

Blue Economy as a Drive Economy, Welfare and Environment Sustainable in Malang Rapat Village Bintan District Meeting Riau Islands

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Abstract. Malang Rapat Village, located in Bintan Regency, Riau Islands, is rich in marine resources and holds significant potential for the development of a blue economy. With its extensive coastline and diverse marine ecosystems, the village offers opportunities for fisheries, sustainable marine tourism, and the creation of products derived from marine resources. These opportunities could contribute to boosting local income and generating employment in the community. However, challenges arise from unregulated fishing practices that threaten marine ecosystems, rising sea levels, and shifting weather patterns that jeopardize coastal areas and maritime infrastructure. Additionally, limited human resources in the marine sector and inadequate infrastructure hinder the growth of this industry. Despite these obstacles, the blue economy presents an avenue for environmental sustainability and marine tourism development. By embracing the blue economy, Malang Rapat Village has the potential to enhance its local economy. This research utilizes a descriptive qualitative approach and SWOT analysis to explore the role of marine resources, sustainable fisheries, marine tourism, and human capital in increasing community income and supporting the blue economy initiative as a driver of sustainable development, welfare, and environmental stewardship in Malang Rapat Village, Bintan Regency.

1 Introduction

The Blue Economy is an innovative approach to economic growth that emphasizes the sustainable and responsible use of marine and coastal resources. It aims to strike a balance between economic development and environmental conservation, ensuring the protection of marine ecosystems while also promoting the well-being and livelihoods of local communities [1]. In coastal areas such as Malang Rapat Village, located in Bintan Regency, Riau Islands, the Blue Economy has huge potential [2]. It offers promising opportunities for sustainable development by harnessing the area's rich biodiversity and marine resources. By implementing this concept, Malang Rapat can thrive economically while preserving its natural beauty for future generations. A detailed map of the Riau Islands can be seen in the figure below [3],

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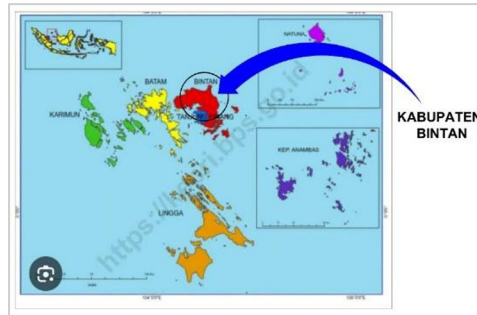


Fig. 1. Map of the Riau Islands [4]

As shown in the figure, the concept is planned for implementation in the Riau Islands. However, putting this concept into practice is far from simple. There are several challenges to overcome, including unsustainable management of natural resources, the effects of climate change, and insufficient public awareness regarding the importance of environmental preservation. Addressing these issues will require comprehensive efforts and strategies. Despite these hurdles, there remains a strong need to move forward with this initiative. Below is a detailed map of Bintan Regency, which highlights the targeted region for implementation.

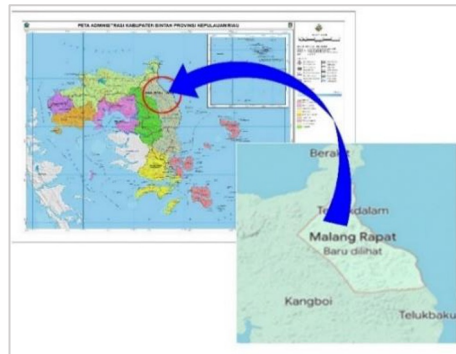


Fig. 2 Map of Bintan Regency

Figure 2 provides a detailed map of Bintan Regency, where the concept will be applied. By gaining a comprehensive understanding of the blue economy, it is expected that Malang Rapat Village, located in Bintan Regency, Riau Islands Province, can adopt the blue economy as a catalyst for economic growth, improved welfare, and environmental sustainability in the region.

