

Emerging Community-Based Blue Economy Industry Sectors in Bintan: Examples From Kampong Teripang

Wahyu Hidayat. R^{1,*}, Mirza Ayunda Pratiwi¹, and Rose Adeh²

¹Faculty of Economics and Maritime Business, Raja Ali Haji Maritime University, Indonesia

²Faculty of Business and Entrepreneurship FKP, University Malaysia Kelantan, Malaysia

Abstract. This study examines the emergence of community-based blue economy industry sectors in Bintan, Indonesia, focusing on Kampong Teripang as a case study. Using a qualitative approach involving interviews, observations, and a literature review, this research explores the ways in which Kampong Teripang has empowered local communities. The findings reveal that Kampong Teripang has successfully mobilized local residents as sea cucumber collectors and workers within the village, while also implementing sea cucumber aquaculture. The establishment of Kampong Teripang in Bintan has not only generated significant economic value for entrepreneurs but has also contributed to improving the livelihoods of the surrounding community. This research highlights the potential of community-based initiatives to drive sustainable economic growth and social development in coastal areas.

1 Introduction

The blue economy is a concept first introduced in 2010 by Gunter Pauli in his book, "The Blue Economy, 10 Years, 100 Innovations, 100 Million Jobs", with his theory that can provide potential benefits for the protection of the global community environment, preservation of natural resources, efforts to reduce industrial costs by switching to environmentally friendly, clean, recycled or renewable energy consumption. The book contains a collection of innovations that contribute to the formation of global awareness, based on the search for practical solutions based on sustainable natural systems. Over time, various sectors in a country should continue to advance and develop. The role of government in optimizing and improving the quality of activities in each sector is very necessary so that progress can be felt by the community.

The Blue Economy is regarded as the decoupling of socio-economic activities and development from environmental degradation and optimizing the benefits which may be derived from marine resources. The attitude of achieving long-term prosperity by a country or a region befitting the wellbeing of all citizens and the mankind preserving the environment, especially the sea is the basis of the Blue Economy. Blue Economy means the use of sea and

* Corresponding author : wahyujmr002@gmail.com

the use of its resources for sustainable economic development and the concept is new in Bangladesh and South Asia [1].

The Blue Economy has great potential to facilitate inclusive economic growth, create job opportunities for a growing population, and achieve the fundamental goals of sustainable development. The oceans as a major protein provider in the global market and also a significant ecosystem provider are still vulnerable to over-exploitation which can harm ecosystems and damage prospects for achieving sustainable development goals [2].

President Joko Widodo in 2017 has made a statement regarding one of the pillars of the vision for the world's maritime axis, which states that marine resources are Indonesia's future. The idea of building a maritime country is based on the fact that Indonesia is the largest archipelago country in the world. The area of Indonesia is almost 2 million km² or 735,355 mi², has 17,508 islands with 6,000 of these islands already inhabited by Indonesians [3]. In the data released by the Coordinating Ministry for Maritime Affairs and Investment, Indonesia's maritime economic potential reaches IDR 1.33 trillion per year with the most promising industries coming from the fisheries and tourism sectors [4].

According to Law Number 27 of 2007 concerning Management of Coastal Areas and Small Islands [5] in Article 1 point 4 it states: coastal resources and small islands are biological resources, non-biological resources; artificial resources, and environmental services; biological resources include fish, coral reefs, seagrass beds, mangroves and other marine biota; artificial resources include marine infrastructure related to marine and fisheries, and environmental services in the form of natural beauty, seabed surface where underwater installations related to marine and fisheries are located and ocean wave energy found in coastal areas. While in point 7 it is explained that coastal waters are seas bordering land including waters as far as 12 (twelve) nautical miles measured from the coastline, waters connecting the coast and islands, estuaries, bays, shallow waters, brackish swamps, and lagoons.

The rise of the blue economy represents an important focus in global strategies aimed at achieving a balance between economic development and environmental sustainability, with a particular emphasis on coastal and marine ecosystems. Therefore, the concept of the blue economy defined by The World Bank (2017), as "the sustainable use of ocean resources for economic growth, improved livelihood and jobs and ocean ecosystem health" provides an analytical roadmap for countries to exploit their marine and coastal assets without prejudice to future rights [6]. Indonesia, as the largest archipelagic country in the world and renowned for its impressive marine biodiversity, has notably stretched into becoming one of this première ranks on blue economy. But even so, its coastal communities are dependent on archaic and poverty-inducing practices like overfishing. In response, community based initiatives have appeared as a remedy to try renew the balance of preservation projects and economic development. One of them Kampong Teripang on Bintan Island, Riau Islands Province.

One great example of community-driven development is given by Kampong Teripang. The village has successfully combined sea cucumber (Holothuroidea) aquaculture and ecotourism into a unique double income mode, which meets the strong consumer acceptance of sea cucumbers as well as maintaining marine ecosystem conservation. Sea cucumbers have been revered in traditional Chinese medicine and cuisine for centuries, due to its numerous health benefits that could maintain skin youth and cure various deadly diseases.

Agreeing to Chen (2018), ocean cucumber collagen is especially profitable, with its recuperating and regenerative properties being utilized in a wide extend of items [7]. Kampong Teripang has utilized this common asset to not as it were drive financial development but moreover to engage nearby communities by making occupations in aquaculture, tourism, and marine preservation.

