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Case study of the application of the blue economy in making coral reefs a business commodity on Pari Island, Indonesia

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Abstract
Indonesia, which is part of the Coral Triangle ecosystem, has abundant marine resources, especially coral reefs which are very important for coastal communities. Pari Island, which is part of the Seribu Islands, is famous for its marine tourism potential which attracts many visitors with its beautiful beaches and diverse marine life. This research aims to explore the application of the Blue Economy concept in managing coral reefs as business assets on Pari Island. The research was carried out on Pari Island from 31 May to 2 June 2024 using interview methods, focus group discussions and field observations. Research shows that the high biodiversity around Pari Island is highly dependent on the presence of *Acropora* coral, which strengthens the urgency of conservation and protection of the marine environment. Blue Economy initiatives on the island include transplantation of *Acropora* corals, which have proven effective in supporting the sustainability of coral reef ecosystems. Responsible ecotourism activities also make a positive contribution to both the welfare of local communities and environmental protection. However, challenges faced such as lack of government support and law enforcement issues highlight the need for closer collaboration between various parties to ensure the sustainability of this initiative in the future.

Keywords: Blue economy, coral reefs, ecotourism

Introduction
The blue economy is a marine resource management concept that aims to improve human and socio-economic welfare while maintaining the sustainability of marine ecosystems (Austen *et al*., 2019) [11]. The basic principles of the blue economy include sustainable use of marine resources, environmentally friendly technological innovation, and improving the welfare of coastal communities (Bhakti & Hakim., 2024) [13]. The blue economy also encourages reducing marine pollution and mitigating climate change through responsible practices (Bari., 2017) [14]. The main focus is on developing sectors such as sustainable fisheries, marine renewable energy, and marine ecosystem-based tourism. Thus, the blue economy seeks to achieve a balance between economic growth and environmental conservation.
The blue economy according to Rahim *et al*. (2024) [29], plays an important role in sustainable management of marine resources by encouraging practices that maintain the health of marine ecosystems. Through this approach, the use of marine resources such as fisheries, tourism and energy is carried out by considering the long-term impact on the environment (Bahri., *et al*., 2023) [23]. In addition, the blue economy encourages innovation in environmentally friendly technologies that can reduce pollution and carbon emissions. Thus, the blue economy ensures that the use of marine resources can meet the needs of current generations without compromising the capabilities of future generations.
Coral reefs have a very important ecological function for the marine environment (Hermansyah & Febriani.. 2020) [20]. They provide habitat and shelter for a variety of marine species, increasing biodiversity. Coral reefs also play a role in protecting beaches from erosion and the impact of large waves, such as tsunamis and storms.

In addition, coral reefs help in the nutrient cycle by recycling organic substances in the sea. Coral reef ecosystems also contribute to the health of local fisheries by providing spawning and nursery areas for many fish species.

Coral reefs provide significant economic benefits to local communities. Its existence supports the fishing industry, which is the main source of income and food for coastal communities (Nursita., 2020) [26]. Coral reefs also attract tourists through activities such as diving and snorkeling, which encourage the development of the local tourism sector. Apart from that, coral reef-based products, such as marine souvenirs and marine products, can improve the community's creative economy. These benefits together create jobs and improve economic prosperity in coastal areas.

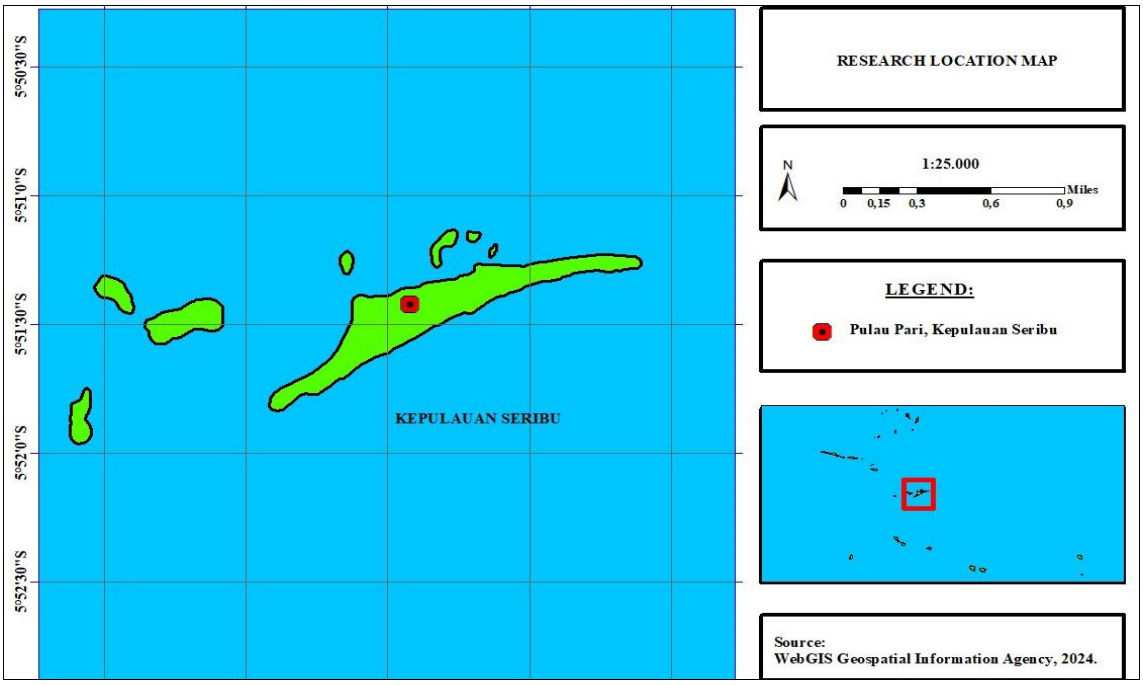
Pari Island, located about 45 km north of Jakarta, Indonesia, is part of the Kepulauan Seribu, Indonesia. This island has an area of around 41.32 hectares and is surrounded by shallow waters rich in coral reefs. Its diverse ecosystem includes white sandy beaches, mangrove forests and seagrass beds that serve as habitat for a variety of marine species. Its strategic geographical location makes Pari Island the center of marine research and conservation activities. This island is famous for its underwater beauty, making it a popular destination for ecotourism activities such as diving and snorkeling. According to data from the DKI Jakarta Tourism and Creative Economy Department (2023) [16], tourist visits to the Seribu Islands reached 404,845 people in 2023, an increase of 27.81% compared to 2022. This shows the important role of ecotourism in supporting the local economy.

