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TAGOLOAN MISAMIS ORIENTAL, NORTHERN MINDANAO PHILIPPINES: SHORELINE AND ITS IMPLICATION

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Abstract

Tagoloan, Misamis Oriental, Northern Mindanao, Philippines, is the nest of aqua economic hubs, livelihoods, and industries, which has an environmental challenge. The study focuses on Barangay Casinglot, Gracia, Sugbongcogon, and Baluarte, a coastal community along Macajalar Bay that traditionally depends on fishing and farming. However, industrial expansion near the PHIVIDEC Industrial Estate has brought threats like shoreline erosion, pollution, and habitat destruction to the marine life. Phenomenological, ethnographic, and anecdotal recording revealed that the rising tides and storm surges are damaging infrastructure and creeping and washing inland soil, worsened by the lack of mangroves or seawall protection. Despite these issues, the area remains important for small-scale fishing and tourism, offering clean waters and diverse marine life. But rapid, unregulated industrial growth risks harming both nature and human health. The sustainable management solutions include restoring mangrove forests, building seawalls, and enforcing stricter pollution controls. The community-driven efforts, combined with strong government support, are essential to protect both the environment and the people's livelihoods. Action is needed to prevent unfavorable, unhealthy ecological development that respects both nature and human well-being. It's a call to protect this dynamic coast through inclusive, resilient policy.

Keywords: *Baluarte Shoreline _ its implication*

Introduction

The Tagoloan, Misamis Oriental, Northern Mindanao Philippines shoreline has a beautiful sceneries interfaces between land and sea, shaped by the natural landscape on Macabalan (Macajalar) Bay. Alongside, the longshore and the rippling sand on the sea of Santa Cruz, Baluarte, Gracia, Sugbongcogon, and Casinglot where sunset and sunrise appearances declared the tides, waves, and currents of the bay engulf the breezes of the wind. It supports diverse ecosystems and offers essential services like small scale on fishing, tourism, and transport, yet it's vulnerable to challenges like surging on the north east wind blow, rising sea-level, and the globalization of garbage pollution carried by the north-west and north east wind monsoon, waves and current of the sea. These coastal dynamics have a direct impact on ecological resilience and community well-being, highlighting the importance of sustainable coastal management. Effective stewardship is necessary to preserve the geographical region's

rich biodiversity and ensure that natural resources continue to benefit both society and the environment (Gomez-de la Peña et al., 2023).

Shoreline in Tagoloan, Misamis Oriental Northern Mindanao Philippines, where water bodies from the inland meets in the low lying area, such as: the seven riverine system from Malitbog, Siloo, Titian, Mangima, Alalum, Amusig, and Dila Rivers from the seven great plateaus in one gigantic plateau on the province of Bukidnon. The Tagoloan River Basin serves as the catchment river basin of the seven rivers and is situated between 8°07‟ and 9°39‟ north latitude and 124° 44‟ and 125°12‟ east longitude in the provinces of Misamis Oriental and Bukidnon. The shoreline is primarily affected by siltation and the sand, gravel and soil withering and washing. However, the shoreline still interfaced by the fascinating wash sand and gravel along the coasts. This dynamic zone is shaped by the relentless forces of waves, tides, and currents, which sculpt the landscape and create a unique habitat for a diverse array of aqua plant and animal species. The frequent movement of shorelines has adversely affected the coastal ecosystem and resiliency.

The interaction between terrestrial and marine environments along the shoreline results in a constantly changing boundary that holds significant ecological, geological, and cultural importance in the area where mangroves grown naturally and preserved by the local government. However, during this study mangroves species and its number are slowly losing its likelihood. This coastal area are often hotspots for human activity, providing resources, transportation routes, and recreational opportunities. However, if this shoreline becomes open to commercial and transport routing it will lose its likelihood and favorableness to a healthful and balance ecology. The sea ports that are already initially done in Casinglot, Sugbongcogon, and Gracia this will expand to Baluarte until the mouth of Tagoloan river.