1.1 History and Significance of the Area

Malang Rapat Village is situated in the Gunung Kijang District, Bintan Regency, Riau Islands Province. The name "Malang Rapat" originates from two words: "Malang" and "rapat." "Malang" refers to an island known for its rocky coastline. Some of these rocks are overgrown with trees and some are not [5]. When the sea water is high tide, the natural beauty is visible because the distance between one island and another is very close, so this village is called Malang Rapat village. The beginning of the formation of the village of Malang Rapat

was a village that was previously led by a Bathin named Zainal in 1947 to 1960, then the change of Bathin Zainal to Bathin Bahudan [6]. After Bathin Bahudan the name of Bathin changed to Penghulu, in 1980 to 1982 where at that time the penghulu was headed by Mr. M. Samin, in 1982 to 1986. At the end of 1986 the village head changed to village head until now. The location of Malang Rapat Village can be seen by the figure bellow [7],



Fig. 3. Map of Malang Rapat village

Malang Rapat Village is located in Gunung Kijang District, Bintan Regency, at coordinates $1^{\circ}06'54.3''N$ and $104^{\circ}34'57.9''E$. The village sits at an elevation of 0-20 meters above sea level, with an average rainfall of 20 mm/year and a temperature of around $30^{\circ}C$. Covering an area of 771.225 hectares, it is bordered by Berakit Village to the north, Teluk Bakau Village to the south, Toapaya Village to the west, and the South China Sea to the east. With a population of approximately 2,891, the village is divided into two hamlets, three RWs (RW 1, RW 2, and RW 3), and eight RTs. RW 1 includes RT 1 (Sungai Angus), RT 2 (Alur Rekap), and RT 3 (Kampung Pemukiman). RW 2 has three RTs: RT 1 (Tanjung Keling), RT 2 (Lembah Cahaya), and RT 3 (Pulau Pucung). RW 3 consists of two RTs: RT 1 (Teluk Dalam) and RT 2 (Kampe) [7,8].

1.2 Natural Potential Of Malang Rapat

Malang Rapat, with its captivating natural beauty, holds significant potential for development. Positioned along the coast, the area is rich in marine resources and well-preserved coastal ecosystems, offering considerable opportunities for marine tourism and fisheries. Additionally, its lush forests and abundant natural resources provide a strong foundation for sustainable development, balancing resource use and environmental preservation. By adopting the right strategies, the natural resources of Malang Rapat can serve as a catalyst for economic development, bringing advantages to the local community. Malang Rapat Village is located in Gunung Kijang District, Bintan Regency, within the Riau Islands Province. Following highlights some key aspects of village's natural potential [9].



Fig. 4. Coastlines and Fisherman's plantar

The coastlines of Malang Rapat are among the region's most valuable assets, offering great potential for development. These pristine shores not only provide opportunities for marine tourism but also contribute to the area's economic growth [10]. In addition, Fisherman's Plantar is a region abundant in marine resources and features well-preserved coastal ecosystems, presenting significant potential for the development of marine tourism and fisheries.

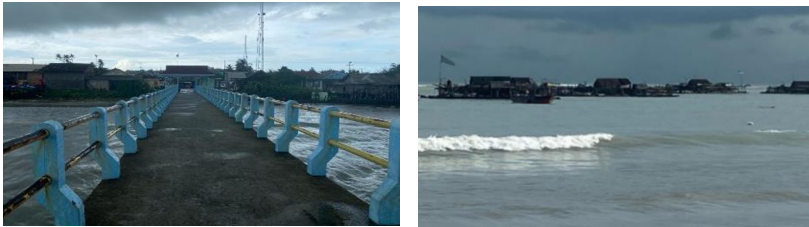


Fig. 5. Fisherman's Wharf and Floating Kelong

Furthermore, Fisherman's Wharf is an area rich in marine resources and home to well-preserved coastal ecosystems, offering substantial opportunities for the growth of marine tourism and the fishing industry. Its natural wealth positions it as a prime location for sustainable economic activities centered around the sea. Additionally, Floating Kelong is an area rich in marine resources with well-maintained coastal ecosystems. This area offering vast potential for the growth of marine tourism and the fishing industry.