The coral reef ecosystem on Pari Island experienced significant damage, with most coral reef areas experiencing degradation of up to 60% according to data from Smiling Coral Indonesia (2023), caused by human activities and natural factors. This damage could have a serious impact on the economies of local communities who depend on marine resources for their livelihoods. Therefore, a sustainable blue economy concept initiative is needed to maintain the sustainability of coral reef ecosystems and ensure that the economic benefits of coral reefs can be enjoyed sustainably by future generations. This is the main reason why this research was conducted on Pari Island, to explore how best to apply blue economy principles in the context of coral reef management and strengthen conservation efforts in the region. It is hoped that the results of this research will produce concrete recommendations for developing local economic potential on Pari Island through sustainable use of coral reefs. By understanding the interactions between the blue economy and coral reef conservation, local communities can implement practices that support sustainable income from the tourism and fisheries sectors. It is hoped that this research will increase public and tourist awareness about the importance of maintaining the sustainability of coral reef ecosystems, which can reduce pressure on marine resources and support the balance of the ecosystem as a whole. Overall, the results of this research are expected to strengthen the scientific and practical basis for implementing sustainable policies and have a positive impact on the local economy and environmental conservation on Pari Island.

Methodology

Research Location

The research was conducted on Pari Island, which is located in the South Seribu Islands sub-district, has an area of 0.95 km2 and is a popular marine tourism destination. Its charming waters attract more and more tourists, making it an ideal location for research. Located on the North Coast of the Java Sea, north of Jakarta Bay, the research took place from 31 May to 2 June 2024.



Source: (Primary Data Processed)

Fig 1: Pari Island, Kepulauan Seribu, Jakarta

Research methods

This research uses a qualitative approach. According to Moha (2019), it is a procedure that produces descriptive data in the form of written or spoken words from people and observable behavior. Qualitative research is a tradition in the social sciences that relies on observing people in their own area and engaging with those people in their discussions and events.a.

The approach used in this qualitative research involves data

collection methods such as interviews with community leaders involved in coral reef conservation, focus group discussions, and field observations at Perawan Beach, Pari Island. The aim of the interviews is to gain in-depth insight into the challenges and successes in conservation efforts (Fahrezi *et al*., 2023) [18]. Focus group discussions were used to explore broader perspectives from the community regarding coral reef issues. Meanwhile, field observations provide direct understanding of the condition and dynamics of coral reefs at the study location.

Population and Sample

The samples in this research are criteria people including individuals or organizations who have direct experience and knowledge in coral reef conservation efforts on Pari Island.. Respondents were selected based on their role as key stakeholders or field practitioners actively involved in conservation activities. This criterion aims to ensure that the data obtained can provide in-depth and relevant insights regarding challenges and successful strategies in coral reef management.

The sampling technique used was purposive sampling. Purposive sampling, this technique was chosen because it focuses on selecting respondents based on certain criteria that are in accordance with the research objectives (Setiawan *et al*., 2020). The criteria are experience and direct participation in coral reef conservation on Pari Island. Some of the respondent criteria are as follows:

- Engaged in preserving the coral reef ecosystem on Pari Island
- Best understand the characteristics of coral reefs on Pari Island
- People who direct tourists to the coral reef ecosystem on Pari Island

The samples chosen were 3 key people from the local community involved in conservation on Pari Island and the tourguides

Data Types and Sources

- Primary Data: Primary data sources are sources obtained directly from research subjects or from an informant. Data sources were taken directly by researchers by conducting observations, in-depth interviews with key shops involved in preserving the coral reef ecosystem on Pari Island and documentation
- Secondary Data: Secondary data sources that are collected indirectly from the source but the collected data is used for several other purposes at different times.

