

**A Qualitative Study on the Experience and Innate Knowledge Concerning Environmental Changes of the Residents in Selected Coastal Communities of Bongabong, Oriental Mindoro, Philippines**

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**Abstract**

The residents of the coastal communities illustrate deep-rooted experience and intrinsic knowledge can shape effective responses and comprehend environmental changes happening in various ecosystems. Their profound connection to both land and marine environment enables them adapt the challenges they encounter when natural hazards threaten their lives and livelihood. This intrinsic ability of humans that made them learn the changes occurring in the environment through experience is an interesting research subject that can be of help in providing valuable insights for researchers and policymakers that can be incorporated in local knowledge to improve environmental management strategies. The objective of this study explores the connection between experience and innate knowledge of the residents in the selected coastal communities of Bongabong which serves as a critical tool for understanding and addressing environmental change. This study employed a qualitative content analysis approach to explore the inner experiences of individuals that reveals how experiences shape the participants' realities. The study focused on the coastal communities of Bongabong, Oriental Mindoro, specifically in Barangay Aplaya and Poblacion. The study involved six residents from these areas selected through purposive sampling. The data analysis adhered to the Graneheim and Lundman qualitative framework, initial codes were extracted and merged based on similarities, leading to the identification of underlying concepts. Based on the analysis the following themes were formulated; Observation Regarding the Current Status of the Natural Surroundings, Distress Relative to the Changes of the Natural Surroundings, Human Influence in Relation to Environmental Stewardship, Future of Humanity, Ecosystem Services of Mangroves.

**Keywords:** environmental management strategies; Graneheim and Lundman qualitative framework; intrinsic knowledge; mangroves; marine environment; natural hazard.

## Introduction

Coastal communities are the front line of environmental change, this ecosystem faced challenges such as retreating shoreline, increasing temperatures, and altered weather patterns. Regardless of geographic location, coastal environment around the world experienced the impact of climate change including the upland ecosystems. In recent years, the effect of the abovementioned phenomena has become increasingly apparent. The coastal residents were noticing changes in weather patterns, extreme climate as well as sea level rise, typhoons becoming more frequent and intense impacting their livelihood, health and home (Malena-Chan 2019; Bercht 2021; Toivonen 2022; Fehrer et al. 2023).

Despite these challenges, the residents demonstrate remarkable resilience as they implement adaptive strategies to mitigate these changes based on their own observation of the surrounding, and understanding of their past experience. Particularly, fishermen residing in the coastal areas are diversifying their catch by exploring alternative fishing grounds or switching to aquaculture. Additionally, elders were working together to educate the community about sustainable practices, such as forest restoration both upland and marine ecosystem, which helps protect coastlines from erosion and provides crucial habitats for marine species. These practices were already learned by the coastal people long before campaign drives regarding the ecosystem services of the environment (Caraballo-Betancort et al. 2023; Kleinberg and Toomey 2023; Caggiano and Weber 2025). The innate knowledge of the coastal communities regarding the extreme changes that happens in the environment in terms of climate, weather patterns and biogeochemical processes provides them clear understanding, and proper decision-making to cope up with the unprecedented natural events. Relative to this, in Bongabong, a coastal municipality in Oriental Mindoro, Philippines, the residents possess a unique blend of experience and innate knowledge regarding the changes that happens in the terrestrial and marine ecosystem. Residents of Bongabong have lived in the coastal environment for generations. Their way of life is closely tied to fishing, farming, and commodities from the marine ecosystem. Through years of observation and adaptation, they have developed a keen understanding of seasonal changes and the behavior of marine life.

Based on the previous statement, the objective of this study explores the connection between experience and innate knowledge of the residents in the selected coastal communities of Bongabong which serves as a critical tool for understanding and addressing environmental change. Their lived experiences provide valuable insights for researchers and policymakers alike, emphasizing the necessity of incorporating local knowledge into environmental management strategies.

