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## A PHENOMENOLOGY APPROACH TO RETHINKING COASTAL COMMUNITY VULNERABILITY TOWARDS SEA-LEVEL RISE

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KEYWORDS	ABSTRACT
coastal vulnerability, approach, community, phenomenology	Due to its proximity to the ocean and the danger it poses, such as sea level rise, coastal floods, tsunamis, and many other natural disasters, the coastal community has been long regarded as one of the most vulnerable communities. However, coastal communities that have prohibited these areas for a long period have grown accustomed to its threats, especially coastal floods, and have adopted localized survival and mitigation strategies. These events have tested the coastal communities' ability to adapt using limited resources, knowledge, and power. Using a phenomenology approach, this paper aims to illustrate the vulnerability exposed to the coastal community in Muara Baru, Penjaringan District, city of North Jakarta, Indonesia, using a geographic and exposure criteria to determine participants. Data gathered from in-depth interviews with head villagers and 25 residents of Muara Baru along with field observations to capture their lived experience as a community in terms of adaptation strategies and how they cope with the rising sea-level and coastal flood. Results show that contrary to previous conceptions, Muara Baru's coastal community are no longer vulnerable to sea-level rise and this research highlights the rising concern for social risks they experience. By focusing on this factor rather on the disadvantage due to their geographical location, policy designs can be tailored to support the enhancement and well-being of the community.

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### INTRODUCTION

Living close to the ocean can have various impacts on a community. Their exposure to the ocean means the natural resources potential in the coastal area can provide coastal communities with abundant livelihood opportunities. From developing its aqua sector and becoming a focal point for development in trade through its ports and industries, it has established high interconnectivity resulting in many economic incentives (Brito & Naia, 2020). Sea-level rise has become a growing global concern due to its rapid increase, especially for coastal cities. Over 17,000 islands in Indonesia made it one of the most vulnerable to sea-level rise and its impacts (Xu, 2023). Not only are coastal communities vulnerable to the already pre-existing natural hazards such as coastal floods, tsunami, hurricanes, and many more, but their dependency on the ocean as their source of income and its continuous degradation threaten their livelihood and would have direct consequences should these threats occur, making them vulnerable (Tran et al., 2019).

Muara Baru, a city in the Penjaringan District in North Jakarta, has experienced an increasing vulnerability to sea-level rise due to rapid land subsidence and urbanization, with many parts of the area living below sea level. With the current trend, it is predicted that sea-level rise in the coastal area of North Jakarta will reach up to 40cm (Varrani & Nones, 2018).