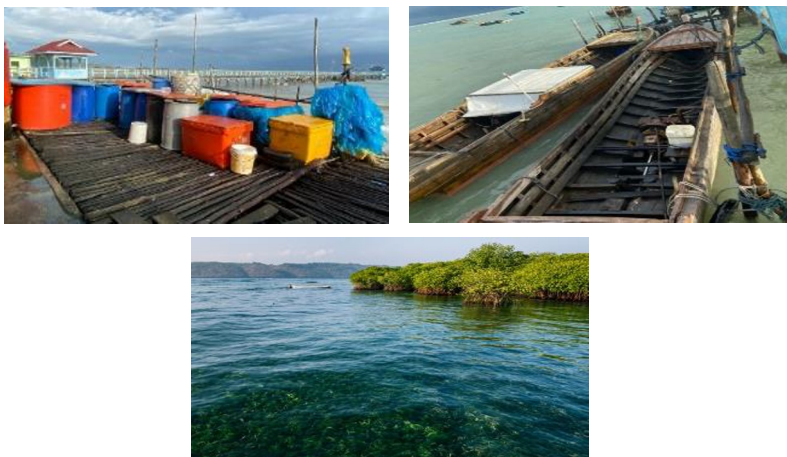


Fig. 6. Fish shelter, Traditional fishing boat, Coral reefs and mangroves

Floating Kelong's unique location makes it perfect for sustainable maritime activities, supported by abundant natural resources. Traditional fishing boats, essential to coastal communities, sustain livelihoods and embody cultural heritage. These boats not only bolster the fishing industry but also offer opportunities for eco-tourism and sustainable practices. Their craftsmanship and design attract tourists, fostering cultural tourism and education. Promoting Malang Rapat's natural potential helps preserve both the environment and long-standing traditions [11].

1.3 Current use of marine resources and projected economic growth through the blue economy in Malang Rapat village today.

Malang Rapat Village, situated in Gunung Kijang Sub-district, Bintan Regency, is embracing the blue economy to foster sustainable economic development, enhance community welfare, and safeguard the environment. The village, known for its marine fishing resources, supports various fishing activities carried out by the local community, such as capture fishing with nets, fishing rods, and traps, the development of fish farming in floating net cages, and seaweed cultivation [12].



Fig. 7. Malang Rapat

The community of Malang Rapat Village boosts fish market value through processing activities like drying, salting, and making products such as crackers and nuggets. Known for its marine resources and traditions, the village also offers attractions like mangrove tours, snorkeling, and diving. With its natural potential and government backing, the blue economy can enhance the local economy, welfare, and sustainability in Malang Rapat, Bintan Regency, Riau Islands [13].

1.4 Blue economy

Blue economy is a development concept that utilizes marine resources sustainably to drive economic growth, improve community welfare, and maintain the sustainability of marine ecosystems [14]. Malang Rapat Village has a marine area and a wealth of marine natural resources, so it has great potential in developing a sustainable economy, welfare, and environment. The potential marine resources that can be developed include [14,15],

- 1) Development of environmentally friendly fish farming, sustainable fisheries management, and value-added fisheries processing.

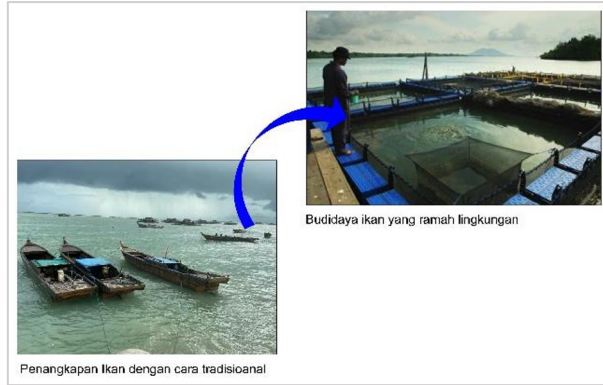


Fig. 8. Development of fish farming

The advancement of environmentally friendly fish farming, coupled with sustainable fisheries management and value-added processing, not only ensures the health of marine ecosystems but also enhances the economic viability of local communities.

- 2) Development of marine tourism that has potential and is sustainable by utilizing existing destinations and developing tourism.



Fig. 9. The Development Marine Tourism

The development marine tourism that is both promising and sustainable can be achieved by leveraging existing destinations and enhancing tourism infrastructure. This approach not only aims to attract visitors but also emphasizes the importance of preserve the natural resources also local culture.

- 3) Development of modern and efficient port infrastructure, as well as integrated maritime transportation services.