## **Methodology**

### **Research Design**

The study employed a qualitative content analysis approach to explore the inner experiences of individuals, revealing how these experiences shape their realities. This method is effective in this study as it allows researcher to immerse in the participants' experiential worlds and comprehend the meaning of phenomena from their viewpoints. In addition, the design creates a more meaningful discussion with the participants that leads to a substantial data collection.

### **Data Collection**

The research focused on the coastal communities of Bongabong, Oriental Mindoro, specifically in Aplaya and Poblacion. The study involved six residents from these areas selected through purposive sampling. The sampling technique is critical as it targets individuals with sufficient knowledge and experience relevant to the subject of the study.

Participants were required to have at least five years of residency in the coastal areas to ensure they had a comprehensive understanding of the changes occurring in their environment. Data collection occurred through semi-structured interviews, which were conducted individually in locations chosen by the participants for their convenience. The interviews began with introductory questions aimed at building rapport, followed by targeted inquiries aligned with the objectives of the study. Participants were encouraged to describe their observations about their living environments in detail, and probing questions were used to elicit deeper insights. The duration of these interviews varied between 30 to 60 minutes, depending on the responses of the participants.

### **Data Analysis**

The data analysis adhered to the qualitative framework of Graneheim and Lundman (Maguire and Delahunt 2017), which involves five stages: 1.) Immediate transcription of the interviews, 2.) Reading for a general understanding of each interview, 3.) Identifying units of meaning and initial codes, 4.) Categorizing similar codes into broader themes, 5.) Identifying underlying themes present in the data.

Transcriptions, both handwritten and typed, were created immediately after the interviews and reviewed multiple times for accuracy. Initial codes were extracted and merged based on similarities, leading to the identification of underlying concepts.

## Results

### Observation Regarding the Current Status of the Natural Surroundings

#### *Logging of Trees from the Forest*

In addressing the observation of the participants regarding the condition of the environment, they emphasized that the flood is different from the previous years and the wind becomes stronger compared from previous cycle. The waves of the ocean become stronger than their normal energy. Their statement pinpointed that logging and urbanization of a particular community caused damaged to the nearby ecosystem, as such, based on the affirmation of Participant 1, *“Today, people become poor, it is because of their wrong doings toward the environment that caused negative impact to our livelihood. They dump their garbage in the bodies of water, they cut down trees for logs and because of that there are floods, the typhoon becomes stronger. It seems that this year was different from the previous year, it bothers me.”* On the other hand, Participant 2 stated, *“The condition of the surrounding is unpredictable, the trees started to decline. The forested areas become settlement.”* In addition, Participant 3 stressed that *“Frequent flooding, because there are too many trees being cut from the forest, pollution is everywhere, I think ozone layer has depleted”*.

#### *Littering of Garbage*

Additional observation in the changes that is happening in the surroundings is the garbage or solid waste thrown in the bodies of water. Solid wastes and other kinds of waste are destroying the marine environment as experienced by Participant 4 *“There are too many vehicles and the ocean is becoming a garbage sink.”*

#### *Extreme Temperature*

As an additional observation from Participant 4 when logging becomes rampant the temperature continues to rise, *“I observed that today there are more houses than trees. There are too many forests being denuded. In that case, it brings extreme temperature.”*

#### *Use of Prohibited Fishing Gears*

Unlike the observation of the other Participants with relation to the cause of flooding and extreme temperature, the Participants noticed the negative impact of illegal fishing, as claimed by Participant 5, *“The fishermen used prohibited fishing gear when they caught the juvenile that will be the new stock for breeding in the wild.”*

#### *Poor Condition of People and Surroundings*

The poor condition of the surroundings has direct effect on the social and economic status of the people. This is an implication that when the environment is damaged, the situation of the community near them is affected. Participant 6, *“Nowadays, people become poorer because of the condition of the surroundings.”*

