

COASTAL RESOURCE MANAGEMENT BY RURAL WOMEN FOR BLUE ECONOMY IN PENGUJAN, BINTAN REGENCY

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ABSTRACT

The implementation of the Blue Economy concept is highly significant for archipelagic nations such as Indonesia. However, the role of women in coastal and marine resource management often lacks adequate attention and recognition, including in Pengujan Village, Bintan Regency. This research aims to deeply examine the role of women in Pengujan Village in managing coastal resources toward realizing the Blue Economy. The study adopts a qualitative methodology. Data collection techniques include semi-structured interviews, non-participant observation, and documentation. A purposive sampling technique was used to select eight informants. The findings reveal that the coastal resources involving women in their management are marine animals, beaches, and marine plants. The women's roles in resource management encompass sourcing, processing, marketing, and maintenance. Several factors support their role in coastal management, including the government, family, private sector, and peers. Conversely, constraining factors include weather conditions, economic constraints, security issues, management skills, resource scarcities, family constraints, and equipment limitations. Based on these findings, it is recommended that the Pengujan Village government enhance women's understanding of the Blue Economy and coordinate with the regional government to improve the management and marketing skills of women in Pengujan Village.

Keywords: Blue Economy; Coastal; Empowerment; Rural; Women.

INTRODUCTION

The potential of coastal and marine environments to fulfill sustainable development needs is substantial. If these coastal and marine resources can be safeguarded and restored to a healthy and productive state, the oceans will play an even more critical role in the future of humanity (Spalding, 2016). This need catalyzed the emergence of the Blue Economy concept. The Blue Economy concept refers to economic and trade activities that are harmonized with the necessity of integrating conservation and sustainability into maritime area management, thereby encompassing marine ecology and the environment (Smith-Godfrey, 2016). The implementation of the Blue Economy concept is highly significant for archipelagic nations such as Indonesia. As Indonesia comprises thousands of islands and possesses the second-longest coastline globally, efforts are imperative to preserve the potential wealth of its marine resources so that they can continue to be utilized sustainably by the community (Nanda et al., 2024).

As an archipelagic region, Bintan Regency possesses abundant coastal resource potential. Teluk Bintan Sub-district is one of the administrative areas whose population relies on coastal resources, such as fisheries, for their livelihood. Notably, five out of its six villages have a majority of residents engaged in the fisheries

sector (Badan Pusat Statistik Kabupaten Bintan, 2024). Pengujan Village, located within Teluk Bintan Sub-district, Bintan Regency, exhibits a high dependency on coastal resources for the livelihood of its residents. This is evidenced by employment data, which shows that the majority of Pengujan's population are fishers (Ruwanti and Siti, 2020). In addition to fisheries, Pengujan Village also features several coastal-based tourism attractions, such as beaches, seafood restaurants, and the cultural tourism activity known as “*cedok udang*” (shrimp scooping) (Andini et al., 2024).

Nevertheless, the role of women in coastal and marine resource management often suffers from insufficient attention and recognition, including in Pengujan Village, Bintan Regency. This is primarily attributed to the perception that men predominantly act as the head of the household and primary providers for the family (Wulandari et al., 2022). Furthermore, the occupation of fishing, which is closely associated with coastal areas, is often more identified with men (Wafi and Sarwoprasodjo, 2018). Conversely, women possess valuable knowledge and skills in utilizing and maintaining the sustainability of coastal resources. Various research findings indicate that women in coastal areas fulfill productive roles and have the potential to contribute significantly to the economic development of their regions (Komalasari et al.,

2023). For instance, coastal women in Jakarta Bay are involved in preparing their husbands for sea voyages, repairing fishing gear, and marketing the catch (Nurlaili and Muhartono, 2017). Similarly, coastal women in Puger Kulon Village, Jember Regency, play a role in processing their husbands' catches into various economically valuable products (Wulandari et al., 2022). In other studies, women have also been documented as being involved in the planning, implementation, and evaluation of mangrove forest rehabilitation as a critical coastal resource (Amir et al., 2021).

This research aims to deeply examine the role of women in Pengujan Village in managing coastal resources toward realizing the Blue Economy. Specifically, this study will identify the various activities and contributions of women in coastal resource management, as well as the factors influencing their roles. This research is crucial for promoting the empowerment of coastal women, especially in Pengujan Village, Bintan Regency. The findings are thus expected to serve as a foundation for developing more inclusive and gender-responsive policies in coastal resource management for the realization of the Blue Economy. Pengujan Village, Bintan Regency, was selected as the research location due to its coastal position within Bintan Regency and its location within a sub-district highly dependent on coastal and fisheries resources.