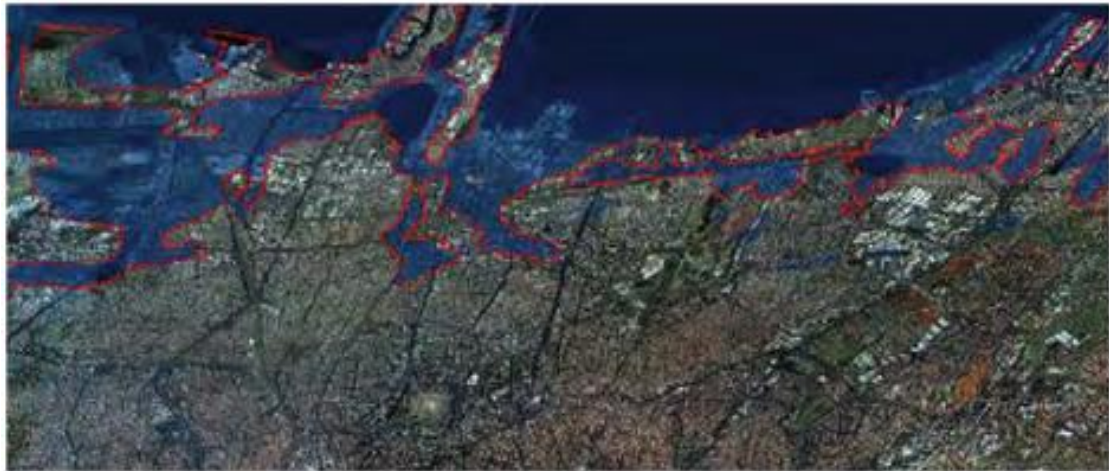


Figure 1. Map projection of Jakarta's sea-level rise

Source: Bandung Institute of Technology, 2007

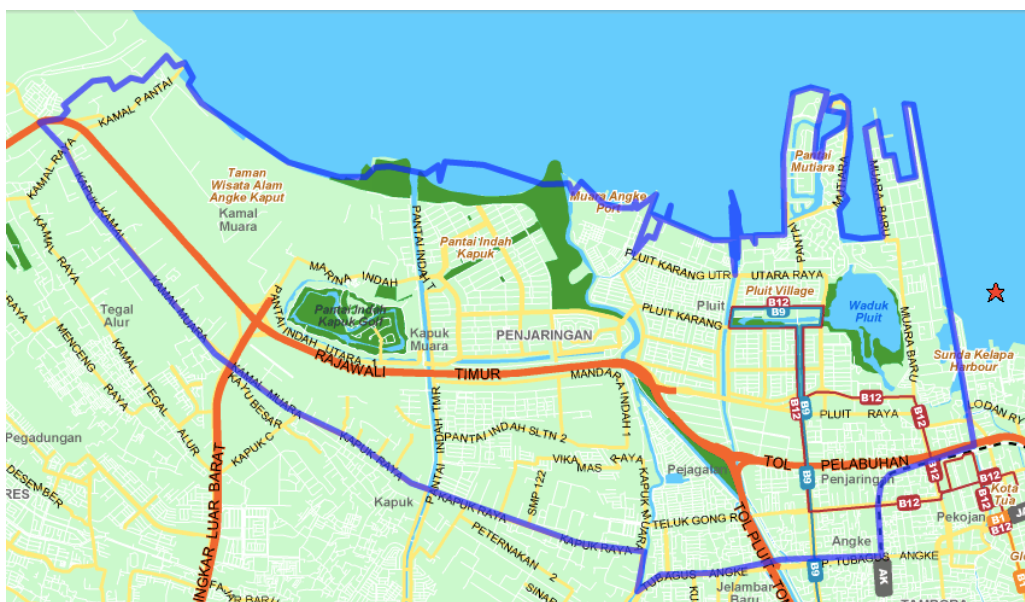
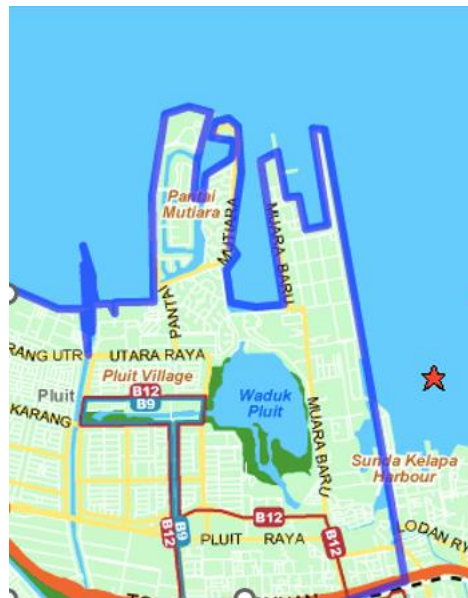


Figure 2. Map of Penjaringan District, North Jakarta

Source: Street Directory



**Figure 3. Map of the coastal community interviewed in Muara Baru, North Jakarta**

Source: Street Directory

This area within the capital city and its proximity to the central administration minimizes the opportunity to be alienated. However, this coastal community, just a few meters from the NCICD sea wall, has been struggling long before the wall was even built, and it is still struggling now. Interviews from the locals show that before the wall, their houses were just within the shoreline and that coastal flood was almost a daily occurrence. Most interviewed people were born and raised here and claimed to have made peace with the flood.

This mindset motivated this neighborhood to find survival and mitigation strategies on its terms using the available resources and how they managed to overcome environmental vulnerability while still fighting social vulnerability.