Data collection technique

- **Observation**
  The observation method is one of the selected variants of data collection methods which has a methodologically strong character. The observation method is not only a process of observing and recording activities, but more than that, observation makes it easier for us to obtain information about the world around us (Hasanah., 2017) [19]. Observation activities are carried out by observing the behavior, events or activities of the actors responsible for the coral ecosystem on Pari Island.
- **Interview**
  The interview method was carried out with key respondents or actors involved in the conservation of coral reef ecosystems on Pari Island, with the aim of gaining in-depth insight into the challenges, strategies and impacts of implementing the Blue Economy program in the region.
- **Documentation**
  The objects documented in this research are the location of Pari Island, the Pari Island Marine Protected Area and biodiversity on coral reefs. data collection in the form of notes, documents, interview processes, and photos related to research activities.
- **Focus Group Discussion**
  Focus Group Discussion (FGD) is an effective method in the context of research or evaluation for collecting qualitative data from a group of participants who represent various perspectives related to the topic under study (Nartin *et al*., 2024). In this research on coral reef ecosystem conservation on Pari Island, FGDs were used to gain an in-depth understanding of the opinions, knowledge and experiences of various key actors. This group discussion not only helps identify the main problems faced in coral reef conservation, but also facilitates the process of formulating solutions based on mutual understanding and collaboration between the various parties involved.

Analysis Techniques

The data analysis technique used in this research is qualitative analysis. Data obtained from interviews, focus group discussions, and field observations will be analyzed in depth to identify patterns, themes, and relationships between the various information collected. The steps in qualitative data analysis include coding data, grouping themes, and interpreting the meaning behind the findings. This approach allows researchers to present information descriptively and develop an in-depth understanding of the challenges and strategies for success in managing coral reefs on Pari Island, in accordance with deeper research objectives.

Result

Pari Island

Pari Island, strategically located between geographical coordinates 5° 50' 20" - 5° 50' 25" south latitude and 106° 34' 30" – 106° 38' 20" east longitude, is part of the Seribu Islands Administrative Regency in Jakarta North. This island is isolated in the Java Sea, bordering the open sea and several small uninhabited islands around it. Based on the Jakarta Central City Administration's Central Statistics Agency report in Figures (2020), the population on Pari Island is 3,665 people. The majority of Pari Island residents work as tour guides, home stay providers, restaurants and snack sellers. Their presence supports the island's growing tourism industry, especially with its underwater attractions that attract tourists to activities such as diving and snorkeling. This island is also known for its natural beauty which is attractive to visitors looking for a unique and memorable ecotourism experience around Jakarta

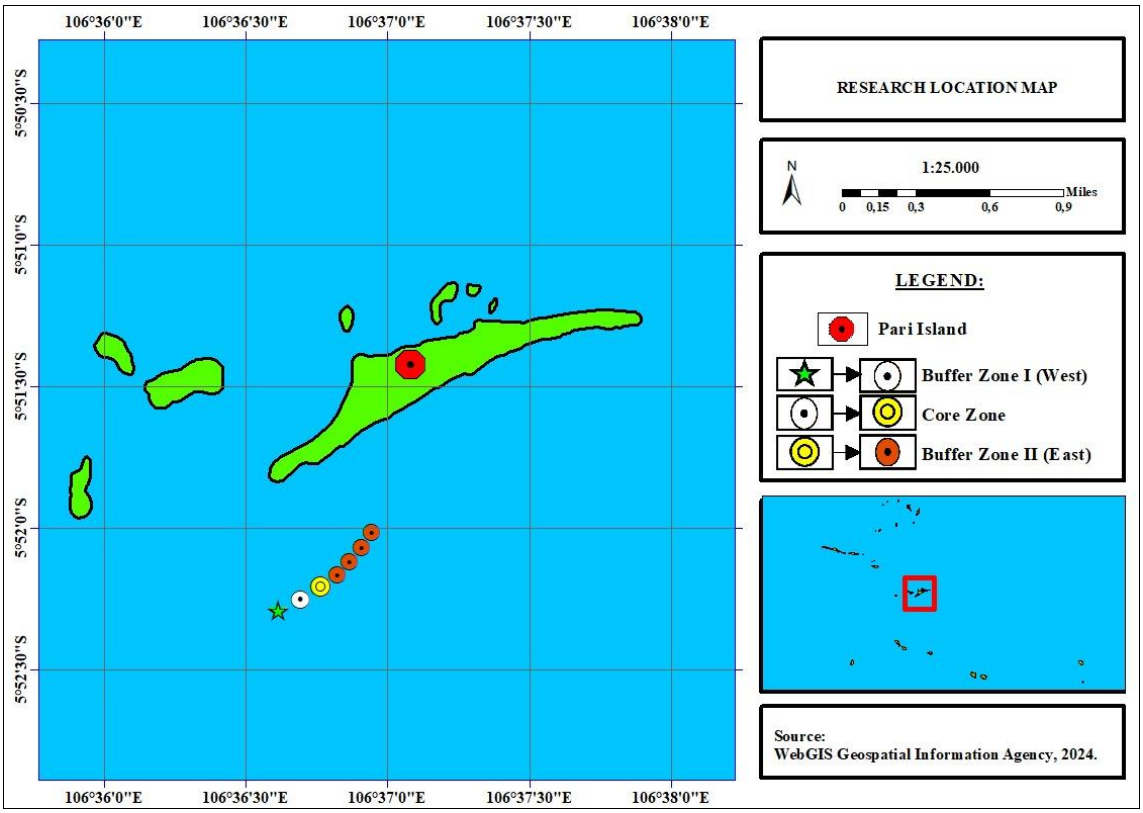
Along the coastline and shallow waters of Pari Island, there are mangrove ecosystems, seagrass beds, coral reefs and various marine biota that interact with each other. This island is also known as the Lagoon because the water is very calm. This lagoon is about 5 meters deep and its beauty is enhanced by the presence of small islands and coral rock formations that surround it. Around the beach, there is a coast called Pasir Perawan which is filled with mangrove trees,