As the longshore of Tagoloan is favorable and likely being the hiding place against the blow of the wind, sea current and waves it will offer an advantageous docking point. The International Mindanao Container Port from PHIVIDEC, and the depot of Petron, Sea Oil, Kitrol and Jetti would become the turning point of creating and stablishing probably an another venue for safety and security purposes. And, this will soon become vulnerable to environmental pressures without sea wharf or sea dikes erosion, rising level of the sea and pollution would become the challenge of the shoreline. Additionally, understanding the healthful and ecological balance environmental preservation ecological integrity and ensuring the sustainability inhabitants of the area will live life to the fullest.

Tagoloan, Misamis Oriental, land area is 7,938 hectares. Tagoloan is composed of ten (10) barangays, namely: Baluarte (289 hectares), Casinglot (680 hectares), Sugbongcogon (87 hectares), Gracia (83 hectares), Mohon (282 hectares), Natumolan (622 hectares), Poblacion (341 hectares), Santa Ana (2,934 hectares), Santa Cruz (890 hectares), and Rosario (1,728 hectares). With the coordinates 8°32' North, 124°45' East (8.5391,124.7538). The distance from the national capital is 758.74 kilometers (488.23 miles) to the north-northwest (N31°w). The cities closest to Tagoloan are Cagayan de Oro City, El Salvador City, Gingoog City, and Misamis Oriental as the province. The Municipality of Tagoloan is a first-class Municipality. It hosted industrial developments such as Sanjia Steel Corporation, PHIVIDEC Industrial Authority, Kitrol, etc. Moreover, it has a shoreline and beaches, and sceneries. The Municipality's economy is largely driven by industry, commercial, businesses and agriculture, with crops like corn, coconuts, and rice being prominent of the geographic agricultural landscape.

Geographically, the municipality is bordered by Macajalar Bay on the west, indicating access to marine resources and the potential for port-related activities. The map also identifies rivers and varied terrain, with certain areas showing rugged topography. Such features are crucial for environmental planning, hazard risk reduction, and agricultural development. The topography affects drainage, land suitability for construction, and zoning regulations, making it an important aspect of the mapping.

The Tagoloan shoreline in Misamis Oriental, Northern Mindanao Philippines, represents a vital intersection of ecological richness, economic productivity, and community life. As both a natural barrier and a resource hub, it faces increasing pressure from industrialization, environmental degradation, and climate change (Mishra et al., 2022a). Thus, this study seeks to explore the multifaceted implications of shoreline use and may be able to guide the sustainable management strategies for a resilient Tagoloan.

Knowing the importance of mapping is essential for effective planning, resource management, and decision-making. It clearly shows barangay boundaries, infrastructure, and geographical features, aiding in urban development, disaster risk reduction, and environmental planning (Toimil et al., 2023). It also supports coordination with neighboring areas and enhances public awareness, education, and community engagement. The availability of multiple data sources (land cover inventories based on sampling and wall-to-wall mapping) has led to an intelligent land classification both regional and local levels (Gessler et al., 2024). So as to prepare the inhabitant the necessary action taken in time of risk management.

Economically, the shoreline sustains local fisheries and industries, forming a major part of household income for residents living nearby. Sustainable fishing and conservation efforts enhance fish stocks and improve long-term livelihood stability (Fernando et al., 2024). Thus, the well-known fish that becomes the delicacies in the Tagoloanon table was “Molly” it slowly becomes extinct. So as this fish was oftenly seen in the 13th largest Tagoloan river in the entire Philippine river system. Wherein, this fish was considerably omnivores that eat flakes, pellets, and algae, and are easy to breed. Their life was favorably engaged on the fresh water and sometimes in the salty one. Additionally, the area holds eco-tourism potential, inviting opportunities for economic growth while promoting environmental awareness (Guthrie et al., 2025). As the large area of the Municipality controlled by the PHIVIDEC holding it become the industrial hub. For Tagoloan to thrive, a balance must be struck between development and conservation to ensure a resilient, sustainable future (Hamburg, 2025)

Lastly, Tagoloan shoreline has its vulnerability alongside with the ecological and economic resource that supports marine biodiversity which provides livelihoods to the local community (Allison, 2025). Its ecosystems, such as coral reefs, seagrass beds, and other marine habitat help maintain marine balance and serve as protective buffers against the impacts of climate change. However, the absence of seawalls and mangroves increases vulnerability to storm surges, flooding, and erosion (Manoranjan et al., 2024). As these environmental threats intensify, preserving and restoring the shoreline becomes essential to safeguarding both biodiversity and community resiliency.