### **Exploring Muara Baru's coastal community vulnerability**

Prior to rethinking Muara Baru's coastal community vulnerability, it is significant to highlight how the coastal community is defined in this paper. Living close to the ocean and relying on the ocean's resources to support one's community can categorize the residence as a coastal community. Their activities' reliance on the ocean and the influence and interactions generate a coastal ecosystem within that community. In the case of residents of Muara Baru, although many still have high interactions with the ocean and their livelihood strongly depends on it, such as fishermen, many of its residents have other work unrelated to the marine environment. Their proximity is what ties them to the ocean, which still exposes them to the same threats that coastal communities with strong ties to the marine environment have. Not only can the ocean influence their living conditions, but also their socioeconomic activities. This will lay out the vulnerability assessment of the coastal community in Muara Baru, taking the environmental threat as more of an external factor contributing to their social vulnerability.

To capture the vulnerability of residents in North Jakarta, a social vulnerability index was done by BPS in 2008. It showed that the city had a 31,28%, the second highest vulnerability index after the Thousand Island Municipality also has a large population of coastal communities. This survey considered their social, economic, and other external factors, such as climate threats and policies. Due to the limited economic resources, low-income families face a big challenge in capacitating themselves with the necessary resources and procuring physical assets to protect them from threats (Siagian et al., 2014).

A study shows how although coastal communities are vulnerable to environmental threats, they are also found to have high adaptive capacity due to those threats using their adaptation strategies (Rampengan et al., 2016). The purpose of this research is to examine and see if the same adaptation strategies and vulnerabilities apply to Muara Baru's coastal community and assess their perception of vulnerability to accurately capture their current condition. Results from this research intends to pave the way for better policy designs and effective interventions.

## **METHOD**

This paper aims to depict the current conditions of the coastal community in Muara Baru and to portray that, a qualitative method was used with a phenomenology approach. Sea-level rise is an environmental phenomenon, and one coastal community is familiar with it due to its long exposure. A phenomenology approach highlighting the participants' experience allows the coastal community to express their perceptions, emotions, and responses to the phenomenon while providing valuable insight into their coping ability with the sea-level rise (Creswell & Poth, 2016).

This approach was also used to minimize fore-conceptions of the coastal community and the impacts of sea-level rise from the participants' perspective. Since both researchers have different experiences with the coastal community, this method was used to capture their general experience using their understanding from in-depth interviews to reassess the mainstream vulnerability perception of coastal communities. To ensure that the data collected can be as genuine and close to the experiences of the coastal community, this approach with very flexible research questions enables the participants to make claims on their terms (Larkin et al., 2021).

To capture the genuine experiences and perceptions of participants who have experienced a significant exposure to sea-level rise within a qualitative studies area, a purposive sampling technique was used. This participant criterion allows for strategically select in-depth insights from individuals that are relevant to the research objectives (Neuman, 2014). Data collection was taken over a period of a year, starting with field visits to observe the research location. Before engaging with the coastal community, it was significant to capture how the environment played a part in shaping their well-being and helped structure the interview questions for the participants. Since the focus of this research is to provide detailed accounts of their experiences, the research criteria include geographic criterion where participants should be coastal communities residing in Muara Baru. Other criterion to ensure the coastal community have faced the same vulnerability context this research tries to explore is the exposure criterion where participants interviewed and engaged are only those who have experienced a long exposure to sea-level rise, thus provide valuable accounts of their perceptions, emotions, and response. Engagement with the area's focal points was then established to conduct an in-depth interview with the neighborhood head. A group interview of 25 participants was held in a more intimate environment where they could share their experiences more comfortably.

Data analysis includes highlighting significant statements from the participants, translated into formulated meanings by the researchers, and broken down into a textural description supported by participants' verbatim quotes to capture the phenomenon. This process was then followed with a structural description analyzing the underlying structure or essence of participants' experience towards the coastal community's vulnerability (Creswell & Poth, 2016).

## **RESULT AND DISCUSSION**

To protect the individuals involved in this research, all names and identities have been concealed apart from their occupations which were important to provide context for their statements. From

interviews with the coastal community in Muara Baru, three significant statements were extracted with their formulated meanings, as shown in the table below.