beautifying the beach view. Pari Island has two ports, one which is still operating on the south side of the island as a place to enter ships from outside the island, and another which is no longer active in the southwest, in the BRIN area, which is in a neglected condition and is rarely used. At each end of the island, which faces directly into the open sea, there are amazing coral reefs, located about 2-10 meters below the water surface. To enjoy the beauty of this coral reef, visitors must use a local fishing boat.

Pari Island Coral Reef Ecosystem

Based on research that has been carried out, Pari Island is a conservation area or Marine Protected Area (DPL). DPL Marine Protected Areas (DPL) are marine areas that have a variety of habitats and are legally protected for the purpose of protecting their uniqueness, beauty and productivity, as well as to carry out environmental rehabilitation. This area is permanently protected from other use activities, except for strictly regulated research, education and tourism activities. Within the Marine Protected Area (DPL) there are three zones, namely:

- **Core Zone:** This is an area that is not permitted to be used for any activity and functions as an important place to maintain ecological functions, especially to protect the spawning habitat of fish and various other marine biota.
- **Buffer Zone:** This is an area designated to support the core zone and is a zone where activities can be regulated in accordance with the norms set by the community. This area allows tourism activities such as snorkeling, diving and fishing as attractions that can be enjoyed by the public.
- **Utilization Zone:** A Utilization Zone is an area where fishing activities can be carried out, with restrictions regarding the type of fishing gear that can be used.



Source: (Primary Data Processed)

Fig 2: Location of each Pari Island Coral Reef Zone

Information regarding the location and extent of the Marine Protected Area (DPL) can be found in Governor's Decree Number 601 of 2019 which regulates the location of the DPL as part of the conservation area in the Seribu Islands Administrative Regency. The area of the Perlingan Laut area of Pari Island itself is 12 Ha.

