduction: Infrastructures as ontological experiments. *Ethnos*, 82(4), 615–626. doi: [10.1080/00141844.2015.1107607](https://doi.org/10.1080/00141844.2015.1107607).
- Jha, S., Martinez, A., Quising, P., Ardaniel, Z., & Wang, L. (2018). Natural disasters, public spending, and creative destruction: A case study of the Philippines. *SSRN Electronic Journal*, 317, 1–23. doi: [10.2139/ssrn.3204166](https://doi.org/10.2139/ssrn.3204166).
- Kendall, S. H. (Ed.) (2019). *Healthcare architecture as infrastructure*. New York: Routledge.
- Kim, M.-J., Nicholls, R. J., Preston, J. M., & Almeida, G. A. M. D. (2019). An assessment of the optimum timing of coastal flood adaptation given sea-level rise using real options analysis. *Journal of Flood Risk Management*, 12(S2), e12494. doi: [10.1111/jfr3.12494](https://doi.org/10.1111/jfr3.12494).
- Klöß, C., Duvat, V. K. E., & Nunn, P. D. (2022). Maladaptive diffusion? The spread of hard protection to adapt to coastal erosion and flooding along island coasts in the Pacific and Indian Ocean. *Regional Environmental Change*, 22(4), 136. doi: [10.1007/s10113-022-01989-x](https://doi.org/10.1007/s10113-022-01989-x).
- Lansen, A. J., & Jonkman, S. N. (2012). Vulnerability of port infrastructure for the port of Rotterdam. In J. C. J. H. Aerts, W. Boutzen, M. Bowman, P. Ward, & P. Dircke (Eds.), *Climate adaptation and flood risk in coastal cities* (pp. 53–74). Earthscan.
- Lara, T. (2020). *The most destructive typhoons in the Philippines*. LiFe • The Philippine Star. Available from: <https://philstarlife.com/news-and-views/755589-most-destructive-typhoons-ph-typhoon-rolly?>
- Larkin, B. (2013). The politics and poetics of infrastructure. *Annual Review of Anthropology*, 42(1), 327–343. doi: [10.1146/annurev-anthro-092412-155522](https://doi.org/10.1146/annurev-anthro-092412-155522).
- Ley, L. (2021a). *Building on borrowed time: Rising seas and failing infrastructure in Semarang*. Chicago: University of Minnesota Press.

- Ley, L. (2021b). Figuring (out) the sinking city: Tidal floods and urban subsidence in Semarang, Indonesia. In E. Elinoff, & T. Vaughan (Eds.), *Disastrous times: Beyond environmental crisis in urbanizing Asia* (pp. 46–64). University of Pennsylvania Press.
- Lukasiewicz, A., & O'Donnell, T. (Eds), (2022). *Complex Disasters*. Singapore: Springer Nature.
- Lynch, F., Yengoyan, A., & Makil, P. (Eds), (2004). *Philippine society and the individual: Selected essays of Frank Lynch*. Ateneo: Ateneo University Press.
- Macalandag, R. (2024). Invoking 'Indgenous circumstances' in disaster governance: Implications for disaster justice. *Philippine Studies: Historical and Ethnographic Viewpoints*, 72(1), 63–90. doi: [10.13185/PS2023.71404](https://doi.org/10.13185/PS2023.71404).
- Mallette, A., Smith, T. F., Elrick-Barr, C., Blythe, J., & Plummer, R. (2021). Understanding preferences for coastal climate change adaptation: A systematic literature review. *Sustainability*, 13(15), 8594. doi: [10.3390/su13158594](https://doi.org/10.3390/su13158594).
- Malm, A. (2013). Sea wall politics: Uneven and combined protection of the Nile Delta coastline in the face of Sea level rise. *Critical Sociology*, 39(6), 803–832. doi: [10.1177/0896920512437054](https://doi.org/10.1177/0896920512437054).
- Meskell, L. (2005). Objects in the mirror appear closer than they are. In D. Miller (Ed.), *Materiality* (pp. 51–71). Duke University Press Books.
- Miller, D. (2005). *Materiality: Politics, history, and culture*. Durham: Duke University Press.
- Miller, D. (1997). *Material Culture and Mass Consumption*. Wiley.
- National Economic and Development Authority (2018). Manila bay sustainable development master plan [government]. *Manila Bay Sustainable Development Master Plan*. Available from: <http://mbsdmp.com/>
- National Economic and Development Authority (2020). *Manila bay sustainable development master plan—final master Annex 4: Community FGD Report*. National Economic and Development Authority. Available from: <http://mbsdmp.com/reference-materials?page=3>
- Neal, D. (1997). Reconsidering phases of disaster. *International Journal of Mass Emergencies*, 15(2), 239–264. doi: [10.1177/028072709701500202](https://doi.org/10.1177/028072709701500202).
- Ng, D. (2020). *Why Manila is at risk of becoming an underwater city*. [News]. CNA. Available from: <https://www.channelnewsasia.com/news/cnainsider/why-manila-risks-becoming-underwater-city-climate-change-12537632>
- Octavianti, T., & Charles, K. (2018). Disaster capitalism? Examining the politicisation of land subsidence crisis in pushing Jakarta's seawall megaproject. *Water Alternatives*, 11(2), 394–420. doi: [10.1177/239965441881357](https://doi.org/10.1177/239965441881357).
- Petraroli, I., & Baars, R. (2022). To be a woman in Japan: Disaster vulnerabilities and gendered discourses in disaster preparedness in Japan. *International Journal of Disaster Risk Reduction*, 70, 102767. doi: [10.1016/j.ijdr.2021.102767](https://doi.org/10.1016/j.ijdr.2021.102767).
- Piepora, Z., Belarga, A., & Alindogan, A. (2020). At a glance. In M. C. Alejanria, & W. Smith (Eds.), *Disaster archipelago: Locating vulnerability and resilience in the Philippines* (pp. 1–20). Lexington Books.
- Rajan, S. R. (2002). Categorical politics and missing expertise. In S. M. Hoffman, & A. Oliver-Smith (Eds), *Catastrophe and culture* (pp. 237–259). School of American Research Press.
- Reeves, M. (2017). Infrastructural hope: Anticipating 'independent roads' and territorial integrity in Southern Kyrgyzstan. *Ethnos*, 82(4), 711–737. doi: [10.1080/00141844.2015.1119176](https://doi.org/10.1080/00141844.2015.1119176).
- Rodolfo, K. S., & Siringan, F. P. (2006). Global sea-level rise is recognised, but flooding from anthropogenic land subsidence is ignored around Northern Manila Bay, Philippines: Global Sea-Level Rise is Recognised. *Disasters*, 30(1), 118–139. doi: [10.1111/j.1467-9523.2006.00310.x](https://doi.org/10.1111/j.1467-9523.2006.00310.x).
- See, J. (2023). Disaster justice in climate resettlement: Is there a potential for equitable processes and outcomes?. *Philippine Studies: Historical and Ethnographic Viewpoints*, 71(4), 495–528. doi: [10.13185/PS2023.71404](https://doi.org/10.13185/PS2023.71404).
- Siriwardane-de Zoysa, R. (2020). Beyond the wall: Dyking as an object of everyday governance in the Bay of Manila, Philippines. *Marine Policy*, 112, 103661. doi: [10.1016/j.marpol.2019.103661](https://doi.org/10.1016/j.marpol.2019.103661).