### **Feelings Relative to the Changes of the Natural Surroundings**

#### *Sickness*

Most of the Participants' feelings regarding the changing weather and climate are associated with the sickness that inflicts the community people. The Participants claimed that these changes in the weather and climate condition triggered common sickness to children and adult age, as cited by Participant 1, *“The climate and weather today caused the children to become susceptible to common sickness.”* On another interview with Participant 6, the interviewee responded that, *“Because of the climate people got sick, it's hard to earn money during these days. The municipal has no aid for us.”*

#### *Stress Due to Changes in Weather and Climate Condition*

On another interview to understand the feelings of the community people of the study site, a Participant expressed that the unpredictable changes in weather and climate caused stress. In support of this intimation, Participant 3 claimed *“The climate this year is very hot, it is stressful. Sir, the plants became withered because of the extreme temperature.”*

### **Human Influence in Relation to Environmental Stewardship**

#### *Agricultural Utilization*

Some Participants' idea about environmental stewardship is utilization. They are much interested in gaining the resources of a particular ecosystem. Thus, their purpose is for their livelihood and sources of basic needs. As mentioned by Participant 1, *“People used the open field for farming.”*

#### *Reforestation Mitigation to Logging*

Today, most of the trees from the forest are depleted because of logging, the same condition is observed by Participant 4, stating, *“I guess people cut down too many trees, it destroyed the forest because population increases.”* On the other hand, Participant 5, supported the same thought and stated, *“The people abused the environment, they cut down trees, too many of them.”* These revelations of the Participants support the devastating trends that are happening in the forest ecosystem. Thus, Participant 2 claimed, *“The people cut down trees, but there were groups of people that do tree planting.”*

#### *Solid Waste Management (SWM)*

The problems regarding garbage or wastes are resolved through the approach of Solid Waste Management (SWM). The people tried to clean-up the surroundings and classified the wastes for proper disposal. According to the statement of Participant 2, *“People cleared their surroundings from solid wastes.”* Participant 5 mentioned that, *“People learned to clean the surroundings. They don’t burn their garbage. They have coastal clean-up programs involving different groups.”* These statements are indication that people today are very much aware of disposing their garbage properly following the SWM concept

#### *Prevention of Environmental Depletion*

Environmental depletion is a general term that covers different areas of externalities within a specific ecosystem. Considering the scope of this identified stewardship that needs to be given attention for implementation, as Participant 5, claimed and stated *“People must be observant to prevent the depletion of the environment.”* The delivery of the statement is short but inside the mind of the Participant having said the idea, this shows awareness regarding urgent actions in protecting the environment.

#### **Future of Humanity**

##### *Financial Crisis*

According to the statement of the interviewees, when the environment becomes depleted, the cycle of the natural environment was disturbed causing more disasters. The climate change will be intensified because of the different anthropogenic activities, as Participant 1 mentioned, *“Life will not be easy, there will be no source of income. The Earth will be abnormal; there will be more calamities.”* Then Participant 6 added that, *“If the environment will be destroyed the people will be losing their source of income. They will look for other options.”* The depletion of the environment is associated with loss of income of people.

##### *Food Crisis*

The significant increase of environmental denudation influences the occurrence of events that made natural resources to be inaccessible. The food that is naturally acquired from the environment becomes unavailable when the depletion continues in the future. As stated by Participant 2, *“If the environment will be depleted, there will be no source of food.”* The Participant has a hint that loss of environment natural process and resources because of the destruction, both by anthropogenic and natural influences, threatens the availability of food in the future.

##### *Upland Natural Hazards*

Future projections regarding the problem of cutting tress in the upland are perceived by the Participant as threat to the situation of the mentioned ecosystem. According to Participant 6, *“There will be landslide and*

*flooding, if they don't stop cutting trees and mining there will be a tremendous flood.*" This statement is an indication of the Participant's knowledge that the trees are significant in holding the flood water that might destroy the biophysical factors of the highland.