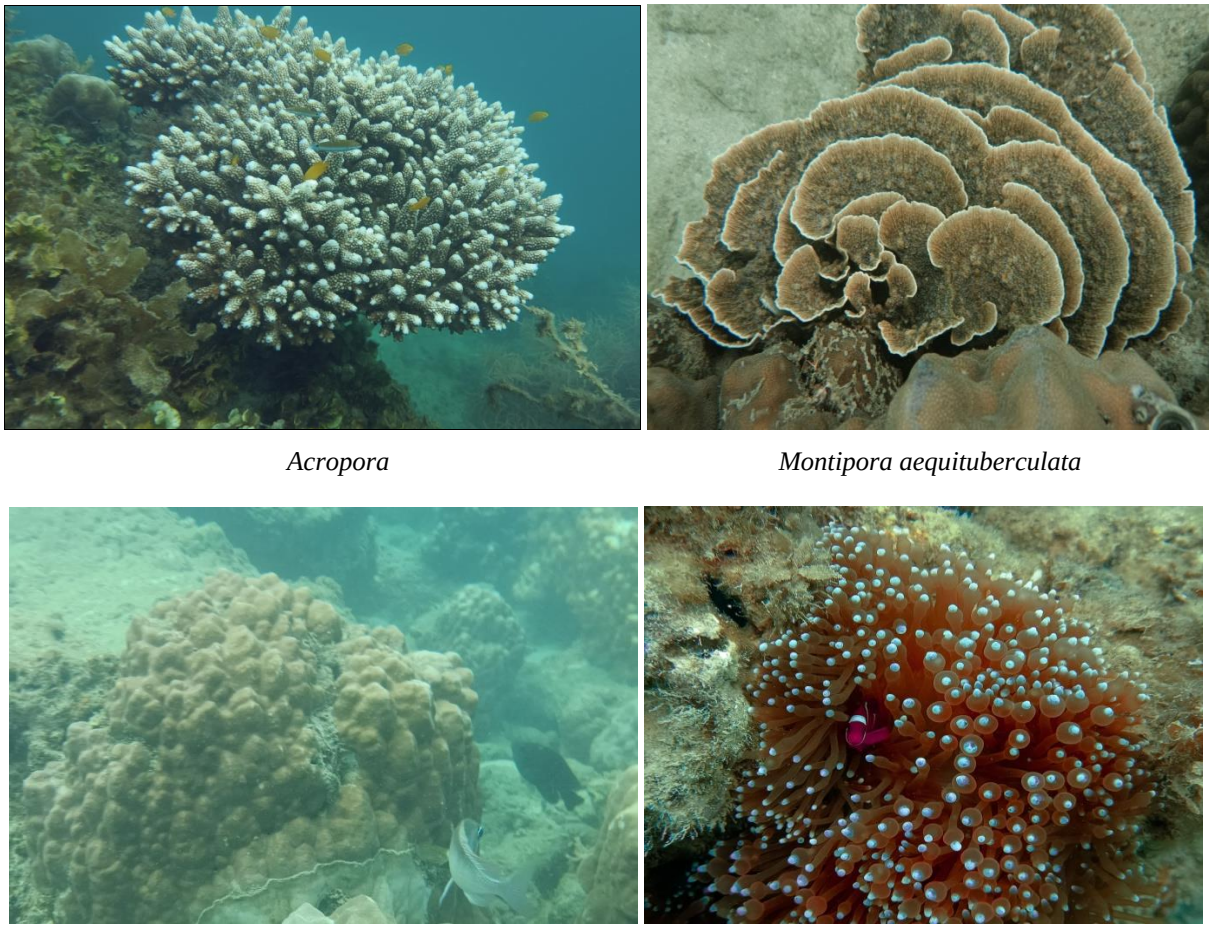
Divided into this zone, Pari Island functions not only as a conservation location that protects biodiversity and marine ecosystems, but also as a place where local communities can engage in sustainable economic activities. According to Patmawati (2019), this zone division allows a balance between environmental protection and responsible use of marine resources, so that ecological and economic benefits can be felt by current and future generations. With clear zone divisions, management of Pari Island can be carried out more effectively and directedly. This policy ensures that every activity that takes place on the island, be it conservation, tourism or fishing, is carried out taking into account its impact on the environment. This is important to prevent over-exploitation and ecosystem damage which could threaten the sustainability of natural resources on Pari Island. In addition, the active involvement of local communities in managing these zones can increase awareness and concern for the importance of protecting the environment, while providing sustainable economic opportunities for them (Hidayat., 2011). In this way, Pari Island is not only a model of successful conservation management, but also a real example of how local communities can be empowered to support and utilize conservation areas responsibly..

Biodiversity of the Pari Island Coral Reef Ecosystem

The biodiversity of the coral reef ecosystem on Pari Island shows the dominance of the *Acropora* coral species. This type of coral is famous for its branching shape and stunning colors,

making it the center of attention in the coral reef ecosystem. The existence of *Acropora* coral not only provides visual beauty that attracts tourists, but also plays an important role in providing habitat and shelter for various marine species (Ali., 2024). Research shows that *Acropora* coral supports high biodiversity around Pari Island, making it vital for conservation and efforts to protect the marine environment in this region. By maintaining the health and sustainability of *Acropora* coral, Pari Island's coral reef ecosystem can continue to provide ecological and economic benefits for local communities and future generations.

Apart from *Acropora* coral, the coral reef ecosystem on Pari Island is also inhabited by other types of coral such as *Montipora aequituberculata* and *Siderastrea sidereal*. Latypov (2013), revealed that montipora aequituberculata is known for its plate-like shape and unique surface texture, while sidereal Siderastrea has a more massive structure and smooth surface. This diversity enriches coral reef ecosystems, providing diverse habitats for a variety of marine biota. Among these corals, various aquatic biota such as sea anemones are also found which add to the complexity and beauty of the ecosystem. Sea anemones not only visually enrich coral reefs but also provide shelter and food for several fish species, including clownfish (Pratte *et al*., 2018). This diversity of coral types and aquatic biota reflects the health of the coral reef ecosystem on Pari Island, making it important for conservation and environmental sustainability efforts (Baum *et al*., 2015).