Fig. 10. Infrastructure Development

The advancement of modern and efficient port infrastructure, along with integrated maritime transportation services, is essential for enhancing regional trade and connectivity. By streamlining logistics and improving facilities, ports can accommodate larger vessels and facilitate smoother operations.

- 4) Development of marine biotechnology-based products such as medicines, cosmetics and food ingredients that have added value.

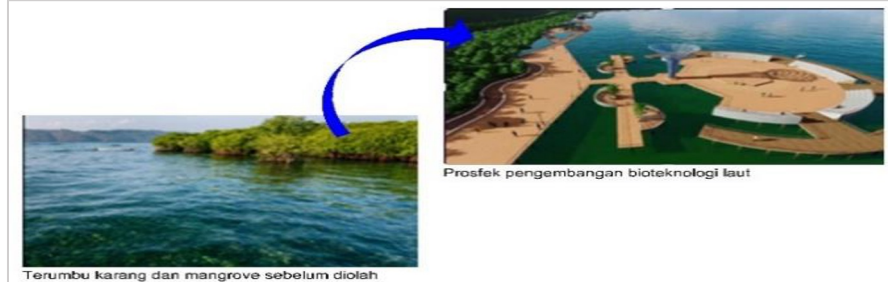


Fig. 11. Infrastructure Development

The advancement of marine biotechnology-based products, including medicines, cosmetics, and food ingredients, holds immense potential for adding value to various industries. By harnessing the unique properties of marine organisms, researchers can develop innovative solutions that not only enhance product quality but also promote health and well-being.

1.4 Benefit of the Blue

The blue economy concept is expected to offer numerous advantages that go beyond just economic growth. By encouraging the sustainable utilization of marine resources, it seeks to improve the health of marine ecosystems, which play a vital role in preserving biodiversity. The specific benefits of the blue economy are outlined below [14,16],

- 1) Enhancing sustainable fisheries
- 2) Utilizing and enhancing marine tourism
- 3) Encourage regional economic growth.
- 4) Creating new jobs.
- 5) Increase community income.
- 6) Improving community welfare can be done through the development of micro (small) and medium enterprises (MSMEs)
- 7) Managing marine resources sustainably can maintain marine ecosystems and reduce the negative impacts of human activities on the environment.
- 8) Increase food production and support national food security.
- 9) Can adapt to climate change through the development of environmentally friendly technologies and practices.

1.5 Challenge

By having a vast sea, long coastline, and great potential, Malang Rapat Village, Bintan Regency, Riau Islands also has several challenges including,

- 1) Uncontrolled fishing.
- 2) Inadequate infrastructure such as ports, roads and facilities still need attention and improvement.
- 3) The application and use of technology is not yet adequate to support the development of the blue economy and still needs to be improved.

- 4) There is still a need for good coordination between various stakeholders to support the implementation of the blue economy.

Through the collaboration and support of the government, private sector, and local communities, we can address all challenges by leveraging the blue economy as a catalyst for economic growth, improved welfare, and environmental sustainability in the island region.

2 Formulation of problem

The formulation of the problem serves as a critical foundation for understanding the challenges at hand. It involves identifying the key issues that need to be addressed and setting the stage for effective analysis and solutions. By clearly defining the problem,

- 1) How the potential of fisheries, marine tourism, and human resources can increase the income of the Malang Rapat village community.
- 2) How SWOT study implements blue economy driver in Malang rapat village

3 Literature review

Blue economy is a concept of utilizing marine resources sustainably to generate economic growth, create jobs, and improve community welfare, while preserving marine ecosystems.

The goals are:

- 1) Increasing economic growth by utilizing marine potential.
- 2) Improving the welfare of coastal communities by creating jobs and increasing income with marine resources.
- 3) Protecting and preserving marine ecosystems and living and non-living natural resources.

3.1 Blue Economy Potential in Malang Rapat Village, Bintan Regency, Riau Islands

Malang Rapat Village, Bintan Regency, Riau Islands has great potential in developing the blue economy, including [17]:

- 1) Marine Resources: This includes the rich marine biodiversity, vast fishing opportunities, and the scenic coastal and marine environments that can be developed for tourism.
- 2) Strategic Location: Malang Rapat village, located in Bintan Regency, Riau Islands, is ideally positioned for tourism and maritime activities due to its favorable geographical location.
- 3) Supportive Government Policies: The Indonesian government has implemented several policies to promote the growth of the blue economy.