#### *Tremendous Disasters*

Some of the Participants viewed that the destruction of the environment caused distress in the future among humans. The abnormal conditions of the climate because of anthropogenic intensification pose a threat to the properties and lives of people, as stated by Participant 3, *"The people will suffer when the environment deteriorates and climate change will intensify"* and Participant 4, *"There might be more disasters which are difficult to stop and can be tremendous. Humans and animals will be at stake."* The Participants have an understanding that climate change is a risk to humanity through the different natural hazards that this phenomenon can bring on the surface of the planet.

#### *Human Extinction*

The catastrophic natural disturbances that occur every year are sometimes the basis of the upcoming events in the future with relation to environmental deterioration. When Participant 2 is asked about the future of the humanity amidst the environmental deterioration, the Participant replied, *"There will be no source of income or worst the humanity will be extinct."*

### **Ecosystem Services of Mangroves**

#### *Shelter of Fish*

The ecosystem service identified by the Participants from the mangrove area is mainly shelter for the fish. The mangroves are efficient place for the fish to spawn and get feed, as stated by Participant 3, *"Mangroves are shelter of fish. They protect us from flood and breeding ground of fish. They need protection"* and Participant 1, *"They are the shelter of fish and their breeding ground."* This is an implication of the importance of mangroves for the marine life as fortification. These individuals perhaps observed or were informed regarding this ecological role of the mangroves.

#### *Provide Marine Commodities*

The mangrove ecosystems shelter different marine life especially the fishes. When the mangrove ecosystem is healthy, there is a high percentage of lurking organisms in the area. Based on the opinion of Participant 5, as the Participant stated, *"They provide fish shelters in the mangrove area. The people benefit from the fish of the mangroves."*

#### *Provide Fresh Air*

Mangroves provide a fair climate for the surrounding communities through the accumulation of fresh air, as claimed by Participant 6 mentioning “*They (mangroves) provide fresh air*” and Participant 5, “*It (mangroves) provided fresh air.*”

#### *Protection Against Coastal Natural Hazards*

The mangroves are known for their diverse ecological role. The disaster risk reduction concerns against natural hazards are similarly moderated by this ecosystem. As stated by Participant 1, “*Mangroves prevent coastal erosion.*” The Participant considered that mangroves can dissipate the erosion caused by tidal wave and sea level rise. The belief of the interviewee is possibly based on learned knowledge or own observation relative to the condition of the sediment content in the beach. Thus, Participant 2 stated, “*They are flood barriers and shelter of fish.*” The Participant has likewise identified mangroves as security from flooding. This affirms the capacities of the mangroves in buffering the strong current of flood water. These are significant in protecting settlements and biophysical factors near the area. On the other hand, protection against the turbulence of the strong winds is also provided by the mangroves as stated by Participant 5, “*They act as barriers from strong wind.*” These responses from the different individuals justify the importance of mangroves in reducing the impact of the abovementioned natural hazards.

## **Discussion**

### **Observation Regarding the Current Status of the Natural Surroundings**

*Logging of Trees from the Forest.* Continuous logging has significant consequences for the environment, particularly in relation to flooding and extreme weather events like typhoons. As the participants in the study noted, the removal of trees eliminates natural barriers that help mitigate these disasters. Without trees, the roots that typically absorb and slow down running water are stripped away, leading to increased flooding. Similarly, the absence of branches that can buffer strong winds means that communities are more vulnerable to the destructive forces of typhoons. The participants' understanding reflects a scientific awareness of the critical role that trees play in maintaining ecological balance and protection against environmental threats. Their knowledge shows the importance of sustainable forestry practices to preserve natural ecosystems and safeguard communities from the impacts of climate change (Maltempie 2017; Spence and Fleischman 2022).