Based on the elaboration above, the research questions for this study are:

1. What types of coastal resources involve women in their management within Pengujan Village?
2. What is the role of women in Pengujan Village, Bintan Regency, in coastal resource management toward realizing the Blue Economy?
3. What factors enable (enablers) the role of women in coastal resource management in Pengujan Village toward realizing the Blue Economy?
4. What factors inhibit (challenges) the role of women in coastal resource management in Pengujan Village toward realizing the Blue Economy?

RESEARCH METHODS

This study adopts a qualitative methodology. Qualitative research was selected because it allows for an in-depth exploration of an issue from the participants' perspectives, utilizing

various data collection techniques and analytical procedures to develop conceptual frameworks and theoretical contributions (Saunders et al., 2019). Consequently, the qualitative approach is considered appropriate for exploring the issue of the role of coastal women in Pengujan Village in coastal resource management toward realizing the Blue Economy, which is the focus of this study. The data collection techniques employed in this research will be semi-structured interviews, non-participant observation, and documentation (Saunders et al., 2019; Sugiyono, 2022). To ensure the validity of data gathered, data triangulation were conducted. Triangulation serves as a methodological strategy to enhance the rigor of qualitative research, typically involving the integration of multiple data collection techniques (Howitt, 2019). Triangulation in this study was conducted by comparing and integrating data gathered from interview, observation and documentation.

The population for this study comprises women residing in Pengujan Village. The sample was selected using a purposive sampling technique based on the following criteria: women residing in Pengujan Village, Bintan Regency, and involvement in the management or processing of coastal resources. The number of women from Pengujan Village interviewed based on these criteria totaled six informants. Additionally, the Village Head and an official from the Bintan Regency Women's Empowerment Office will also be interviewed to gather information regarding existing programs, specifically in Pengujan Village, aimed at empowering women in coastal resource management. Consequently, the total number of informants interviewed in this study is eight.

Interviews with informants were conducted after obtaining informed consent and were recorded using a voice recorder. The collected data will then be transcribed and analyzed using a thematic analysis approach, facilitated by the NVIVO software. Thematic analysis involves examining the statements made by participants in the interviews and the insights derived from other qualitative data, thereby generating themes relevant to the research (Howitt, 2019).

RESULTS & DISCUSSION

Participants Demographic

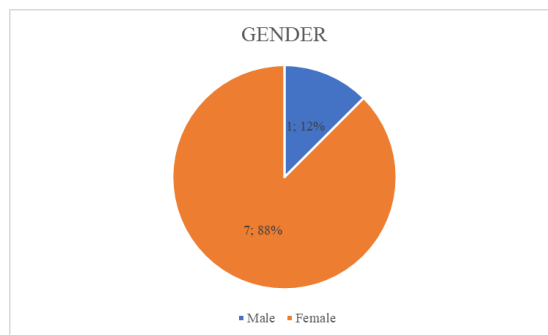


Figure 1. Participants' Gender

Figure 1 illustrates the distribution of participants categorized by gender. In this study, there is one male participant, the Head of Pengujan Village (ZF), who served as the key informant. There are seven female participants, comprising MH, SZ, MS, JL, SH, and NB from Pengujan

Village, and EF, who is the Head of the Gender Mainstreaming and Women's Empowerment Division at the Bintan Regency Office of Women's Empowerment, Child Protection, Population Control, and Family Planning (DP3KB).

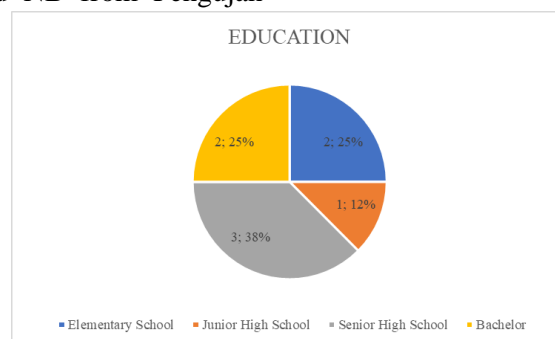


Figure 2. Participants' Education

Furthermore, Figure 2 shows the distribution of participants categorized by their highest educational attainment. Specifically, two participants have an Elementary School (SD) education level, one participant has a Junior High School (SMP) level, three participants have a Senior High School (SMA) level, and two participants hold a Bachelor's degree.