Acropora *Montipora aequituberculata*

Sidesratra sidereal *Sea anemone*

Source: (Field Documentation)

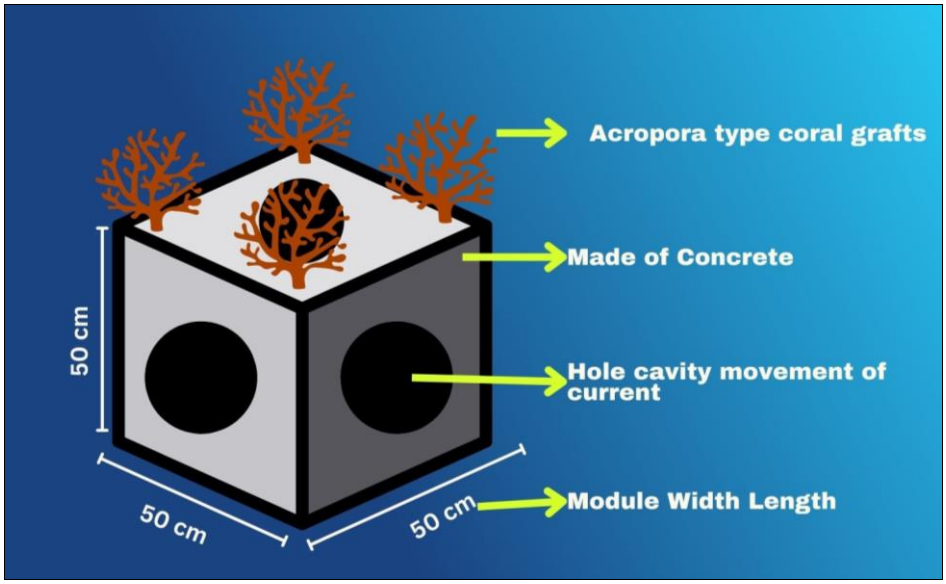
Fig 3: Biodiversity and types of aquatic corals on Pari Island

Discussion

Implementation of the Blue Economy on Pari Island

The implementation of the blue economy on Pari Island is carried out through initiatives aimed at overcoming damage to coral reefs due to human activities and natural factors. One of the main efforts undertaken is coral transplantation, where damaged coral is repaired by replanting coral fragments on an artificial substrate. This transplant uses a cube-shaped coral module with a cavity in the middle, which is designed to stimulate coral growth and provide a safe habitat for various marine species. The type of coral transplanted is Acropora coral, which is known for its fast growth and beauty that attracts tourists (Zainuddin., *et al*., 2023) [31]. Acropora coral is very suitable for transplantation because it has a fast growth rate compared to other coral types, allowing for more efficient coral reef rehabilitation (Khasanah *et al*., 2023) [23]. In addition, its branching structure provides a complex and ideal habitat for various species of fish and marine invertebrates, thereby increasing biodiversity in the transplant area. According to Oppen *et al*. (2015) [30], Acropora corals are also quite resilient and can adapt to a variety of environmental conditions, making them an effective choice in coral reef restoration projects. The visual beauty of this coral is also a special attraction for tourists who are interested in ecotourism, supporting conservation efforts through increasing awareness and community participation in protecting marine ecosystems. Thus, the use of Acropora corals in transplantation not only helps in repairing damaged coral reefs but also supports the sustainability of the marine ecosystem as a whole.

Coral Module Formation Coral Module Arrangement



Source: (Field Documentation)

Description of the Coral Module on Pari Island

Fig 4: Coral Transplantation on Pari Island

Tourists are also involved in the sustainability of conservation activities on Pari Island, with a system where every time they use the services of ecotourism business actors on Pari Island, a portion of the proceeds from the tourist activities is deposited in the amount of 2 thousand rupiah per person. This system not only helps fund coral conservation and transplantation projects, but also raises awareness among tourists about the importance of protecting and preserving marine ecosystems. With direct contributions from tourists, local communities gain additional support to continue conservation efforts and promote sustainable practices in the management of their marine resources.

The implementation of the blue economy on Pari Island has shown some success, especially in terms of increasing awareness of local communities and tourists about the importance of coral reef conservation and developing a sustainable ecotourism sector. However, the challenges faced are not small. One of them is the lack of incentives from local governments, so that coral reef conservation and rehabilitation efforts largely depend on income from tourist visits. Apart from that, there are still many fishermen who do not comply with zone regulations, so they often pass through and damage coral reef areas. These two challenges show the need for more support from the government as well as increased supervision and law enforcement to protect the marine ecosystem on Pari Island. In addition, closer collaboration is needed between the government, local communities and conservation institutions to ensure the sustainability of blue economy initiatives in this region.

Furthermore, diversification of funding sources also needs to be considered to ensure the continuity of conservation programs. For example, seeking funding from international environmental grants or developing coral reef adoption programs by corporations that care about the environment. Developing education and training for local communities on sustainable fishing practices and coral reef rehabilitation techniques could also increase the effectiveness and community participation in this initiative. Thus, the implementation of the blue economy on Pari Island can be an effective model for sustainable marine resource management in other areasn.