*Littering of Garbage.* Observations made by participants in recent studies reveal their clear understanding between the mismanagement of waste and the deteriorating health of ecosystems. Improper garbage disposal by households, business establishments, and industrial factories has significant repercussions on the environment,

particularly in coastal zones. Furthermore, interviewees have noted that such practices contribute to climate change, as decomposing waste releases harmful greenhouse gases into the atmosphere. They know that the cumulative effect of these actions highlights the urgent need for effective waste management strategies to protect both the environment and the communities that rely on these upland and coastal areas for their livelihoods (Farage et al. 2024; Raphela et al. 2024).

*Extreme Temperature.* The participants have knowledge that rampant logging poses a significant threat to the balance of the earth's climate, as trees play a significant function in regulating atmospheric temperatures. They have an understanding but lack scientific details that forests act as carbon sinks, absorbing carbon dioxide from the atmosphere and mitigating the greenhouse effect that leads to global warming. In addition, participants pointed out that when logging occurs at an unsustainable rate, the removal of trees not only releases stored carbon back into the atmosphere but also diminishes the forest's capacity to sequester future carbon emissions. This disruption of the carbon cycle contributes to rising global temperatures, leading to more extreme weather events, altered ecosystems, and threats to biodiversity (Ige-Elegbede et al. 2024; Phan 2024).

*Use of Prohibited Fishing Gears.* The use of prohibited fishing gears has significant implications for the health of fish stocks in the ocean. Participants in recent discussions have expressed concern that these illegal practices result in the capture of juvenile fish, preventing them from growing to a size where they can successfully spawn. This threatens the immediate populations of various fish species but also jeopardizes the long-term sustainability of marine ecosystems. Participants highlighted that without intervention from authorities, fishermen who utilize these harmful methods will persist in their practices, thereby continuing to impose a serious threat to the overall condition of fish stocks in the ocean. (Bauge Sheard et al. 2019; Abakah and Owusu 2022).

*Poor Condition of People and Surrounding.* The participants recognize that exploitation of natural ecosystems has profound implications for human survival, and sustainability of the planet. For them, environment provide essential goods and services including food, water, shelter, and income. Additionally, they understood that humans have often prioritized immediate gains over long-term health of these systems resulting to both have poor condition. This short-sighted approach leads to significant damage, diminishing the ability of ecosystems to function effectively. Participants have also knowledge that when an ecosystem is compromised, the vital services it once offered become limited or entirely lost, disrupting the balance necessary for biodiversity and human well-being. As a result, the raw materials needed for the production of various goods, from agricultural products to construction resources, become increasingly scarce (Graff et al. 2022).

### **Distress Relative to the Changes of the Natural Surroundings**

*Sickness.* The impact of changing weather and climate conditions on the health of individuals living in coastal areas is profound and multifaceted as recognized by the participants. The human body often struggles to adapt to new stressors, leading to various health issues. This phenomenon is subtly captured in the reflections of affected residents, whose non-verbal cues during interviews reveal a deeper emotional state characterized by concern and anxiety about their well-being. While their statements may not overtly express distress, the underlying sentiment suggests a growing unease regarding the implications of climate variability on their health. (Noël et al. 2021).

*Stress Due to Changes in Weather and Climate Condition.* Extreme temperatures can significantly affect human sensation and mood, leading to a range of physiological and psychological responses. When temperatures soar, the body may experience discomfort due to heat, prompting irritability and stress as the senses become overwhelmed. High humidity combined with heat can exacerbate these feelings, making it challenging to concentrate and be comfortable. Conversely, frigid temperatures can evoke a different set of reactions. This physical response can impact mood, often resulting in feelings of unease or anxiety. Participants of the study have experienced the abovementioned condition due stress because of varying atmospheric events. They did not provide the scientific details of their encounter with relation to weather and climate conditions but their stories based on the things they observed in the surroundings supports their claim (Cianconi et al. 2020).