Types of Coastal Resources

In relation to Research Question 1, the findings indicate that women in Pengujan Village manage three distinct types of coastal resources: marine animals, beaches, and marine plants.

Marine animals represent the most frequently managed and utilized coastal resource by women in Pengujan Village. The marine animals managed and utilized include conch (*gonggong*) and coral reef fish. This was corroborated by one participant, SZ, who stated, "Fish crackers. Reef fish. Here, it is difficult to get, like, tuna. The sea is small, so we use reef fish." Another participant, MS, noted, "There is also a PKK (Family Welfare Movement) group that makes conch meatballs, but it's not yet effective; it has just started. They make it when people order, working together in a group of five." Conch and coral reef fish are marine animals easily obtainable in Pengujan Village. However, other marine

animals are also processed by the women, such as anchovies (*ikan bilis*), although these are not sourced directly from the village.

Another coastal resource utilized is the beach. Only one participant, JL, reported managing and utilizing the beach resource. The beach is utilized as the location for a restaurant managed by JL. JL stated in the interview, "We have a restaurant, so at least we want the dining area to be clean, including the beach. Here, where there are many leaves, we usually sweep. I don't like it when there is litter around when guests are here; it feels unpleasant. When the tide is low, the beach extends far out, and I notice how dirty this beach is."

Finally, the resource found to involve women in its management is marine plants, specifically seagrass (*setu*) or seaweed. Pengujan Village previously conducted a program for planting seagrass/seaweed that involved the women of the village. This was confirmed by ZF, the Village Head, who stated, "That Village Cash-For-Work Program (*Padat Karya Tunai Desa*), we had women in Pengujan plant seagrass, seaweed, for sea cucumber cultivation." This activity was also participated in by SZ, who confirmed, "Yes, seagrass [*pohon setu*]. That's what the people here call it."

The Role of Women in Coastal Resource Management Towards the Blue Economy

In response to Research Question 2, the study found that the role of women in coastal resource management in Pengujan Village is divided into four main activities: sourcing/gathering, processing, marketing, and maintenance/conservation. These findings are consistent with research by Sabilla et al. (2024), which highlighted that coastal women undertake diverse daily roles, including being active economic contributors to the family.

The first role is sourcing/gathering. Women in Pengujan Village actively participate in obtaining coastal resources. This is realized through *bekarang*, the activity of searching for conch (*gonggong*) when the tide is low. Participant MH expressed this involvement, stating, "Occasionally, if I'm feeling diligent, I go and gather conch." Similarly, NB stated, "Hamlet 1 only searches for conch, searches for shrimp..." This aligns with the researcher's observation on July 15, 2025, where women from Pengujan Village were seen engaged in *bekarang*. The *bekarang* activity is typically carried out in the morning. However, some women also venture out at night to spear shrimp, as noted by participant SH: "At night, I go with friends using a boat," when describing her shrimping activities. Women in coastal communities often hold significant roles in daily life, including the direct harvesting of fish or other marine products (Awalia et al., 2023).

The second role is processing. In this study, all interviewed female residents of Pengujan Village are involved in processing, whether by transforming captured or purchased marine animal resources into a product, or by participating in fish rearing in cages. For instance, MH, who produces traditional cakes made from fish floss, revealed that she makes the floss herself. SH processes conch and coral reef fish into marketable products, stating, "For the marine products, there are conch chips, conch chili sauce, conch nuggets, conch meatballs, [and] small parrotfish/reef fish chips and crackers." Meanwhile, participant MS is involved in the process of fish rearing or cage farming, explaining her role as, "Yes, giving food and cutting fish for food." Pengujan Village, through the Village Head (ZF), strives to promote conch as a unique product, noting that, "In 2023, conch meat was targeted to be made into several food items like nuggets, meatballs, and conch chili sauce. This is still in the process of production and sale." The processing role undertaken by women in Pengujan Village is also found among women in Puger Kulon Village, Jember Regency, who process catches into products such as fish crackers,

shrimp paste, and fish floss (Wulandari et al., 2022).

The third role is marketing. Women in Pengujan Village are also involved in marketing activities, both for fresh marine catches and processed marine products. However, much of the marketing remains traditional, such as placing products in small stores or directly selling the *bekarang* catch to collectors. SZ stated, "I also place the products at the small stores and stalls," while SH noted, "Yes, if the catch is large, it is sold to a collector" regarding the market for her *bekarang* yield. Nurlaili and Muhartono (2017) also found that coastal women in Jakarta Bay sell catches to collectors, though the product sold was from their husbands who worked as fishers. Digital marketing, where it occurs, is limited to the WhatsApp application. MH stated, "Because I make it, then I post a status on WA (WhatsApp)." Although marketing activities are routinely carried out by women in Pengujan Village, the traditional nature of these activities will later be categorized as an inhibiting factor. This finding is consistent with research by Butarbutar et al. (2020) which found that coastal women in Central Kalimantan are involved in the entire process of fish processing and marketing.