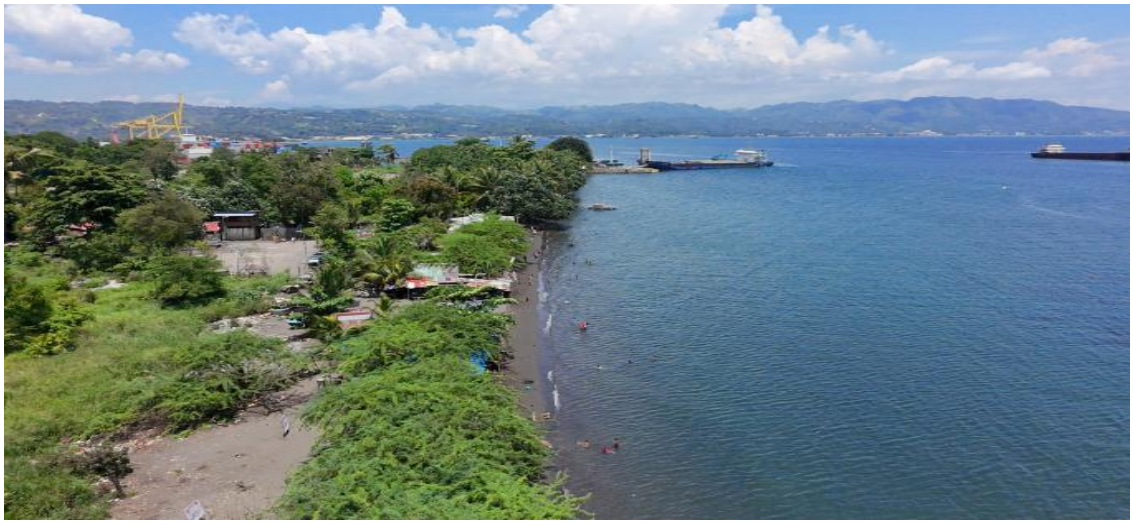
Methods

The qualitative design on the research were utilized to put the vision and mission of the College of Education in Tagoloan Community College for Instruction, Research and Extension (IRE) for first year to fourth students within the college are trained to become IRE engaged. Do difficulty in conducting the said method but the social studies course is always attempting to

familiarize the process of conducting the phenomenological, ethnographic and anecdotal recording technique. Thus, the data of this study are lock-up within three (3) years for search and research maturation. The land and visual mapping associated with a flying drone landscape the area oftenly explored and investigated (Gomez et al., 2025a). Images capturing also serve as visual evidence to support the findings from the peoples, places, events and interaction within the mentioned area. Camera-based and audio-recording were also done as essential in the study for the accurate and reliable research collected and gathered data and relative information thereto.

Validity also utilized for the accuracy of the captured images or videos in representing the subject matter and its consistent occurrences, while reliability also was engaged to involve the consistency and dependability on the repetitive occurrences in the people, places, events and interactions. The key aspects also include the test-retest reliability, inter-rater reliability, and intra-rater reliability were made until the collected data or information being saturated. All ethical behavior in research are always protected. Likewise, privacy and other relative laws are obeyed and followed.

GPS tools were used for precise geolocation of zones. The GPS recorded coordinates to create a detailed map of the study area (Gomez et al, 2025b). Additionally, it assisted in establishing and marking transects across the area for pictorial analysis, which was phenomenologically, ethnographically, and anecdotally recorded based on the roles of participants, main themes, sub-themes, and significant statements were recorded (Gomez, 2025). Validity was strengthened through triangulation, expert consultations, and review of official documents from the local government Offices were constantly done for the verification, validity and reliability of the information. Below is a partial glimpse on the research locale.