**Table 1. Clustering significant statements into formulated meanings**

Significant statement	Formulated meaning
We suffered greatly before. Rain, flood, no electricity, or even clean water made us miserable. Cannot even take showers or go to the toilet. During extreme floods, they would give us food, but because it was unreachable, they would throw it, and it would get soaked.	Sea-level rise used to be a life-threatening phenomenon where the coastal community suffered from its impact during its disaster aid process.
(Regarding obtaining access to clean water) They told us to make reports, and we did through our mobile phones. They just kept saying yes. Sometimes they are the ones who are more stubborn; we never understand the protocols.	Obtaining access to other essential resources to support their daily life was made complicated.
(Regarding sea-level rise) The worry remains, but we are used to it.	The rising sea-level phenomenon is no longer considered dangerous to coastal communities as they found ways to adapt and live with it.

From the three formulated meanings gathered, researchers want to illustrate this phenomenon chronologically, starting from the time they were vulnerable to sea-level rise until their coping and adaptation strategies.

To simplify the formulated meanings, they were translated into three main themes of the findings that are 1) vulnerability towards the sea-level rise, 2) poor quality of resources to support daily needs, and 3) making peace with sea-level rise.

**Vulnerability Toward A Sea-Level Rise**

Sea-level rise has been a slow but steady phenomenon in Muara Baru, and people who have lived there for a long period have felt the significant difference from the time before the Jakarta seawall was built to after. This theme captures the coastal community's struggles before the seawall was built. It provides a lengthy account of how deadly and damaging the sea-level rise and coastal flood made them.

One participant detailed their experience during one of the coastal flood's aftermaths, stating, *"When it flooded, we would look for shelter and food. They would give us rice but throw it from rescue vehicles, those from the military, because they could not reach us. We got them, but they dropped it. The rice was soaking wet."* Another informant detailed a similar experience during another coastal flood claiming, *"We cannot shower; we cannot even poop."*

Not only did they experience difficulty obtaining food and water access, but the coastal flood also limited their movement and grounded them in their own houses. *"Before the seawall, it flooded almost every day. The main road in front was inaccessible; not even a motorcycle could pass it because of the water and because it was too slippery. Too much mud and moss since it flooded almost daily."*

**Poor Quality of Resources to Support Daily Needs**

One topic of conversation that was highlighted quite often during the interview was access to clean water. The head village stated, *"They told us to make reports, and we did it through our mobile phones. They just kept saying yes. Sometimes they are the ones who are more stubborn; we never understand the protocols."* Moreover, followed by a supporting statement from another informant, *"We have to be persistent; only then will they come. Moreover, when they do, because everyone needs it, everyone fights over it."*

Even after the seawall was built and access to piped water to households was provided, many difficulties remain, mainly that the water does not work most of the time. *"It is not that we are running out of water; they (PAM) just do not work. For instance, we have water at 2 PM, but later on, at 4 PM, the water would be dead. Look at that galloon; they are all empty. Later at night, it would work."* This was a daily occurrence, and sometimes the water would take up until a month to start working again.

The head village stated, *"Sometimes the water doesn't work until a month, and when that happens, we have no choice but to purchase clean water. Everyone would always chip in however they can like five thousand (Rupiah) per person."* Another informant also stated that sometimes, even Rp. 5.000 was still too much for them, *"If we do not have the money, the head village will cover the cost. What can we do? We do not have money."*

Apart from difficulty obtaining clean water, the coastal community also needs help dealing with waste management in their area, despite being an effective mitigation strategy towards environmental threats and considering their location as a fore line to the ocean. This topic was inquired due to the observation in the area where many loads of waste were accumulated and spread around the neighborhood. One informant stated that *"We burn (waste) it ourselves."* The head village then followed up, stating, *"We burn the garbage ourselves because they don't get picked up. We want them to collect the garbage, but what can we do? They do not collect it because we cannot pay for it."* The garbage would be stored and burned there since they have an extra land separating them from their houses to the seawall. *"We just throw it there since there is an empty land or to the ocean."*