The fourth role is maintenance/conservation. Maintenance is a crucial component in achieving the Blue Economy. However, not all participants are aware of the significance of the Blue Economy concept and the importance of maintenance for the sustainability of their coastal life. For example, when asked about the concept, SZ said, "Not yet, this is the first time I've heard of it," and MH stated, "Not yet. That's why I asked what the Blue Economy is." Nevertheless, some participants engage in maintenance roles that inherently support the Blue Economy. For instance, JL routinely cleans the beach because her restaurant is located on Pengujan beach. JL explained, "When it's the south monsoon season, there is a lot of plastic waste on the beach. We take that up, and if there is driftwood on the shoreline, we also take it up and clean it." Meanwhile, SZ participated in the village's seagrass (*setu*) planting program, stating, "Yes, *setu*, that's what the locals call it." Another participant, SH, once lodged a complaint upon seeing fishers using trawling nets. SH stated, "We protested. What would we get? Moreover, marine animals reproduce slowly, so that's what we were worried about." These results indicate that awareness regarding the Blue Economy already exists among some individuals, but needs to be translated into systematic programs and movements.

Enabling Factors for Women's Role

The analysis identified four key factors supporting the role of women in coastal resource management: the government, family, the private sector, and peers, thereby answering Research Question 3.

The first factor is the government. Both the Bintan Regency administration and the Pengujan Village administration have implemented various measures to empower women in coastal resource management. Government support includes the provision of equipment, such as the fish cages received as government aid in 2008, as mentioned by MT. SH also noted receiving equipment like a stove, wok, and cooking oil. Beyond tangible tools, the government actively enhances women's capacity through training programs, such as the keychain-making training attended by NB. This is supported by EF, the Head of Women's Empowerment, who confirmed that training covers crafts and cooking, citing fish scale keychain making as an example. Other training involves conch nugget production. This governmental support—including capacity building and the provision of infrastructure—is consistent with efforts found in other coastal areas like Kakorotan Village (Tempoh et al., 2022) and Marore Sub-district (Paparang et al., 2017), aiming to improve residents' livelihoods. The government's role as a facilitator of knowledge should be well utilized to educate coastal women about the Blue Economy concept and provide consistent programs aligned with its goals.

The second factor is the family. Family support is provided in the form of discussion partners and assistance with business operations. JL, for example, noted that her husband serves as a partner in developing their business, stating, "The two of us often collaborate, sharing, sometimes even sitting like this we discuss what to cook next so that we become more known." SZ also received support, gratefully saying, "Thank God, they are supportive and also help; sometimes the children help deliver orders." Family support, including encouragement and practical assistance, is widely recognized as a motivator for women in entrepreneurship (Rizki et al., 2023).

The third factor is the private sector. Private sector support is channeled through Corporate Social Responsibility (CSR) programs, often coordinated with the Bintan Regency Women's Empowerment Office, to conduct empowering activities in the region. EF acknowledged this, stating, "Sometimes we also get support from CSR (Corporate Social Responsibility), because they (private companies) are present and doing businesses here." Although

often collaborative with the government, the private sector plays a role in supporting women's participation through these implemented CSR programs.

The fourth factor is peers. Peer support, in this context, refers to assistance with production capital. When facing capital constraints, women address this by obtaining credit or taking an advance (*kasbon*) from fellow material suppliers. MH confirmed this practice, explaining, "If there's no capital, I take credit. Then, after the customer takes the product, I pay."

Inhibiting Factors for Women's Role

Based on the data analysis, seven factors inhibiting the role of women in coastal resource management were identified: weather, economics, security, management capability, resource limitations, family, and equipment limitations. This finding addresses Research Question 4.