### **Human Influence in Relation to Environmental Stewardship**

*Agricultural Utilization.* For the participants, the stewardship of ecosystems often reflects a dual focus: the pursuit of profit and the sustainable management of natural resources. Agriculture stands out as a primary example, where the drive for efficiency and high yields often overshadows environmental considerations. While farming is recognized as one of the most productive occupational practices globally, it operates under the premise that maximizing output benefits all stakeholders involved. However, the participants have knowledge that profit-centric approach raises critical questions about the long-term sustainability of ecosystems. Their observations lead them to the idea that various regions suggest that farming, while effective in generating immediate returns, may inadvertently compromise the health of the environment (Dale and Polasky 2007).

*Reforestation Mitigation to Logging.* The participants recognized that logging activities pose a significant threat to forests worldwide, that may lead to a rapid decline in tree populations and biodiversity. Despite this alarming trend, it can be observed that the participants were aware of the information regarding various

reforestation programs have emerged as a proactive response, promoting tree planting initiatives. They believed that these programs are vital, as they not only aim to restore ecosystems but also enhance carbon sequestration, combat climate change, and support sustainable development. Tree planting is one of the most effective strategies for addressing the urgent issues surrounding deforestation and the depletion of forest resources. Through collective efforts and community engagement, these initiatives foster a greater awareness of environmental stewardship and the importance of maintaining healthy forests for future generations (Cunningham et al. 2015).

*Solid Waste Management (SWM).* The participants recognized various programs have been established to enhance clean-up drives in these coastal communities which for them aiming to foster compliance among residents regarding waste management practices. They have prior knowledge that effective SWM strategies involve the segregation of solid wastes, which is essential for preventing pollution of land, air, and water. Based on the results, encouragement of responsible waste disposal and promoting environmental stewardship, may reduce the volume of solid waste but also protect marine ecosystems and promote sustainable living. They understand that the success of these programs relies on community participation and awareness (Molina and Catan 2021).

*Prevention of Environmental Depletion.* The participants manifested based on the answers they provided during the interview that there was growing concerns over climate change, habitat destruction, and resource depletion. The participants recognize the weight of their contributions confirmed by their remarks on the condition of the environment. They emphasize on the immediate action that need a diverse perspective in developing innovative solutions due to anthropogenic activities. For them, policy reform and community engagement should be imparted for the community people leading to a healthier, more sustainable environment for future generations.

### **Future of Humanity**

*Financial Crisis.* The Participants have knowledge that when the environment is destroyed, the source of raw materials for production and other natural resources are becoming unavailable. Considering that they profit from these raw materials and other natural resources, their income is affected. This is the possible reason for the interconnection of the income and environmental loss. On the other hand, calamities likewise destroy the environmental resources even the properties of humans which happen to be the source of their income. In this case, financial scarcity might occur due to inaccessible sources of income (Indunil et al.).

*Food Crisis.* The participants have an understanding that security of food stocks was becoming an increasingly pressing global concern as environmental degradation accelerates due to human activities. As natural

habitats are destroyed and ecosystems are disrupted, the very foundation of food production is threatened. Overexploitation of resources, including deforestation, soil degradation, and pollution, has led to a decline in agricultural productivity. This situation poses a dire risk not only to food availability but also to the livelihoods of millions who depend on these resources (Zhu et al. 2022).

*Upland Natural Hazards.* The current state of upland forests is critical, as participants in environmental discussions have recognized the heightened risk of devastating flash floods due to tree depletion. The ongoing logging activities have severe repercussions, leading to soil erosion and reduced water retention capacity in the landscape. This understanding underscores the urgent necessity to cease tree cutting practices, which are not only detrimental to the ecosystem but also contribute to the increasing prevalence of flooding. By acknowledging the negative impacts of environmental exploitation, communities can mobilize to advocate for forest protection initiatives, emphasizing the vital role that healthy forests play in maintaining ecological balance and safeguarding human lives from the catastrophic effects of natural hazards (Beckman et al. 2015).