As the primary Edu Eco Involvement tourism goal based on ocean cucumbers within the world, Kampong Teripang has made a comprehensive instructive and experiential tourism demonstrate [8]. Guests are advertised the opportunity to memorize around ocean cucumber cultivating, involvement conventional collecting strategies, and appreciate the wellbeing benefits of ocean cucumber-based items, such as collagen-rich spa medications at the Klaut Marine Spa. The town moreover offers immersive exercises such as BeKarang, where sightseers seek for ocean cucumbers at night. BeKarang is Coastal foraging encompasses a diverse range of wild foods found along the coast, including plants, seaweeds, shellfish, and crustaceans. This practice can occur in various locations, such as sea cliffs and dunes, extending to the low tide mark in rocks, gullies, pools, as well as mudflats and estuaries. Coastlines provide an exceptionally rich and reliable habitat for foragers, which is one reason why humans have historically preferred to settle near the sea. Archaeological evidence, such as midden piles of discarded shells from ancient coastal foragers, highlights the significance of the seashore as a vital food source throughout history.

Many coastal foods continue to be staples in our diets today, including prawns and crabs, as well as carrageenan seaweed, which is commonly used as a thickening agent in products ranging from toothpaste to desserts. However, some other tasty and nutritious options, like winkles, have become less popular over time.

MeLamun, a sumptuous staycation involvement in estates found specifically on the ocean These encounters not as it were give relaxation and unwinding but too fortify the significance of feasible asset utilize and marine preservation. Kampong Teripang's incubator and ocean farming programs are key to keeping up ocean cucumber populaces, guaranteeing the long-term supportability of this profitable asset.

Moreover, Kampong Teripang has coordinates biological preservation into its commerce show, recognizing the significance of protecting the broader marine environment. The village's Lamun Warrior activity centers on the rebuilding and security of seagrass knolls, which are basic to carbon sequestration and coastal security. Seagrasses, frequently ignored in marine preservation endeavors, are basic to combating climate alter due to their capacity to retain expansive sums of carbon dioxide. LIPI (the Indonesian Organized of Sciences) reports that Indonesia's seagrass glades can retain up to 992.67 kilotons of carbon yearly, playing a pivotal part in relieving the effects of climate alter [9]. The Lamun Warrior program not as it were reestablishes seagrass environments but moreover raises mindfulness approximately their significance through community engagement and instruction programs, such as Lamun Warrior Camp and School of Fish workshops, which emphasize collaborative learning and environmental stewardship.

The social and chronicled noteworthiness of ocean cucumbers includes another layer of abundance to Kampong Teripang's character. Concurring to antiquated Chinese legends, Chief of naval operations Cheng Ho, the celebrated Ming Line pioneer, looked for out the amazing "dragon's spit," a legendary substance accepted to allow youth and imperativeness. His journey driven him to the disclosure of ocean cucumbers within the waters of Bintan Island. Depicted in Cheng Ho's "General Records of the Ocean" as having the appearance of "knots of fat" with a fishy odor, ocean cucumbers were before long recognized for their therapeutic properties and have since been a esteemed product in East Asian societies. Six centuries afterward, Kampong Teripang proceeds to honor this authentic association by developing and handling ocean cucumbers into different wellbeing and excellence items, situating itself as a pioneer within the generation of collagen derived from ocean cucumbers.

Kampong Teripang's part within the blue economy expands past tourism and aquaculture. It has ended up a center for community improvement and environmental preservation, advertising different programs that cultivate inventiveness, instruction, and natural duty. The village's Eco Stop and CCS-MICE Tradition Center serve as scenes for both environmental instruction and large-scale occasions, drawing in nearby and universal members to lock in in

maintainable improvement dialogs and exercises. The Cik Budiman extend, which centers on decreasing, reusing, and reusing squander, advance represents the village's commitment to natural stewardship. In this way, Kampong Teripang has not as it were contributed to financial development but too developed a culture of maintainability and development inside the nearby community.

In addition, Kampong Teripang's Lamun Warrior Calculator activity reflects its forward-thinking approach to marine preservation. By utilizing progressed innovations such as farther detecting, marine mechanical autonomy, and atomic environment, the town is able to screen and oversee seagrass rebuilding endeavors on a expansive scale. This integration of innovation and conventional hones illustrates Kampong Teripang's capacity to adjust and enhance, setting a show for other coastal communities looking for to create maintainable blue economy segments.

This think about points to investigate the multifaceted part of Kampong Teripang in progressing community-based blue economy advancement. Particularly, the inquire about looks for to recognize the key variables contributing to the village's victory in mobilizing nearby communities, analyze the financial and social impacts of its activities, and assess its potential as a replicable demonstrate for other coastal districts. By looking at the crossing point of tourism, aquaculture, and preservation, this consider will give profitable bits of knowledge into how community-based activities can drive economical improvement whereas protecting marine environments.

The results of this inquire about are anticipated to offer commonsense suggestions for policymakers, business visionaries, and community pioneers looking to create comparable activities in other districts. Kampong Teripang's victory highlights the potential of the blue economy to not as it were produce financial esteem but moreover cultivate social advancement and natural conservation. As worldwide request for economical, eco-friendly items proceeds to rise, Kampong Teripang stands as a confirmation to the control of community-driven advancement in forming long haul of coastal and marine businesses.

2 Research Methodology

This investigation utilizes a subjective approach to examine the role of Kampong Teripang in creating community-based blue economy industry sectors in Bintan, Indonesia. Kampong Teripang was chosen as a case study due to its integration of sea cucumber aquaculture, conservation-based ecotourism, and community strengthening programs centered on the sustainable management of marine resources. The strategies employed aim to deeply analyze the contributions of various aspects of Kampong Teripang in promoting economic development, environmental conservation, and improving the welfare of the local community.