One other essential need that requires improvement is its infrastructure. Due to their secluded location from the main road, as they have stated before, the community could repair infrastructure more quickly and often. A statement from one of the informants states, *"They (government) do not come here. If someone runs for office, they come here and repair the road."*

As a marginalized coastal community living below the poverty line, they are entitled to receive government assistance; this was the next topic brought up during the interview. One elderly informant who now works as a waste scavenger to support her daily needs stated, *"I don't receive BLT (direct cash assistance), and I have lived here a long time. They said I was not registered in their database. What can I do? However, people who live in decent houses receive it."* This topic of conversation soon turned into a planning strategy among the informants, who decided to go together to the District Office to inquire about this topic. One of the informants stated, *"Okay then, come on, let us rent a bus."*

Moreover, although this informant's motivation was met with doubts from the others who questioned her, such as *"And to do what?"* this was soon diminished by the head village's wife who stated, *"To ask them about this, to do something rather than kept begging for assistance. My husband even said so."* This was a new step for this coastal community because, as the head village's wife said, *"We never dared to do it."*

### **Making Peace with Sea-Level Rise**

After detailed descriptions of their past struggles before the construction of the Jakarta seawall and their current social condition, the coastal community then illustrates how they respond to sea-level rise and coastal flood now. When asked how they perceive the current sea-level trend, they responded, *"We do not care; we are used to it. We are so used to it because it has been years and years, and that is why we don't want to be relocated because we've been here for years, and our work is here."*

Their resistance to being relocated was also discussed in detail with the head village's wife stating, *"From the beginning, I already said I do not want to be relocated, because one, it would be far from our work. Moreover, relocation to flats requires a monthly payment, like renting a place. We do not have to pay our rent now. Our current jobs also pay already so little."* This statement was then followed by accounts from the elderly informants stating, *"Many of the people living here are also elderly people. What can we do?"*

One adaptive mechanism discussed during the interview was their coping mechanism during coastal floods. One informant recalled how kinship within their community is very strong due to their shared experience and common difficulties stating, *"Kinship is very strong and tight here."* When inquired about the coastal flood system, another informant elaborated that they did not have a



centralized alarm system informing them of the coastal flood events. Their alarm system was *"We wake each other up, door-to-door, informing that water is already close or high and that they should prepare."* This was also the same case in the aftermaths of coastal floods, where the area would be filled with waste, mud, and moss that would block their only access to the main road. They stated that *"We also clean that ourselves here."*

When asked if they are aware of the current environmental threat that is sea-level rise and the potential coastal flood in the upcoming years, they stated that *"Of course we are worried. The worry remains, but we are so used to it. Thankfully after the seawall building here, the coastal flood was not as bad as it was. Before, when I was little, I was so fed up with the flood. I've been in Jakarta since 1985, and it flooded back then. It is either flood, fire, flood, fire; I'm so fed up with both of them."*

Coastal communities that have prohibited coastal areas for a long period have grown accustomed to its threats, especially coastal floods. These events have tested the coastal communities' ability to adapt using limited resources, knowledge, and power, which are then turned into adaptive capabilities (Bott et al., 2019).

Findings in the previous section illustrate the chronological phenomenon of the coastal community's experience prior to the National Integrated Coastal Development (NCICD) development, which included building a giant seawall to tackle the rising sea level and resolve coastal floods. Before the seawall was built, the coastal flood was almost a daily occurrence, and an in-depth interview with the coastal community in Muara Baru portrayed their suffering in great detail. An in-depth interview with the head village during early engagements reveals how they lived right within the coastline, and many of their houses used extra foundations to prevent seawater from entering them. She showed how much they got pushed back due to the rising sea level. The area that used to be their neighborhood now lies outside the seawall, along with the infamous drowned mosque of Wal Adhuna (Arbi, 2021). During this time, they were vulnerable to environmental threats. Their already poor conditions and marginalized area only increased this threat as they had very few resources to cope with the coastal flood, a statement they also acknowledged (Esteban et al., 2017).