3.2 Challenges in Implementing the Blue Economy

The successful implementation of the blue economy faces various obstacles that must be addressed. These challenges can hinder progress and impact the sustainable management of marine resources. The main issues in adopting the blue economy are outlined below:

- 1) Unsustainable fishing harms mangroves and coral reefs, key habitats for marine life and natural coastal defenses. Destructive methods like fish bombs and trawls deplete fish stocks, lower fishermen's incomes, and negatively impact Malang Rapat's fishing and tourism industries.
- 2) Damage to marine ecosystems such as mangrove forests, marine pollution, domestic and industrial waste discharged into the sea causes damage to marine ecosystems).
- 3) Infrastructure limitations (infrastructure to support the blue economy, such as infrastructure, ports and seafood processing facilities, is still limited).
- 4) Lack of knowledge and technology (limited skilled labour in the maritime sector).
- 5) Climate change, rising sea levels, and shifting weather patterns pose significant physical and socio-economic risks to coastal areas. Sea level rise leads to more frequent tidal

flooding and accelerates coastal erosion, shrinking shorelines. Socio-economic impacts include damage to infrastructure, reduced tourism appeal, and loss of income due to harm to coral reefs and mangroves. Coastal settlements are also threatened by rising sea levels.

- 6) Regulations and policies (storage and distribution of fishermen's catches are still controlled by the fish touke).

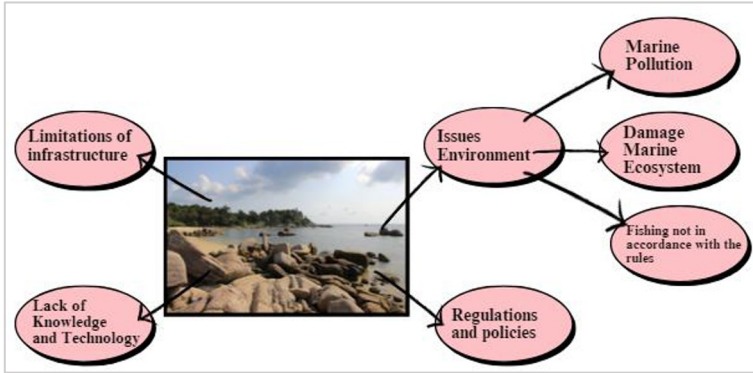


Fig. 12. Challenges in Implementing the Blue Economy

The implementation of the Blue Economy in Malang Rapat Village, Bintan Regency, Riau Islands, includes:

- 1) Aquaculture (Fish farming and other marine farming with environmentally friendly technology).
- 2) Marine Tourism (Sustainable development of marine tourism destinations).
- 3) Human Resources (Improving natural resources through training)
- 4) Marine Debris Management (Implementation of an effective waste management system).

4 Research methods

4.1 Descriptive Qualitative Approach

The aim is to gain a deeper understanding of the phenomena that exist in Malang Rapat Village, Bintan Regency, Riau Islands, such as the implementation of the blue economy at the village level by:

- 1) Gaining in-depth understanding of community experiences, perceptions and motivations regarding the blue economy, what are the benefits and challenges faced by communities in implementing blue economy practices and what policies do communities think need to be improved to support the blue economy.
- 2) Understanding people's daily activities related to the blue economy in the context of their social environment. So that all data can be combined as a descriptive qualitative method.

4.2 SWOT Analysis

The blue economy is a development model centered on the responsible and sustainable utilization of marine resources. Malang Rapat Village, Bintan Regency, Riau Islands has very broad maritime potential. The blue economy can drive economic growth, improve community welfare, and preserve the environment. There are few of analysis potential that can be used for this research but SWOT is one of the best tools that can be used in this research [18].