The subjective approach was chosen as it allows for an in-depth exploration of the complex phenomena within blue economy development. This study focuses on a holistic understanding of the interactions between different components involved, such as the community, marine resources, and conservation-based tourism businesses. By employing a subjective strategy, this research emphasizes the significance of narratives and local community experiences to grasp the true impact of Kampong Teripang on the environment and economy.

Data collection was conducted through observation, literature review, and interviews. Observations involved direct engagement, where the researcher participated in activities, visited key locations, and took part in initiatives like the Lamun Warrior program. This hands-on approach allowed the researcher to gain firsthand insights into how blue economy activities are managed by the local community, including sea cucumber farming processes, ecotourism programs, and marine conservation efforts.

Additionally, interviews were conducted with the owner and manager of Kampong Teripang to enrich and validate the findings from the observations and literature review. These interviews provided valuable perspectives on operational practices, challenges faced, and future aspirations, ensuring a more comprehensive understanding of the community's initiatives.

A literature review was also conducted to strengthen the analysis and provide a solid theoretical foundation. The reviewed literature included journal articles, report documents, and online news sources related to the blue economy, marine conservation, and aquaculture, as well as government policy documents and official reports on marine resource management in Indonesia. This literature review is critical for providing a broader context for Kampong Teripang's role in global efforts to implement sustainable blue economy concepts. By reviewing related literature, this study can also compare the practices implemented in Kampong Teripang with similar initiatives in other regions.

The data collected from observations, literature reviews, and interviews was analyzed using the NVivo 12 software program. This program was utilized to organize and code the qualitative data gathered, making it easier to identify the most relevant themes related to the research objectives. The analysis aims to reveal patterns emerging from the interaction between the local community, marine resources, and the businesses developed in Kampong Teripang, as well as to understand the social, economic, and environmental impacts generated by this initiative.

Through a combination of observations, literature reviews, and interviews, this research seeks to provide a comprehensive picture of how Kampong Teripang has effectively implemented the concept of a community-based blue economy. The study also aims to present a detailed analysis of the potential for similar initiatives to be replicated in other coastal regions while contributing significantly to the global discourse on economic development strategies and environmental conservation.

3 Result and Discussion

3.1 Overview of Kampong Teripang's Blue Economy Initiatives

Kampong Teripang, arranged on the lovely shores of Bintan, has risen as a trailblazer in community-based blue economy advancement, advertising a one of a kind mix of financial development, social strengthening, and natural maintainability. This activity is centered around the economical utilization of marine assets, especially the ocean cucumber, a species known for its tall wholesome and restorative esteem. The town has adeptly mobilized neighborhood inhabitants, changing them into ocean cucumber collectors and aquaculture specialists, which has brought about in substantial financial benefits for the community.



Fig. 1. Visualization of Kampong Teripang

The usage of ocean cucumber aquaculture not as it were points to upgrade nearby financial action but too emphasizes the significance of economical asset administration hones. By cultivating a demonstrate where neighborhood communities effectively take part within the economical gathering and cultivating of ocean cucumbers, Kampong Teripang adjusts itself with worldwide standards of the blue economy, which advocate for the feasible utilize of sea assets whereas improving jobs.



Fig. 2. Visualization of MeLamun

MeLamun is an eco-tourism initiative in Kampong Teripang, Indonesia, featuring unique accommodations situated in the middle of the sea, centered on the conservation of seagrass ecosystems, which are vital for marine biodiversity and carbon sequestration. This initiative allows visitors to stay in over-water accommodations while participating in hands-on activities such as seagrass planting and educational workshops focused on marine conservation. Through these immersive experiences, MeLamun not only raises awareness about the ecological significance of seagrass habitats but also fosters a sense of stewardship among participants. By combining comfortable lodging with eco-tourism activities, MeLamun generates revenue for the local community while promoting the sustainability of Kampong Teripang's marine resources.

3.2 Economic Impact on Local Communities

The financial activities attempted by Kampong Teripang have demonstrated to be transformative for neighborhood inhabitants. As the inquire about highlights, the town has made a dynamic nearby economy that flourishes on the feasible gathering and deal of ocean

Table 1. Economic Benefits of Kampong Teripang Initiatives

Economic Initiatives	Benefits	Targeted Community Group
Sea Cucumber Harvesting	Job creation and income generation	Local residents
Sea Cucumber Aquaculture	Sustainable livelihoods and skill enhancement	Local fishers and workers
Eco-Tourism Activities	Increased tourism revenue and community development	Local entrepreneurs and service providers
Sale of Sea Cucumber Products	New revenue streams for local businesses	Local entrepreneurs
Longdrip Cafe	Job creation and income generation	Local resident

2. The table summarizes the economic initiatives associated with sea cucumber activities in Kampong Teripang and their impacts on different local community groups. Sea cucumber harvesting plays a crucial role in job creation and income generation for local residents, providing them with direct employment opportunities that enhance their financial stability. In addition, sea cucumber aquaculture promotes sustainable livelihoods and skill enhancement among local fishers and workers, as they learn sustainable farming techniques that ensure a consistent income while preserving marine resources.