*Tremendous Disasters.* The extreme rainfall, intense temperature, strong typhoon, devastating winds and sea level rise causing coastal erosion are the dangers that climate change can specifically enhance as these natural hazards struck a particular community. The intensification of climate change and other natural hazards causing disasters are associated by the participants with the environmental depletion. This deterioration of the environment is caused by anthropogenic activities as suggested by one of the participants. This validated and strengthened the fact that rapid environmental destructions are caused by humans (Mueller et al. 2023).

*Human Extinction.* The notion of the participants that environmental loss may ultimately lead to the extermination of humanity was grounded in the interconnectedness of ecosystems and human survival. As natural habitats were destroyed, biodiversity diminishes, destabilizing essential ecological processes that sustain life, such as pollination, water purification, and climate regulation. The consequences of deforestation, pollution, and climate change not only threaten wildlife but also jeopardize food security, health, and economic stability for human populations. As resources become scarcer and natural disasters more frequent, social structures may crumble, leading to conflict and displacement (Sandberg 2018).

### **Ecosystem Services of Mangroves**

*Shelter of Fish.* The participants recognized importance of the environment to support humans and other biotic components basic needs are proven. The ecological processes to provide food, medicines, oxygen, materials for production, protection from natural disasters, climate regulation and even wellness are solely done by the

environment. They enunciate that destroying and total removal of the mechanisms that composed the environment result in imbalance, and furthermore, affect human lives. This is an implication that a healthy environment can support life on them even in the middle of devastation (Carrasquilla-Henao et al. 2019).

*Provide Marine Commodities.* Mangroves are essential ecosystems that not only provide crucial habitat for a diverse array of marine life but also serve as a significant source of marine commodities for both household and commercial use. These coastal forests are rich in biodiversity, supporting fish, crustaceans, and other marine species that thrive in their intricate root systems. Communities often rely on the resources harvested from mangroves, including fish and shellfish, which play a vital role in local economies and food security. When mangroves are protected, they not only sustain the marine species that depend on them but also enhance the livelihoods of the communities surrounding them (Rössler et al. 2022) .

*Provide Fresh Air.* Mangroves are unique coastal ecosystems that thrive in intertidal zones, providing crucial benefits to both the environment and local communities. Participants in studies of this ecosystem have reported that mangroves significantly influence the microclimate of their surroundings, creating a more suitable temperature for various species and organisms. The dense, shading canopy of mangrove trees not only protects the delicate undergrowth from harsh sunlight but also facilitates the circulation of fresh air, improving overall air quality. This protective environment fosters biodiversity, as many species rely on mangroves for shelter and breeding grounds. Furthermore, the presence of mangroves helps mitigate the impacts of climate change by acting as natural barriers against storm surges and coastal erosion, underscoring the importance of preserving these vital ecosystems (Akram et al. 2023).

*Protection Against Coastal Natural Hazards.* Mangroves are crucial ecosystems that play a significant role in safeguarding coastal areas from the impacts of extreme weather events, particularly flooding and strong winds. These unique trees thrive in intertidal zones, where they serve as natural barriers against rising water levels. The participants have highlighted that mangroves act as buffers against the strong currents of floodwaters, effectively reducing the force and potential damage to nearby settlements and biophysical environments. Their extensive root systems stabilize the shoreline and absorb excess water, which not only protects human communities but also preserves the delicate balance of coastal ecosystems. Furthermore, mangroves provide resilience against the turbulence of strong winds during storms, thereby enhancing the overall security of coastal regions. As climate change continues to raise sea levels and increase the frequency of severe weather, the importance of preserving and restoring mangrove forests becomes ever more critical for environmental protection and community safety (van Hespen et al. 2023).

## Conclusion

The residents of Bongabong, Oriental Mindoro, exemplify how experience and innate knowledge can inform responses to environmental change. Their connection to the marine environment enables them to adapt the challenges they face in the changing ecosystem, ensuring the sustainability of their livelihoods while preserving their cultural heritage. By recognizing and supporting the knowledge of these communities, experts and decision-makers can foster a more inclusive approach to environmental stewardship that benefits both people and the planet.

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