After the seawall construction, the coastal flood was no longer a daily occurrence; with this, environmental threats significantly decreased. However, this brings questions about whether they are still protected. Results show that the coastal community in Muara Baru still needs help accessing essential resources to support their needs. It is important also to note that there is a big group of elderly residing in Muara Baru, and the increasing daily needs prompted them to help their families to work and gain any money they can. However, the nature of the work in the coastal areas is challenging and unsuitable for the elderly such as working in ports, fishing markets, and other areas that require manual labor. The motivation remains, but they understand the circumstance and have no choice but to either stay home and help around the household or do other low-paying informal jobs.

Claims from the coastal community reveal that considering their demography and social conditions, little has been done to minimize those vulnerabilities they face, as simple as having proper aid registration. One of the most common forms of social aid (banjos) is direct cash assistance (BLT). Since its establishment and until now, the main challenge has remained the same: identifying the correct receivers. This was one of the most crucial processes in ensuring the aid would be directed toward people in need, which was low-income families, as opposed to middle-class ones (Gandhawangi, 2023). Efforts have been made to tackle this issue, with many government institutions tightening and re-identifying target receivers to ensure the aid would be used (BPKP, 2022). However, progress has been slow, as testified previously by the informants. One key positive takeaway from this research is that this discussion encouraged the coastal community to move and demand their rights by voicing their concerns to the district government.

Other findings include difficulty obtaining clean water, which proved to be a greater obstacle than fending themselves from coastal floods. Rather than fearing the threat of natural hazards such as sea level rise and coastal flood, this coastal community fears more the practice of extortion, commonly known as "jungle." Due to the scarcity of clean water and other affordable resources, this practice roams free within this neighborhood and in neighboring ones. Many illegal parties have taken advantage of this. As a result, access to clean water, waste management, electricity, and many more have become increasingly monetized; with their worsening economic condition, especially after the COVID-19 pandemic, this was a bigger threat to overcome them. Many residents fall below the poverty line and work in the informal sectors, such as fishermen, waste scavenger, and business owners of small stores, also known as "warung," and many are unemployed. Restraints on obtaining essential resources can potentially increase low-income households' vulnerability, which was the case for the coastal community in Muara Baru.

The last theme that concludes this research is how the coastal community perceives sea-level rise and whether they consider it a threat. Based on accounts from all the informants involved in this research, when we inquired what their number one concern is, including environmental hazards within their area, such as sea-level rise, coastal flood, and land subsidence, all of them stated grocery (cembalo). They claim their daily needs, such as food and water, were a much bigger priority rather than security over environmental hazards, a phenomenon they have been used to for a long time. This does not diminish the existing environmental threats they are aware of. However, this has allowed them to adapt and cope using their strategies, as limited as they are.

Findings show that this struggle has bonded the community closer with one another, creating a high social capital to cope with sea-level rise, as shown by their coastal flood alarm system, which is still very conventional but effective within their community. Since this was a collective burden, they felt compelled to put aside personal struggles and work together to ensure their community's safety, a common finding from marginalized and vulnerable communities (Braun & Abheuer, 2013). As a result, the coastal community in Muara Baru no longer regarded sea-level rise as a vulnerability factor since they have developed a coping strategy that has proven to be efficient for them now. This research shares similar results with previous studies done on other coastal communities, providing detailed accounts of what is considered as a weakness for the coastal communities in Muara Baru and can be a new assessment criterion for future policy developments.

## CONCLUSION

While the coastal community in Muara Baru is vulnerable, this research shows that it is not due to sea-level rise and its impacts or other environmental hazards. Coastal floods and other sea-level rise impacts pose certain threats to coastal communities. However, findings show that those occurrences have become normalized and that residents of Muara Baru have made "peace" with them. Findings show that they are more vulnerable to social conditions than the environment. Instead of allowing the lack of resources and the economic restraints in their community to hinder their capability to cope and adapt to vulnerabilities, they have learned to utilize their current resources and created a high social capital within their community. Results from this research provided not only what the coastal community in Muara Baru regarded as their priority as a community exposed to prolong impact of sea-level rise, but also their strong social capital that are borne as a result of this prolong exposure. This exposure needs to be recognized as a strength to guide policy designs and highlight their high coping and adapting strategy as opposed to what conventional perceptions of what are considered to be coastal communities' vulnerabilities.



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