Kampong Teripang's eco-tourism initiatives uniquely showcase the village's commitment to sustainability while attracting environmentally conscious tourists. The village offers immersive experiences such as sea cucumber harvesting, where visitors can actively engage in traditional harvesting methods and learn about the ecological significance of sea cucumbers in marine ecosystems. This hands-on experience not only educates participants but also fosters a deeper appreciation for sustainable aquaculture practices.

Additionally, the village features the 'BeKarang' activity, an engaging nighttime adventure where tourists search for sea cucumbers. This activity highlights the importance of marine conservation while providing a memorable experience for visitors. Beyond these hands-on experiences, Kampong Teripang has implemented various marine conservation initiatives that allow tourists to participate in efforts such as seagrass restoration through the 'Lamun Warrior' program, which underscores the vital role of seagrass in coastal ecosystems.

The impact of these eco-tourism offerings is significant. In the past year alone, Kampong Teripang has welcomed over 12,400 visitors from diverse backgrounds, including international tourists from the Netherlands, France, Singapore, and China. Collaborations with educational institutions like the National University of Singapore (NUS) and the International French School have also contributed to the influx of tourists. The revenue generated from eco-tourism activities has become a crucial income stream for the village, enhancing the economic resilience of local communities while ensuring the sustainable management of marine resources.

By promoting Kampong Teripang as a destination for eco-conscious travelers, the village effectively taps into the growing demand for responsible tourism. The commitment to sustainability, combined with unique cultural experiences, positions Kampong Teripang as a leader in eco-tourism, demonstrating how local communities can leverage their natural resources to create meaningful economic opportunities while preserving their environment.

7. Kampong Teripang's ability to effectively merge tourism with conservation is commendable and serves as a model for sustainable development. By offering eco-tourism experiences, such as guided tours of seagrass habitats and hands-on sea cucumber harvesting, the village not only generates vital revenue for the local economy but also fosters a deeper understanding among visitors about the importance of marine preservation. These immersive experiences allow tourists to engage with the local environment and appreciate the delicate

balance between economic activity and ecological health. Through educational initiatives embedded in these tourism offerings, Kampong Teripang cultivates awareness and advocacy for marine conservation among visitors, encouraging them to become stewards of the ocean even after they return home. This strategic approach not only enhances the village's economic sustainability but also promotes a culture of environmental responsibility that benefits both the local community and global efforts to protect marine ecosystems.



Fig.4. Products Based Sea Cucumber By Kampong Teripang

5. Furthermore, the sale of sea cucumber products generates new revenue streams for local businesses, allowing entrepreneurs to tap into various markets, such as food, health, and beauty sectors. Overall, these initiatives reflect a holistic approach to economic development in Kampong Teripang, where community members benefit from sustainable practices that not only enhance their livelihoods but also promote environmental stewardship.

Kampong Teripang has established two primary industries based on sea cucumbers: cosmetics and food and beverage (F&B). In the cosmetics sector, notable products include Fit Sea, a natural supplement containing glucosamine, chondroitin, and collagen that aids in treating bone pain and joint diseases; Seacume Serum, an anti-aging serum enriched with patented hydrolyzed collagen that helps reduce fine lines and dark spots; Seacume Jelly Collagen, a beauty drink made from pure hydrolyzed collagen with blueberry flavor; Sticol Serum, an anti-acne serum that minimizes and heals breakouts while keeping the skin hydrated; and Sticol Massage Oil, which utilizes sea cucumber peptides for wound healing and as a massage oil.

In the F&B sector, the offerings include Longdrip Chocolate Bar, rich in hydrolyzed collagen, and Forayya Gluten-Free Cookies, which are made with protein, wheat, milk, and nuts. Additionally, Forayya Protein Glutamate is a natural seasoning free from monosodium glutamate (MSG), packed with 27 grams of natural glutamate, hydrolyzed protein, EPA, and DHA, all without artificial preservatives or flavors. These diverse product lines not only highlight the versatility of sea cucumbers but also cater to the growing demand for health and beauty solutions while providing significant income opportunities for the local community.



Fig.5. Longdrip Café & Resto By Kampong Teripang

Kampong Teripang features the Longdrip Café & Resto, which specializes in food and beverages enriched with hydrolyzed collagen, known for its efficient absorption by the body. The café's signature offerings include Housome Cake, Indonesia's first collagen dessert, and Collato, a healthy collagen ice cream that combines taste and nutrition. By providing these innovative collagen-based products, Longdrip Café & Resto not only enhances local culinary traditions but also boosts community income through the increasing demand for health-conscious dining options.

3.3 Social Empowerment and Community Engagement

A basic viewpoint of Kampong Teripang's victory lies in its approach to social strengthening and community engagement. The inquire about demonstrates that neighborhood pioneers effectively include inhabitants in decision-making forms with respect to the administration of marine assets, cultivating a culture of interest and collective duty.



Fig. 6. Sea Cucumber Cultivation in Kampong Teripang

This participatory approach not as it were engages people but moreover develops a more profound association between the community and its marine environment.

The foundation of instructive activities, such as the School of Fish, plays a urgent part in upgrading nearby capacity. These programs encourage information exchange almost marine preservation hones and the centrality of feasible asset administration. Members pick up profitable aptitudes that enable them to create educated choices with respect to the utilize of marine assets, promoting a culture of maintainability that's fundamental for the long-term victory of Kampong Teripang's blue economy activities.