Fig. 13. SWOT Analysis

SWOT analysis is ideal for assessing the blue economy, as it identifies internal and external factors affecting marine resource management. Unlike other tools, it offers a balanced view of strengths, weaknesses, opportunities, and threats. This comprehensive approach helps stakeholders develop strategies that enhance strengths and opportunities while addressing challenges, supporting sustainable blue economy initiatives. It can be used to assess the potential and challenges of implementing the blue economy in Riau Islands [19],

4.2.1 Strength

Here are the strength of the SWOT Analysis that describe in the information bellow,

- 1) The geographical location of Malang Rapat Village, Bintan Regency, Riau Islands is very strategic so that it can support maritime affairs and has abundant marine wealth such as fisheries, marine tourism, and other marine products.
- 2) The fisheries and marine tourism potential of Malang Rapat Village, Bintan Regency, Riau Islands is very broad with the natural beauty of the sea and islands which have their own unique attractions.
- 3) Having local wisdom that can support activities to improve a sustainable economy.
- 4) The government supports and is committed to developing the blue economy with various programs and policies.

4.2.2 Weaknesses

Here are the weakness of the SWOT Analysis that describe in the information bellow,

- 1) The availability of skilled workers in the maritime sector is still limited.
- 2) The use of technology in marine resource management is not yet optimal.
- 3) The storage and distribution of fishermen's catches is still controlled by the fish touke.
- 4) Supporting infrastructure for the blue economy still needs to be built and improved, such as ports, docks, and seafood processing facilities.

4.2.3 Opportunities

Here are the opportunities of the SWOT Analysis that describe in the information bellow,

- 1) Marine tourism can be a source of income that maintains environmental sustainability and conservation.
- 2) The use of information technology can help manage marine resources.
- 3) Cooperation with investors can accelerate the development of the blue economy.

4.2.4 Threats (Threats)

Here are the threats of the SWOT Analysis that describe in the information bellow,

- 1) Uncontrolled fishing that does not comply with applicable regulations can cause a decline in fish populations and damage marine ecosystems.

- 2) Climate change can cause sea level rise, coastal erosion, and damage to marine ecosystems.
- 3) Marine pollution due to human activities can damage the quality of sea water and threaten the lives of marine biota.

4.3 TOWS Analysis Strategy

TOWS Analysis builds on SWOT by creating actionable strategies from identified strengths, weaknesses, opportunities, and threats. It directly connects internal capabilities to external opportunities and threats, offering a deeper strategy framework. In the blue economy, TOWS helps stakeholders develop strategies for resilience and sustainable growth in marine resource management.

4.3.1 SO (Strengths-Opportunities)

Leveraging existing strengths to seize available opportunities, here are the detail of SO Analysis,

- 1) Utilizing the potential of large marine resources by increasing investment.
- 2) Developing marine tourism with a sustainable concept by utilizing the existing natural beauty.
- 3) Increasing fisheries production by applying modern cultivation technology.

4.3.2 WO (Weaknesses-Opportunities)

Overcoming weaknesses by taking advantage of opportunities, here are the detail of WO Analysis,

- 1) Improving the quality of human resources through training and cooperation with international educational institutions.
- 2) Overcoming infrastructure limitations by involving the private sector and investors in development.
- 3) Simplifying the licensing process to attract more investors.

4.3.3 ST (Strengths-Threats)

Maintain strength to reduce the impact of threats, here are the detail of ST Analysis,

- 1) Prevent illegal fishing at the border by increasing surveillance and law enforcement.
- 2) Reducing the impact of marine pollution by implementing environmentally friendly waste processing technology.

4.3.4 WT (Weaknesses-Threats)

Reducing weaknesses and avoiding threats, here are the detail of WT Analysis,

- 1) Addressing climate change by developing adaptation and mitigation programs
- 2) Facing global competition by improving product quality and market diversification.

5 Results and discussion

5.1 Descriptive qualitative approach

From the data from the descriptive qualitative approach, the data can then be integrated to gain an understanding of the implementation of the blue economy in Malang Rapat Village, including:

- 1) Increasing sustainable fisheries yields
- 2) Realizing marine tourism by utilizing marine resources
- 3) Improving human resources so that it can increase the income of the surrounding community.