- Takasaki, Y. (2011). Do local elites capture natural disaster reconstruction funds? *Journal of Development Studies*, 47(9), 1281–1298. doi:10.1080/00220388.2010.509786.
- Taylor, C., & Gutmann, A.(Ed.) (1994). *Multiculturalism: Examining the politics of recognition*. Princeton University Press.
- Tiggeloven, T., De Moel, H., Winsemius, H. C., Eilander, D., Erkens, G., Gebremedhin, E., . . . Ward, P. J. (2020). Global-scale benefit-cost analysis of coastal flood adaptation to different flood risk drivers using structural measures. *Natural Hazards and Earth System Sciences*, 20(4), 1025–1044. doi: 10.5194/nhess-20-1025-2020.
- Tsing, A., Deger, J., Saxena, A. K., & Zhou, F. (2020). *Feral Atlas: The More-Than-Human Anthropocene*. Stanford University Press.
- United Nations Office for Disaster Risk Reduction. (2023). *The Midterm Review of the Sendai Framework 2015-2030*. UN Office for Disaster Risk Reduction.
- Vaughn, S. E. (2012). Reconstructing the citizen: Disaster, citizenship, and expertise in racial Guyana. *Critique of Anthropology*, 32(4), 359–387. doi: 10.1177/0308275X12467718.
- Venkatesan, S., Bear, L., Harvey, P., Lazar, S., Rival, L., & Simone, A. (2018). Attention to infrastructure offers a welcome reconfiguration of anthropological approaches to the political. *Critique of Anthropology*, 38(1), 3–52. doi: 10.1177/0308275X16683023.
- von Schnitzler, A. (2008). Citizenship prepaid: Water, calculability, and techno-politics in South Africa. *Journal of Southern African Studies*, 34(4), 899–917. doi: 10.1080/03057070802456821.
- Wade, M. (2019). Hyper-planning Jakarta: The Great Garuda and planning the global spectacle. *Singapore Journal of Tropical Geography*, 40(1), 158–172. doi: 10.1111/sjtg.12262.
- Wang, L., Zhao, N., & Liu, D. (2020). Complex disaster management: A dynamic game among the government, enterprises, and residents. *Journal of Cleaner Production*, 266, 122091. doi: 10.1016/j.jclepro.2020.122091.
- World Wildlife Fund (2016). *Natural and nature-based flood management: A green guide*. World Wildlife Fund. Available from: <https://envirodm.org/>
- Yaneva, A. (2017). *Five ways to make architecture political: An introduction to the politics of design practice*. Bloomsbury Publishing.
- Yee, D. K. P. (2018). Violence and disaster capitalism in post-Haiyan Philippines. *Peace Review*, 30(2), 160–167. doi: 10.1080/10402659.2018.1458943.

Further reading

- Oliver-Smith, A. (1996). Anthropological research on hazards and disasters. *Annual Review of Anthropology*, 2(1), 303–328. doi: 10.1146/annurev.anthro.25.1.303.
- Webb, G. R. (2018). The cultural Turn in disaster 6 research: Understanding resilience and.

About the author

Pamela Gloria Cajilig is an anthropologist who completed her PhD in Architecture and Design at the RMIT University School of Architecture and Urban Design. Her research and practice are located at the junctures of community-based disaster risk reduction, participatory design, and climate adaptation. She is presently a Professorial Lecturer at the University of the Philippines College of Architecture and a Global Fellow at the Brown University Center for Human Rights and Humanitarian Studies. Pamela Gloria Cajilig can be contacted at: pgcajilig@up.edu.ph

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com