Table 2. Community Engagement Activities

Activity	Purpose	Impact on Community
Community Decision-Making	Involvement in resource management decisions	Increased sense of ownership
School of Fish	Education and skill development	Enhanced local capacity
Eco-Conservation Campaigns	Promote marine conservation awareness	Increased community participation

3.Encouraging greater local participation in decision-making processes for marine resource management is essential for fostering a stronger sense of ownership among community members in Kampong Teripang. When local residents are actively involved in decisions about fishing quotas and sustainable harvesting practices, they are more likely to advocate for responsible resource use and conservation. For example, community-led discussions have resulted in guidelines that balance economic needs with ecological health, leading to better compliance and enforcement of regulations as community members take pride in their stewardship of marine resources.

Programs such as the "School of Fish" provide platforms for local voices to be heard, facilitating dialogues on best practices for resource management. This engagement strengthens community bonds and builds capacity for effective management strategies. As local residents actively participate in these processes, they become champions of sustainability, educating others about the importance of conserving marine ecosystems. Ultimately, fostering local participation contributes to more resilient and sustainable marine management strategies that benefit both the community and the environment.



Fig. 7. School of Fish

4.Expanding programs like the "School of Fish" is vital for educating more locals on sustainable marine practices and resource management in Kampong Teripang. School of Fish is taken from the Schooling concept, which is a group of similar fish species that swim together simultaneously; twisting and forming sweeping, shimmering shapes in the water.

With this concept, it is hoped that every student or participant who studies at the Fish School can learn together, form a team, and complement each other's strengths and weaknesses in developing the various creativity that each student has. This initiative, which provides educational experiences in the middle of the sea with the Suku Laut (sea tribes), has proven impactful by equipping community members with essential knowledge about marine conservation. The curriculum includes hands-on training in sustainable fishing techniques, identification of local marine species, and methods for protecting marine habitats, fostering a strong sense of stewardship among participants.

The "School of Fish" is part of the broader Eduexperiences initiative in Kampong Teripang, which also includes Club KT, offering educational experiences on land with local youth. Together, these programs create a holistic approach to environmental education that bridges marine and terrestrial conservation efforts. By incorporating practical workshops and field activities, participants gain valuable real-world experience, enhancing their understanding of both marine ecosystems and the importance of sustainable practices.

Scaling up the "School of Fish" program could lead to even greater benefits for Kampong Teripang and surrounding regions. Increased participation would create a larger network of individuals trained in sustainable practices, resulting in improved fishing yields and heightened community engagement in marine conservation. By fostering educational partnerships with local schools and organizations, Kampong Teripang can cultivate a culture of environmental awareness among younger generations, ensuring the long-term preservation of marine resources and enhancing local livelihoods.

4. Programs like the "School of Fish" play a crucial role in enhancing local capacity by providing education and practical training in sustainable marine practices. Through hands-on experiences, participants learn essential skills such as responsible fishing techniques, habitat conservation, and the importance of biodiversity. These initiatives not only empower community members to make informed decisions about their natural resources but also instill a sense of stewardship that is vital for the long-term health of marine ecosystems. By equipping both current and future generations with the knowledge and tools needed to protect marine resources, the "School of Fish" ensures the continuity of sustainable practices in Kampong Teripang. This commitment to education ultimately strengthens the community's resilience against environmental challenges and fosters a culture of conservation that benefits both the local economy and the surrounding marine environment.

3.4 Environmental Sustainability

The commitment to natural supportability could be a foundation of Kampong Teripang's blue economy show. The investigate highlights a few activities pointed at protecting marine biological systems whereas advancing financial exercises. For occasion, the incubator and ocean farming programs are indispensably to keeping up the supportability of ocean cucumber populaces, subsequently guaranteeing that this important asset remains accessible for future eras.

Furthermore, community-led preservation endeavors, exemplified by the #GoBlue campaign, emphasize the collective duty of Kampong Teripang's inhabitants to secure their marine environment. This campaign has raised mindfulness approximately the significance of seagrass glades, which play a imperative part in supporting marine biodiversity and moderating climate alter.



Fig. 8. Seagrass Ecosystem Conservation in Bintan

The integration of nearby information, especially the conventional Bekarang hone, emphasizes the community's authentic association to its marine environment, upgrading the viability of preservation endeavors.

Table 3. Environmental Sustainability Initiatives

Initiative	Description	Environmental Impact
Hatchery Program	Cultivating sea cucumbers for sustainability	Maintains sea cucumber populations
Sea Ranching	Releasing cultivated sea cucumbers into the wild	Enhances marine biodiversity
#GoBlue Campaign	Community-led conservation efforts	Promotes awareness and action
Bekarang Practice	Traditional resource harvesting method	Preserves local marine knowledge
Lamun Warrior	Restoring seagrass ecosystems	Contributes to the health of marine biodiversity
Cik Budiman	The community projects to learn how to recycle, reduce and reuse the garbage	Reduces the volume of waste sent to landfills

6. Strengthening initiatives like the Lamun Warrior program is crucial for restoring seagrass ecosystems, which play a vital role in carbon sequestration and supporting marine biodiversity. Seagrasses are among the most productive ecosystems on the planet, capable of capturing and storing significant amounts of carbon dioxide from the atmosphere. By enhancing the Lamun Warrior program, Kampong Teripang can increase its efforts to rehabilitate degraded seagrass beds, which not only mitigates climate change but also enhances the resilience of coastal ecosystems.