The first constraint is weather. Women in Pengujan Village who rely on coastal resources face challenges when weather conditions are unfavorable for their activities. For instance, *bekarang* (conch gathering) cannot be conducted during rain, as participant MH stated, "On the coast, the weather definitely affects us... Even now, if the weather is bad, we cannot go to the sea." Wind and waves also affect fish farming or rearing activities, as JL explained, "Now, during the south monsoon season, the fish we are raising cannot survive long because the waves make them quickly get sick." Furthermore, rainy weather can disrupt the production process of crackers, with SH noting, "If the production obstacle is the crackers, they cannot be dried because of the rain." This aligns with observations on September 28, 2025, which confirmed that cracker production still relies on the traditional method of sun-drying. This dependency is a unique challenge for coastal communities highly reliant on climate, as bad weather leads to fish scarcity (Anggraini, 2018), subsequently hindering processing activities that rely on fish as a raw material.

The second inhibiting factor is the economy, which can be grouped into two sub-themes: capital and raw material prices. Capital serves as a barrier for women in running their businesses. Structurally, coastal women often face limited access to production resources such as business capital, skills training, and appropriate technology (Kurniawan and Wahyuni, 2025). MS, involved in fish rearing, stated, "The fish are the difficult part; if we want to buy them, we need a large capital," a sentiment echoed by JL, who runs a restaurant business. The second economic barrier is the perceived rising cost of raw materials. NB expressed this, saying, "Meanwhile, equipment for

the sea is getting more expensive," and MH added, "The economy is getting more difficult now. The price difference for basic necessities has become significant."

The third factor is security, which encompasses two sub-themes: environmental security and occupational safety. Environmental security is a specific concern for women involved in fish rearing or cages (*keramba*). The number of fish in the cages often decreases due to theft, despite the area being fitted with adequate lighting. MS disclosed, "Sometimes they are fished out of the cage; sometimes just before harvest, only a few are left—only 60 remaining in one cage." Regarding occupational safety, women producing crackers or traditional cakes sometimes suffer burns from hot water or oil during the production process. SZ revealed, "Sometimes when making crackers, I get burned by the hot steam, and when frying chips, sometimes it's the hot oil," while NB similarly described, "For example, if the hot water splashes, when we cook, the oil splashes hit us..." Safety in the kitchen, as a production site, is often overlooked because cooking is considered a daily activity, but this needs attention for the sustainability of their businesses.

The fourth constraint is management capability, divided into business management skills and marketing skills. Regarding business management, ZF, the Village Head, observed that women-managed businesses in Pengujan Village struggle to grow, stating, "I think no matter how much capital they have, it can run out without good management." While capital is a barrier, inadequate management prevents the business from surviving. Furthermore, in marketing management, the methods used by women are generally traditional, with limited digital assistance only through WhatsApp status updates. NB confirmed this, saying, "Yes, sales depend on whether people know us; then we offer the product." ZF observed that while much effort goes into product development, marketing remains a challenge, expressing, "For example, the product is ready, but how do we market it? So the limitation is there." Marketing skills require attention, given that women are actively producing various goods but still market them traditionally. Continuous guidance on using digital platforms and identifying sustainable distribution channels is essential for these women-managed businesses. This finding aligns with the situation in Bontojai Village, where the lack of online marketing media forces heavy reliance on middlemen (Firman et al., 2025). This condition must be addressed, as increasing women's proficiency in processing and marketing marine products will generally enhance their

overall potential (Silviyana, 2023). The lack of management and marketing capabilities ultimately hinders the successful continuation of government programs, a phenomenon similar to that observed in Muncar, Banyuwangi, where low proficiency levels among coastal women made government training programs difficult to sustain (Pahlevi and Jauhariyah, 2022).

The fifth inhibiting factor is resource limitations. This refers to the scarcity of fish species in the Pengujan area and the increasing difficulty in sourcing fish, conch, shrimp, and other marine animals. NB noted, "It's getting harder to find fish; the same goes for conch and shrimp." Additionally, the lack of certain fish species needed for specific products also poses a challenge. SZ explained, "Sometimes making products depends on the fish, too, because the sea here is small; if we want to buy in Tanjung Pinang, sometimes the fish, like mackerel, is expensive." These resource limitations serve as a critical reminder of the importance of the Blue Economy concept for the women of Pengujan Village, and indeed, for all components of the village community.

The sixth factor is family. Interestingly, family was also identified as an enabling factor. This dual role was highlighted by EF, who noted that in her experience organizing capacity-building activities, many women faced obstacles due to the lack of permission from family members. EF stated, "They depend on their family or the head of the household, their husband; to participate, she must get permission." Traditional gender norms remain dominant in coastal communities, tending to restrict women's mobility in the public sphere, as domestic roles such as homemaking and childcare prevent full participation in productive economic activities (Kurniawan and Wahyuni, 2025).