5.2 SWOT Analysis

SWOT analysis offers a comprehensive view of the opportunities and obstacles for the blue economy in Malang Rapat Village, helping to pinpoint strategies that can be adopted to meet sustainable development objectives. The adoption of the blue economy in this village is anticipated to bring several advantages, including:

- 1) Improving the quality of sustainable fisheries.
- 2) Increasing marine tourism by utilizing marine potential.
- 3) Improving human resources.
- 4) Increase the income of the surrounding community.
- 5) Improving infrastructure so that the quality of life of coastal communities through access to basic services such as clean water, sanitation and health also improves.
- 6) Reducing marine pollution.
- 7) Sustainable use of marine resources.

With a descriptive qualitative approach and SWOT analysis, we can utilize the potential of fisheries, marine tourism and human resources to increase the income of the Malang Rapat village community and can implement the blue economy as a driver of the economy, welfare and sustainable environment of the Bintan Islands Regency.

5.3 Case Study

For completing the result of the paper, here are the comparative study of regions that have successfully implemented the blue economy,

1. Raja Ampat

Raja Ampat in Papua, Indonesia, is famous for its beautiful underwater scenery, rich marine life, and beaches. With diving, snorkeling, and water activities as key attractions, it offers great potential for marine tourism and advancing the blue economy, benefiting local communities through sustainable resource use.



Fig. 14 Raja Ampat

The government and local communities in Raja Ampat are working together to promote sustainable tourism and protect marine ecosystems. They've implemented sustainable seaweed farming, set up fishing zones, regulated fishing practices, and encouraged eco-friendly aquaculture. The Blue Economy strategy includes waste management, government support for small businesses, and training locals in tourism, fisheries, and environmental management, while fostering partnerships to achieve sustainability goals.

2. Costa Rica

Costa Rica has made significant strides in environmental preservation, particularly in its marine sector. Some of the tangible steps the country has taken to advance its blue economy include developing tourism infrastructure with minimal environmental disruption,

constructing eco-friendly accommodations, creating safe trekking paths, and implementing effective waste management practices.



Fig. 15 . Costa Rica

Costa Rica boasts a vast network of marine protected areas that safeguard coral reefs, mangroves, and other marine ecosystems. The government enforces stringent fishing regulations to preserve sustainable fish populations and marine environments. Environmental education is introduced from an early age, and local communities are actively involved in managing natural resources and tourism.

6 Conclusion

In conclusion, the insights gained from this analysis highlight the importance of adopting a comprehensive approach to the blue economy can be seen bellow,

- 1) Malang Rapat Village in Bintan Regency has great potential to drive the blue economy, supported by abundant marine resources, strategic location, and government backing. It is rich in fish, both food and ornamental, which can be developed through fish farming and sustainable fisheries. The village's beaches offer opportunities for marine tourism like snorkeling and diving, boosting local income. Seaweed cultivation also presents an economic opportunity. However, challenges like overfishing, limited infrastructure, and a lack of skilled labor hinder full blue economy implementation.
- 2) There are several challenges to implementing the blue economy, such as unregulated fishing, limited infrastructure and a lack of skilled human resources. It is necessary for the government to improve education and training in the marine sector, both through universities and training institutions. Education in the marine sector needs to be adapted to technological developments.
- 3) The Blue Economy is a concept of sustainable economic development through the optimal use of marine resources, which requires maintaining the health of marine ecosystems and a range of interventions and policies.
- 4) Government policy has a role to play in promoting the economy of coastal areas by establishing regulations for the sustainable use of marine resources, including regulation of fishing zones, environmental licensing, marine waste management, and increasing the capacity of human resources through training.
- 5) The government must implement the policy through coordination between central and local government and between related institutions. The government must increase community participation and empowerment by educating coastal communities about the importance of the blue economy and by providing training and support to the community to develop sustainable businesses in the marine sector, such as micro, small

and medium enterprises (MSMEs), incentives (provision of subsidies, credit assistance and facilitation in obtaining permits).

- 6) The government should budget for marine-related research, such as the development of environmentally friendly fishing technology, marine ecosystem management and marine energy use, and work with educational institutions and NGOs to produce innovations and technologies that support the blue economy.
- 7) Fisheries, marine tourism and other marine products offer significant growth opportunities.
- 8) Fisheries, marine tourism and other marine products offer significant growth opportunities.
- 9) In developing a blue economy, environmental sustainability must be a top priority.

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