Restoring seagrass ecosystems contributes to the health of marine biodiversity by providing essential habitats for various marine species, including fish, crustaceans, and other marine organisms. These habitats serve as breeding and nursery grounds, promoting the overall productivity of marine life. Moreover, seagrasses improve water quality by filtering pollutants and stabilizing sediments, which further supports marine ecosystems. By reinforcing the Lamun Warrior program, local communities can engage in restoration activities, such as planting seagrass seedlings and monitoring ecosystem health, fostering a sense of stewardship and environmental responsibility. Ultimately, these efforts not only enhance the ecological integrity of Kampong Teripang's marine environment but also

promote sustainable livelihoods by ensuring the long-term viability of fisheries and tourism in the region.



Fig. 9. Lamun Warrior Program

9. Implementing waste recycling and reduction programs is crucial for mitigating environmental impact and supporting the sustainability goals of Kampong Teripang. The Cik Budiman waste management initiative serves as a foundational effort in this regard, focusing on reducing waste generation and promoting recycling within the community. This program has introduced several key practices, such as regular community clean-up events, educational workshops on waste segregation, and the establishment of recycling points throughout the village where residents can dispose of materials like plastic, glass, and organic waste properly.

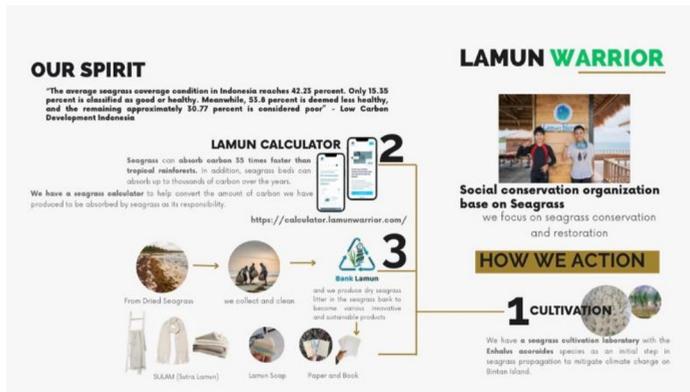


Fig. 10. Waste recycling and reduction programs

One notable success of the Cik Budiman initiative is the introduction of composting programs that transform organic waste into nutrient-rich compost for local gardens and farms. This practice not only reduces the volume of waste sent to landfills but also enhances soil quality and promotes sustainable agriculture in the area. Additionally, the program has fostered collaboration with local schools and organizations to engage students and community members in environmental education, reinforcing the importance of waste reduction and recycling practices. Furthermore, Cik Budiman has expanded to include the creation of various products, such as lamun silk (seagrass silk), lamun soap (seagrass soap), seagrass paper, and fabric made from seagrass. These innovative products not only provide new income streams for local artisans but also emphasize the sustainable use of marine

resources, showcasing how seagrass can be transformed into valuable goods while contributing to the local economy and environmental conservation.

To scale up the Cik Budiman initiative, Kampong Teripang could explore partnerships with NGOs and governmental organizations specializing in waste management. These partnerships could provide access to additional resources, funding, and expertise to implement more advanced waste processing technologies, such as anaerobic digestion for organic waste. Furthermore, expanding outreach efforts to include more community members and local businesses can increase participation and foster a collective commitment to sustainability. By enhancing the Cik Budiman initiative and encouraging community engagement, Kampong Teripang can significantly reduce its environmental footprint while promoting a culture of sustainability that benefits both the community and the surrounding ecosystem.

3.5 Technological Innovations in Marine Conservation

7.Utilizing modern technologies, such as marine robotics and remote sensing, can significantly enhance the monitoring and management of seagrass restoration and other marine conservation efforts in Kampong Teripang. Marine robotics, including autonomous underwater vehicles (AUVs) and remotely operated vehicles (ROVs), provide researchers and conservationists with the ability to conduct detailed surveys of seagrass habitats without disturbing the ecosystem. These advanced technologies can capture high-resolution images and collect data on seagrass density, species composition, and overall health, allowing for more accurate assessments than traditional methods, which often rely on manual surveys and can be time-consuming and labor-intensive.

Remote sensing technologies, including satellite imagery and aerial drones, complement marine robotics by offering a broader perspective of seagrass distribution and changes over time. By analyzing satellite data, researchers can monitor large areas of coastline and detect shifts in seagrass coverage due to environmental factors such as nutrient runoff, climate change, and human activities. This capability allows for the timely identification of areas requiring intervention or protection, facilitating more effective management strategies.

The advantages of these modern technologies over traditional methods are substantial. They enable continuous monitoring of seagrass ecosystems, providing real-time data that can inform adaptive management practices. Moreover, the integration of artificial intelligence and machine learning algorithms can enhance data analysis, leading to improved decision-making based on predictive modeling of seagrass growth and resilience. By leveraging these advanced tools, Kampong Teripang can significantly enhance its conservation efforts, ensuring that seagrass ecosystems remain healthy and productive for generations to come.

3.6 Enhancing Tourist Facilities and Services

8.To enhance Kampong Teripang's appeal as a tourist destination and boost revenue, improving tourist facilities and services is essential. Currently, the village offers basic amenities, including a small selection of accommodations and dining options; however, further investments in infrastructure could significantly increase accessibility and attract a wider range of visitors. Planned improvements include the development of better transport links, such as enhanced road access and shuttle services to and from nearby transportation hubs, making it easier for tourists to reach the village. Additionally, establishing partnerships with local tour operators can facilitate guided tours and activities, promoting a more immersive experience for visitors.

Accommodations are another critical area for improvement. The village plans to introduce a variety of lodging options, ranging from eco-friendly lodges to comfortable

guesthouses, catering to different budgets and preferences. Upgrading existing facilities to meet higher standards of comfort and service will enhance the overall visitor experience. Furthermore, developing amenities such as tourist information centers, recreational areas, and public restrooms will not only improve convenience for tourists but also contribute to a more welcoming environment.