Blue Economy Business Model on Pari Island

The economic business models on Pari Island that are currently available include:

- Coral reef transplantation and restoration, this business model focuses on efforts to restore damaged coral reefs by replanting coral fragments into prepared locations. Parties involved can generate income from donations, sponsorships, or participation fees in restoration programs. Apart from supporting conservation, this model also creates local employment opportunities in coral reef monitoring and maintenance activities.
- Sustainable ecotourism, developing a sustainable

ecotourism sector into a profitable business model on Pari Island. Activities such as snorkeling, diving and responsibly organized nature tours attract environmentally conscious tourists. Development of environmentally friendly tourism infrastructure, such as the use of ships with more efficient engines.

An economic business model on Pari Island that is currently not available and could very well be implemented is:

- Conservation education and consulting, this business model focuses on providing educational and consulting services on coral reef conservation to local communities, tourists and related parties. Organizing workshops, educational courses, or consulting for environmental management can generate additional income. Local communities can be involved as instructors or consultants, which in turn strengthens awareness and knowledge about conservation.
- Conservation education and consulting, this business model focuses on providing educational and consulting services on coral reef conservation to local communities, tourists and related parties. Organizing workshops, educational courses, or consulting for environmental management can generate additional income. Local communities can be involved as instructors or consultants, which in turn strengthens awareness and knowledge about conservation.
- Community-based management, this business model involves empowering local communities in sustainable management of marine resources. Through this approach, local communities can have a greater role in decision making regarding the management and protection of coral reefs. Business can develop by utilizing traditional knowledge and local wisdom in preserving the environment.

Lessons Learned

Community involvement is critical to the success of coral reef conservation, fostering a sense of ownership and responsibility. An integrated approach that combines conservation efforts with sustainable tourism, research and adaptability ensures a holistic conservation strategy. Adaptive management practices emphasize the importance of flexibility in dealing with problems that arise immediately. Sustainable tourism represents economic activities that are aligned with conservation objectives, and promotes a balanced approach. A clear policy and regulatory framework provides stability and support for conservation efforts at the institutional level.

Conclusion & Recommendations

Conclusion

Research shows that coral transplantation techniques, specifically using Acropora corals, are effective in restoring damaged coral reefs by growing rapidly and providing complex habitats for a variety of marine species. Sustainable ecotourism business models on Pari Island, such as responsible snorkeling and diving, make a positive contribution to the well-being of local communities and the protection of coral reefs, with income from tourists supporting conservation projects. Increasing awareness of local communities and tourists about the importance of preserving coral reefs is achieved through educational programs and participation in conservation activities, building a sense of ownership of natural resources. Key challenges in implementing the Blue Economy on Pari Island include a lack of government support and law enforcement issues against coral reef-damaging fishing, but collaboration between government, local communities and the private sector has helped overcome some of these challenges. The research also highlights the importance of a holistic approach in coral reef management, which integrates conservation, economics and education to maintain the sustainability of the Blue Economy initiative and protection of marine ecosystems on Pari Island.

Recommendations

To scale up sustainable blue economy efforts on Pari Island:

1. Diversify economic opportunities to reduce dependence on coral reef resources;
2. Strengthen a sustainable economic model that combines renewable energy and ecotourism;
3. Increase community involvement in the decision-making process;
4. Develop a regulatory framework that supports Blue Economy principles;
5. Monitor and evaluate progress periodically to ensure effectiveness and sustainability.

References

1. Ali AMT. Monograph Exploring the Beauty of the Undersea. Rizmedia Pustaka Indonesia; c2024.
2. Priyanka RN, Mohammad RR, Joyshri S, Rashadul Islam SM. Prevalence and Intensity of *Contracaecum* sp. in Jew-Fish (*Otolithoides pama*). Scholars Journal of Agriculture and Veterinary Sciences. 2019;10:1-10. ISSN 2348-8883.
3. Seesao Y. Caractérisation des *Anisakidae* dans les poissons marins: développement d'une méthode d'identification par séquençage à haut-débit et étude de prévalence. World Wide Web electronic publication, //tel.archives-ouvertes.fr/tel-01412878; c2016.
4. Sinare Y, Boungou M, Kangoye MN, Kabre GB. Modèle de distribution des nématodes chez le poisson chat (*Clarias anguillaris* (Linnaeus, 1758)) dans deux réservoirs du Burkina Faso (Afrique de l'Ouest). International Journal of Biological and Chemical Sciences. 2021;15(3):1015-1029.
5. Valero A, Paniagua MI, Hierro IR, Diaz V, Valderrama MJ, Benítezae FJ. Anisakid parasites of two fork beards (*Phycis blennoides* and *Phycis phycis*) from the Mediterranean coasts of Andalucia (Southern Spain). Parasitology Research. 2006;55(1):1-5.
6. Vassilades G. Un nouveau *Paracamallanus* (Nematoda; Camallanidae), chez un poisson *Clariidae* de Sangalkam (Sénégal). Annales de Parasitologie (Paris). 2010;4:441-448.
7. Vassiliades G, Petter AJ. *Camallanus ctenopomae* n. sp. (Nematoda; Camallanidae), parasite de *Ctenopoma kingsleyae* Gunther (Poisson; Anabantidae) au Sénégal. Annales de Parasitologie (Paris). 1972;3:383-389.
8. Vassiliades G, Troncy PM. Description de *Falcaustra tchadi* n. sp. (Nematoda; Katblaniidae) parasite de *Distichodus brevipinnis* (Poisson; Citbarinidae) du Tchad. Annales de Parasitologie (Paris). 1973;3:489-495.
9. Vassiliades G. Un nouveau *Paracamallanus* (Nematoda; Camallanidae), chez un poisson *Clariidae* de Sangalkam (Sénégal). Annales de Parasitologie (Paris). 1970;4:441-448.
10. Vassiliades G. Nématodes parasites de *Distichodus*