Results and Discussions

The Tagoloan shoreline in Barangay Casinglot, Sugbongcogon, Gracia and Baluarte faces challenges driven by natural and anthropogenic forces. Coastal erosion, exacerbated by the loss of mangroves and weak coastal defenses, has led to a 40-meter shoreline retreat, threatening

homes and livelihoods. Industrial activities, particularly from the PHIVIDEC Industrial Estate, have intensified land-use human settlement, polluting nearshore waters and displacing traditional fishing grounds (Villanueva, 2025). As the longshore of the shoreline reaches within nine (9) transectorized kilometers. Thus, the participants from the area under study said:

> *"kaniadto nga wala pa gyud ang kumpaniya dinhi sa amoa daghan pa kami ma kinhas ug ma pangisda ug ang lapyahan anindut pa gyud kaayo nga talan-awon. Kung wala kami sud-an basta na lamang kami mo anha sa dagat pila ka minuto maka kuha na dayon mi sa isda o kinhason para panud-an"*
>
> *(before that we don't have the company here in our place we can get the shells and catch fish and the shoreline has a beautiful scenery. If we don't have viand we go to the sea few minutes getting and catching fish and shells for our viand)*

Despite these pressures, the area retains ecologically valuable with moderately healthy marine ecosystems supporting small-scale fisheries and untapped tourism potential (Mendoza, 2024). However, declining fish stocks, siltation from construction, and unregulated tourism risks highlight the fragility of these resources. Socioeconomically, industrialization has created a dual reality: while factories provide jobs, they also introduce pollution and disrupt community resilience, forcing residents to adapt through informal labor or livelihood diversification, such as seaweed farming (Gesler, 2024).

Additionally, Climate vulnerability further compounds these challenges. The barangay's low-lying geography and inadequate infrastructure leave it exposed to typhoon-induced flooding and storm surges, with recurrent inundation damaging homes and infrastructure (Islam, 2025). Grassroots adaptations, such as elevated housing, lack institutional support, and fragmented governance undermines the enforcement of coastal management policies (Maboob 2024). Weak zoning regulations permit industrial encroachment into ecologically sensitive zones, heightening risks of chemical spills and habitat loss. These issues reflect broader systemic gaps, including limited community awareness of climate plans and a disconnect between policymakers and vulnerable populations (Tolentino, 2023).

To foster sustainability, integrated solutions are critical. Ecosystem-based approaches, such as mangrove restoration and hybrid seawalls, could mitigate erosion while enhancing biodiversity (Yum et al., 2023). Stakeholder collaboration including stricter industrial regulations, community-led conservation, and eco-tourism initiatives must be prioritized. Policy reforms, such as establishing coastal vulnerability indices and buffer zones, alongside climate literacy programs, would strengthen resilience. By balancing economic growth with ecological preservation and empowering local communities, Tagoloan can navigate its complex challenges and secure a sustainable future for its shoreline ecosystems and residents (Rivera, 2023).

Finally, the delta terrain explains the deposits of the sediments coming from the riverine at the top down to the longshore in the shoreline of Tagoloan. As the catchment geolocation of the water drains thru the low-lying topography of the area mangroves trees and relative species are needed to balance the ecosystem (Tirol, 2024). When the team are transectorizing the possible growing bio-life cycle in the aquamarine in the longshore shoreline of Tagoloan the data may lead to the idea of "Pulot," Lagnasan, and Nabulod that mangroves species are almost

extinct. The salt surviving trees are no longer visible that one day this will only be part of the dream to the future generation.

EXHAUTIVE DISCUSSIONS

The Tagoloan shoreline in Misamis Oriental was blessed by its natural mangroves and coral reefs that safeguard coastal ecosystems and support livelihoods through fishing, aquaculture, and tourism, faces escalating threats from rapid industrialization, particularly from PHIVIDEC industrial holdings and Sanjia Steel, resulting in wastewater discharge, mangrove deforestation, and habitat degradation intensifies erosion, flood in vulnerable areas. These environmental pressures, compounded by rising sea levels, stronger typhoons, and inadequate infrastructure. These heightened the call to all industries near the shoreline, company and business partners call to social obligations and rejoined the call to healthful and balance ecosystem.

Conclusions

Tagoloan shoreline in Misamis Oriental, Northern Mindanao Philippines plays an important role both environmental protection and economic hub of the community. Eco-tourism has more likelihood despite of the growing industrial activity. Ensuring economic stability and preserving mangroves and coral reefs, enforce sustainable practices, and invest nature-based solutions that protect both the environment and the people who depend on it.

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