Incorporating local culture and sustainable practices into the tourism offerings can further enhance Kampong Teripang's attractiveness. Initiatives such as hosting cultural events, workshops, and local artisan markets can create unique experiences that resonate with eco-conscious travelers. By investing in these improvements, Kampong Teripang can position itself as a desirable destination that balances environmental sustainability with cultural richness, ultimately boosting tourism revenue and benefiting the local community.

3.7 Challenges and Future Prospects

5.Despite its successes, Kampong Teripang faces significant risks from climate change that pose serious threats to its marine-based economy and ecosystems. Rising sea levels, driven by global warming and the melting of polar ice caps, jeopardize the village's coastal infrastructure and increase the risk of flooding. This disruption not only threatens local livelihoods but can also displace communities that rely on stable coastal conditions. Furthermore, rising sea levels can lead to the loss of critical habitats, such as mangroves and seagrass beds, which serve as essential buffers against storm surges and erosion.

In addition to rising sea levels, ocean warming presents further challenges for Kampong Teripang's marine environment. Increased water temperatures can alter species distribution, leading to shifts in fish populations and coral bleaching, which threaten the biodiversity that is vital for sustainable fishing and aquaculture. The health of the local sea cucumber industry, a cornerstone of the community's economy, is at risk if marine ecosystems are compromised. As these challenges intensify, it becomes imperative for Kampong Teripang to implement adaptive strategies that enhance resilience against climate impacts, ensuring the long-term viability of both its marine environment and the community's economic future.

Additionally, there's an progressing require for nonstop instruction and capacity-building activities to guarantee that community individuals are prepared to adjust to changing natural conditions and advertise flow. Reinforcing associations with neighborhood and universal organizations can give fundamental assets and skill to improve the versatility of Kampong Teripang's blue economy activities.

Looking ahead, the potential for scaling the Kampong Teripang demonstrate to other coastal communities in Indonesia and past is promising. By sharing best hones and cultivating collaborative endeavors among partners, comparative activities can be created to improve the employments of coastal communities whereas advancing natural stewardship and maintainability.

10.Fostering partnerships with external organizations is essential for expanding Kampong Teripang's sustainable practices and enhancing community development initiatives. Currently, the village has established collaborations with local NGOs focused on marine conservation and community empowerment. These partnerships have facilitated educational programs, such as the "School of Fish," which educates local residents on sustainable fishing practices and resource management. Additionally, collaboration with academic institutions has led to research projects that assess the ecological health of marine resources, providing valuable data that informs conservation strategies.

To further strengthen these efforts, Kampong Teripang could explore opportunities for collaboration with government bodies and private entities. Engaging with government agencies could provide access to funding opportunities and technical support for

infrastructure improvements, such as enhancing waste management systems and developing eco-tourism facilities. Collaborations with private sector companies specializing in sustainable technologies can introduce innovative practices, such as renewable energy solutions or advanced waste processing techniques, which can greatly benefit the community's sustainability goals.

Furthermore, establishing partnerships with international organizations focused on sustainable development can bring in expertise and resources that empower local initiatives. These organizations often have access to funding, training programs, and technological innovations that can enhance the effectiveness of Kampong Teripang's sustainability practices. By leveraging these partnerships, Kampong Teripang can build a robust framework for community development that not only addresses immediate needs but also fosters long-term environmental stewardship and economic resilience.

4 Conclusion

The investigation of Kampong Teripang's community-based blue economy activities gives noteworthy bits of knowledge into the crossing point of financial advancement, social strengthening, and natural supportability. This inquire about highlights the basic part that neighborhood communities play in overseeing and utilizing marine assets reasonably, especially through the case consider of Kampong Teripang in Bintan, Indonesia.

4.1 Summary of Key Findings

From the examination conducted in this ponder, a few key discoveries risen that outline the significant affect of community-driven activities in Kampong Teripang:

-Economic Empowerment: The activities built up in Kampong Teripang have altogether contributed to the financial upliftment of nearby communities. By mobilizing inhabitants into the ocean cucumber gathering and aquaculture divisions, the town has produced work openings and broadened wage sources. The investigate demonstrates that this financial development has been significant in lightening destitution and upgrading the quality of life for nearby inhabitants. For occurrence, the foundation of a ocean cucumber preparing plant not as it were makes employments but too increments the esteem chain of neighborhood marine items, permitting community individuals to determine more salary from their normal assets.

-Social Engagement and Capacity Building: Community cooperation could be a foundation of the victory seen in Kampong Teripang. The investigate outlines that nearby pioneers have successfully included inhabitants in decision-making forms concerning marine asset administration. Instructive activities, such as the School of Fish, have cultivated a culture of learning and participation, preparing community individuals with the essential abilities and information to lock in in feasible hones. The discoveries propose that these instructive programs play a crucial part in bridging the information crevice and ingrains a sense of obligation toward marine preservation.

-Environmental Sustainability: The commitment to protecting marine environments is clear within the different activities actualized inside Kampong Teripang. Programs such as incubator operations and ocean farming illustrate a proactive approach to keeping up the supportability of ocean cucumber populaces. Furthermore, community-led preservation endeavors, counting the #GoBlue campaign, underline the significance of collective activity in securing the marine environment. The integration of nearby shrewdness, such as the conventional hone of Bekarang, further enriches the community's endeavors to maintain marine assets, because it advances the mindful

utilization of nearby biological systems whereas cultivating a association to their legacy.