rostratus Poisson *Citharinidae* du lac de Guiers (Sénégal). Annales de Parasitologie (Paris). 1973;3:469-475.
11. Austen M, Andersen P, Armstrong C, Döring R, Hynes S, Levrel H, *et al*. Valuing Marine Ecosystems-Taking into account the value of ecosystem benefits in the Blue Economy. https://doi.org/10.31230/osf.io/vy3kp; c2019.
12. Badan Pusat Statistik Kota Administrasi Jakarta dalam Angka; c2020.
13. Bakti S, Hakim LN. Blue Economy and Strategic Leadership: Driving Sustainable Development in Indonesia. Kalianda Halok Gagas. 2024;7(1):1-18. https://doi.org/10.52655/khg.v7i1.88
14. Bari A. Our oceans and the blue economy: Opportunities and challenges. Procedia Engineering. 2017;194:5-11.
15. Baum G, Januar HI, Ferse SC, Kunzmann A. Local and regional impacts of pollution on coral reefs along the Thousand Islands north of the megacity Jakarta, Indonesia. PLoS One. 2015;10(9). https://doi.org/10.1371/journal.pone.0138271
16. DKI Jakarta Tourism and Creative Economy Department Report; c2023.
17. DKI Jakarta Governor Decree No. 601. 2019. Concerning the Location of Marine Protected Areas as Conservation Areas in the Seribu Islands Administrative Regency.
18. Fahrezi MS, Aulia PA, Santoso G. Defending the Motherland with All Your Soul: The Role and Responsibilities of the Young Generation in Safeguarding the Nation's Sovereignty and Interests. Journal of Transformative Education. 2023;2(2):391-404. https://doi.org/10.9000/jpt.v2i2.382
19. Hasanah H. Observation techniques (an alternative method of collecting qualitative data in the social sciences). At-Taqaddum. 2017;8(1):21-46. doi: 10.21580/at.v8i1.1163
20. Hermansyah H, Febriani F. Impact of environmental damage to coral reef ecosystems. Journal of Population and Environmental Development. 2020;1(3):42-51.
21. Hidayat H, Haba J, Siburian R. Ecological politics: management of national parks in the autonomous era. Indonesian Obor Library Foundation; c2011.
22. Khasanah RI, Herawati EY, Tri Y, Nugroho EN. Coral Reef Ecosystem Restoration Based on Technological Innovation for Using Coal Waste. Smiling Coral Indonesia Report; c2023.
23. Latypov YY. Barrier and platform reefs of the Vietnamese coast of the South China Sea. International Journal of Marine Science. 2013;3. doi: 10.5376/ijms.2013.03.0004
24. Moha I. Qualitative Research Variety Resume; c2019.
25. Nartin SE, Faturrahman SE, Ak M, Deni HA, MM C, Santoso YH, *et al*. Qualitative research methods. Independent Noble Scholars; c2024.
26. Nursita L. Initiating the Development of a Blue Economy on Coral Reefs; A Socioeconomic Approach. EcceS (Economics, Social, and Development Studies). 2020;7(1):62-86. https://doi.org/10.24252/ecc.v7i1.13730
27. Parmawati R. Economic Valuation of Natural Resources & Environment Towards a Green Economy. Universitas Brawijaya Press; c2019.
28. Pratte ZA, Patin NV, McWhirt ME, Caughman AM, Parris DJ, Stewart FJ. Association with a sea anemone alters the skin microbiome of clownfish. Coral Reefs. 2018;37:1119-1125. https://doi.org/10.1128/AEM.00063-18
29. Rahim A, Hastuti DRD, Malik A. Blue Economy Development in Indonesia. NEM Publishers; c2024.
30. Van Oppen MJ, Oliver JK, Putnam HM, Gates RD. Building coral reef resilience through assisted evolution. Proceedings of the National Academy of Sciences. 2015;112(8):2307-2313. https://doi.org/10.1073/pnas.1422301112
31. Zainuddin M, Priosambodo D, Ambeng A, Al Anshari M. Analysis of Coral Animal Growth Type *Acropora* sp. On Hanging Transplant Media and Spiders. BIOMA: Journal of Biology and its Learning. 2023;5(2):29-38. https://doi.org/10.31605/bioma.v5i2.2884
32. Zainul Bahri SE, Aprilianti DV, SSTP M. Nas Media Pustaka; c2023.