The seventh constraint is equipment limitations. This restricts large-scale production activities. For instance, cracker production must rely on weather for drying, as previously explained. Furthermore, the lack of equipment for storing ready-to-use raw materials is also a barrier. NB shared, "Because the conch cannot be ready immediately... we just don't have a freezer yet." Equipment limitation is one of the main challenges faced by coastal women in optimal resource management in areas like Labuan Badas Sub-district (Ardiyansyah et al., 2025). Therefore, the equipment assistance provided by both village and regency governments must be targeted effectively to ensure the sustainability of coastal women's activities, particularly in Pengujan Village.

One approach that can be used to understand the findings of this research is the sustainable livelihood approach (SLA). Livelihood approaches serve as conceptual frameworks that prioritize people-centered development characterized by their responsive and participatory nature which emphasize the necessity of multidisciplinary collaboration and interactions across various institutional levels (Karki, 2021). Viewed from the SLA framework, the economic reality of women in Pengujan Village is predicated on the exploitation of Natural Capital. Yet, the long-term viability of these strategies and their alignment with the Blue Economy are compromised by Human Capital asymmetries: the presence of practical skills contrasts sharply with a limited conceptual understanding of conservation, resulting in minimal engagement in resource maintenance. Furthermore, the Vulnerability Context remains high due to external environmental threats. Social Capital plays a dual role, offering communal support while entrenching restrictive familial obligations. Thus, Transforming Structures are critical in supplying the necessary Physical and Financial Capital to catalyze a shift from vulnerability to sustainable resilience.

CONCLUSIONS AND SUGGESTIONS

The conclusions of this research are as follows:

1. The coastal resources actively managed and utilized by women in Pengujan Village are marine animals, beaches, and marine plants.
2. Women's roles in coastal resource management toward achieving the Blue Economy include the sourcing/gathering, processing, marketing, and maintenance/conservation of coastal resources. Participation in maintenance activities is currently minimal, reflecting a limited understanding of the Blue Economy concept.
3. Enabling factors for women's involvement in coastal resource management include government support (in the form of equipment and capital), family support, peer support, and private sector support.
4. Inhibiting factors (challenges) to women's involvement in coastal resource management include weather, economics, security/safety, management capability, resource limitations, family obligations, and equipment limitations.

The findings of this study may bring new perspectives in the literature of gender and blue economy, especially for the issue of gender and the blue economy in villages setting. The findings underscore that while fulfilling practical gender needs through material provision is a necessary prerequisite, it remains insufficient for achieving

substantive integration. The data suggests that unless strategic gender interests, specifically managerial agency and decision-making power are actively prioritized, women will remain entrenched in subsistence-level extraction. Furthermore, this study complicates the discourse on social capital in coastal resilience by revealing its paradoxical nature in Pengujan Village: social networks function simultaneously as a critical buffer against economic volatility and as a mechanism for enforcing domestic obligations, thereby circumscribing women's professional mobility and hindering their strategic participation in the Blue Economy.

Based on these results, the following recommendations are proposed:

1. To the Village Government: It is recommended that the Village Government consider implementing activities that enhance the understanding of the Blue Economy among the women of Pengujan Village. This is crucial so that the utilization of coastal resources is accompanied by maintenance activities carried out by all residents, especially the women of Pengujan Village, thus ensuring the long-term sustainability of existing marine-based economic activities. Suggested activities include seminars, beach cleanup initiatives, seagrass/seaweed planting programs, and other activities focused on coastal preservation and ecosystem protection.
2. To the Bintan Regency Women's Empowerment Office: It is recommended that the Office consider collaborating with the village and other local government organizations (OPD) in Bintan Regency to organize integrated marketing and MSME (Micro, Small, and Medium Enterprise) management workshops to enhance the management and marketing capabilities of the women in Pengujan Village. Currently, the women's activities are managed individually with limited knowledge, while marketing is largely traditional and restricted. The proposed workshops are expected to address the managerial and marketing challenges faced by the women in coastal resource management.
3. To the Village Government and the Bintan Regency Women's Empowerment Office: Collaboration with other OPDs is advised to identify the necessary equipment, facilities, and infrastructure to improve the processes already implemented by the women of Pengujan Village. This identification must prioritize the health and occupational safety of the women in the management of coastal resources.

4. To the Women of Pengujan Village: It is recommended that women actively involved in coastal resource management activities pay due attention to the coastal environment during their operations, ensuring that the Blue Economy/coastal economic activities they undertake are sustainable.

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