-Challenges and Future Directions: In spite of the advance made, challenges stay that seem block the long-term reasonability of Kampong Teripang's activities. Natural dangers, such as climate alter and contamination, posture noteworthy dangers to both marine environments and community jobs. The inquire about distinguishes the need for ceaseless instruction and capacity building to prepare inhabitants with the devices to adjust to these challenges. Moreover, fortifying organizations with outside organizations can improve assets and back for community activities, guaranteeing they stay strong against outside weights.

4.2 Implications for Community-Based Blue Economy Models

The case of Kampong Teripang serves as a important show for other coastal communities looking for to create community-based blue economy activities. It illustrates the potential for coordination financial development with natural stewardship and social value. By cultivating dynamic community cooperation and contributing in economical hones, comparable activities can contribute to accomplishing broader objectives of feasible improvement and climate strength.

Additionally, the discoveries of this investigate emphasize the need for approaches and systems that back community-led endeavors in overseeing marine assets. Governments and organizations ought to recognize the interesting information and capabilities of nearby communities and lock in them as crucial accomplices in preservation and advancement endeavors. Collaborative approaches that include neighborhood partners in policy-making can lead to more successful and feasible administration techniques.

1.Kampong Teripang's model successfully integrates economic growth with environmental conservation, demonstrating that community-driven blue economy initiatives can protect marine ecosystems while providing sustainable livelihoods. The village's focus on sea cucumber aquaculture exemplifies this approach, as it allows local residents to sustainably harvest and farm this valuable marine resource, generating a reliable income while supporting the health of surrounding marine habitats.

Moreover, the participatory governance model in Kampong Teripang fosters a strong sense of ownership among community members, encouraging them to actively engage in protecting their marine environment. This commitment to sustainable practices, including eco-tourism and marine conservation programs, not only enhances biodiversity but also attracts visitors who contribute to the local economy. Thus, Kampong Teripang serves as a compelling example for other coastal communities, illustrating that economic prosperity and ecological well-being can coexist harmoniously.

2.Kampong Teripang's focus on sea cucumber aquaculture highlights the potential of leveraging local resources to create economic opportunities while preserving the environment. This sustainable initiative not only provides a reliable income for local fishermen but also promotes responsible harvesting practices that protect marine ecosystems. By implementing methods such as rotational harvesting and population monitoring, the village ensures the health and resilience of sea cucumber stocks, reducing the risk of overexploitation. Moreover, the success of this model serves as an example for other coastal communities, demonstrating how similar sustainable aquaculture practices can be adapted to harness local marine resources responsibly, enhance local economies, and foster environmental stewardship.

3.The participatory approach in Kampong Teripang, where local residents are actively involved in decision-making processes, is vital for the success and sustainability of the blue economy model. By engaging community members in discussions about resource

management, fishing practices, and conservation strategies, the village cultivates a strong sense of ownership and responsibility among its residents. This involvement not only empowers locals to take charge of their marine environment but also ensures that the strategies implemented are culturally relevant and tailored to the community's unique needs. As a result, this collaborative governance fosters long-term sustainability, as community members are more likely to adhere to and champion practices that protect their resources and livelihoods, thereby creating a resilient framework for both economic growth and environmental conservation.

4.3 Recommendations for Future Research

6. The success of Kampong Teripang offers a compelling case for replicating similar models in other regions of Indonesia and beyond, particularly in coastal areas abundant in marine biodiversity. By effectively integrating sustainable practices with community-driven economic development, Kampong Teripang demonstrates how local resources can be managed responsibly while providing livelihoods for residents. This model not only showcases the benefits of sea cucumber aquaculture and eco-tourism but also emphasizes the importance of community engagement in decision-making processes. As other coastal communities grapple with the challenges of overfishing, environmental degradation, and climate change, the lessons learned from Kampong Teripang can serve as a blueprint for fostering resilience and sustainability. By adapting these strategies to local contexts, other regions can enhance their economic prospects while ensuring the protection of vital marine ecosystems.

Given the complexity and dynamism of marine asset administration, future inquirers ought to investigate the long-term impacts of community-based activities on both neighborhood economies and environments. Comparative thinking about diverse coastal communities that have embraced comparative blue economy models may give more profound bits of knowledge into best practices and lessons learned. Moreover, exploring the part of innovation in upgrading community engagement and asset administration may advance the talk around maintainable advancement in coastal zones.

4.4 Final Thoughts

In conclusion, Kampong Teripang embodies the transformative control of community-based activities within the blue economy. Through a all encompassing approach that intertwines financial, social, and natural measurements, the town has not only upgraded the jobs of its inhabitants but also contributed to the feasible administration of marine assets. The effective mobilization of community individuals in ocean cucumber collecting, aquaculture, and preservation activities illustrates that when communities are enabled, they can end up as viable stewards of their situations.

As the world progressively stands up to the challenges posed by climate change and biodiversity loss, the lessons learned from Kampong Teripang can illuminate and rouse comparable endeavors over coastal districts all inclusive. By cultivating a collaborative spirit, advancing local knowledge, and prioritizing supportability, we can clear the way for a more feasible and impartial future for coastal communities and the marine environments they depend upon. Eventually, the encounter of Kampong Teripang underscores the significance of coordination and community voices into the broader account of feasible improvement, guaranteeing that the benefits of the blue economy are shared impartially among all partners included.

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