

Strategy to Improve Coral Reef Rehabilitation Behavior in Spermonde Archipelago Communities

Fachrie Rezka Ayyub¹, Muhammad Ardi¹, Faizal Amir¹, Fatma²

¹Population and Environmental Education Postgraduate Program, Universitas Negeri Makassar, Indonesia

²Fisheries Science Postgraduate Program, Universitas Hasanuddin, Indonesia

Abstract:

Background: Coral reefs play a vital role in supplying many ecological functions, but they have been destroyed in many places of Indonesia, particularly as a result of human activity on land and at sea. As a result, rehabilitative attempts must be made. This, however, necessitates a number of considerations, including ecological aspects such as coral reef degradation, marine bio-ecology, environmental and water conditions, species chosen for rehabilitation, socio-economic aspects such as community involvement and policy aspects such as national regulations and institutions. as well as regional.

Materials and Methods: Using the Strengths, Weaknesses, Opportunities and Threats (SWOT) paradigm, this study intends to assess solutions to improve coral reef rehabilitation behavior in the Spermonde Archipelago (South Sulawesi Province, Indonesia). The analysis is carried out by incorporating a number of factors, including policy, bio-ecology and community behavior. Purposive sampling was used to determine the locations of the samples, which included Barrang Caddi Island, Badi Island and Bontosua Island. Key informants (i.e. central government officials, local government officials, university academics, NGOs and the private sector) and respondents selected by stratified random sampling were interviewed to identify and determine the internal (i.e. Strengths and Weaknesses) and external (i.e. Opportunities and Threats) factors. The IFE (Internal Factor Evaluation) and EFE (External Factor Evaluation) Matrix were used to examine the qualitative data using a SWOT technique.

Results: The findings revealed that attempts to rehabilitate coral reef ecosystems in the Spermonde Archipelago had a very high bio-ecological value, based on 13 internal and 9 external criteria. The SWOT matrix analysis reveals S-W = 0.45 and O-T = 0.18 with a quadrant I position.

Conclusion: According to the SWOT analysis, efforts to improve coral reef restoration behavior in the Spermonde Archipelago have not been adequate thus far. As a result, we propose that initiatives to promote coral reef rehabilitation behavior in the Spermonde Archipelago make progressive and aggressive use of Strengths and Opportunities. The implemented strategy must support efforts to protect biodiversity and exploit maritime resources sustainably.

Key Word: Human Behavior; Marine Ecosystems; Coastal Management; Small Islands; SWOT.

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I. Introduction

Coral reefs are renewable resources with vital ecological, socio-economic and cultural functions, particularly for coastal people and small islands that rely on shallow marine fishing for their livelihoods. Coral reefs are extremely beneficial to human life, with one of them being able to prevent beach erosion caused by waves or abrasion. Even if there are no coral reefs, the brunt of the large waves will endanger human life. The presence of coral reefs in a location will support the life cycle of undersea species that collaborate to keep coastal waters biologically and ecologically productive ^[1].

The Spermonde Archipelago is one of Indonesia's islands with a significant coral reef dispersion. This marine region comprises of 120 islands that run between the southern arc of Sulawesi and the Makassar Strait off the southwest coast of Sulawesi. The archipelago covers roughly 2,500 square kilometers and is made up of about 50 vegetated islands and 70 unvegetated sandbars. A total of 50 islands are inhabited, with a population of around 50,000 people ^[2].

Coral reef damage in the Spermonde Archipelago was estimated to be around 299,97 ha/year ^[3]. Coral reef ecosystems in the waters of Pangkep Regency are still in moderate condition, with an average of 59,1 percent ^[4], whereas around Makassar City's islands, an average of 19,64 percent with damaged to moderate conditions ^[5]. Catching reef fish with explosives (bombs), anesthetics or toxic chemicals (potassium cyanide), crowbars (mini muroami), taking coral for building materials and commercial exports ^[4], pollution of water ^[6],

eutrophication and sedimentation [7], solid waste [8], air pollution and climate change [9] are the main causes of coral reef damage.

Coral reef rehabilitation works have been widely carried out in the territorial waters of South Sulawesi Province, particularly around the Spermonde Archipelago. These efforts are carried out by a variety of groups, ranging from the government to the commercial sector to environmental non-governmental organizations. The group was involved in coral reef repair work on numerous small islands in the Spermonde Archipelago. However, due to the combination of numerous circumstances, the community's behavior in these activities is deemed inadequate.

This restoration endeavor elicited a wide range of responses from many groups. Some people are negative about this activity because they believe it will only lead to strife, particularly within communities. This is based on experience carrying out activities on one of the islands, Badi Island, where, in response to these concerns, a refuse attitude arose. The community's rejection could be due to a lack of attention to the process of involving the community in management and decision-making related to the use of marine space, social jealousy among community members who felt they were left out, or the activity's direct economic benefits had yet to be realized.

However, there is still a lack of knowledge on the strengths and drawbacks of various coral reef rehabilitation projects. One of the most crucial questions is whether stakeholders and the surrounding community are aware of the problems and opportunities associated with coral reef rehabilitation. Using a framework of Strengths, Weaknesses, Opportunities and Threats (SWOT), this study will examine measures to improve the behavior of coral reef rehabilitation in the Spermonde Archipelago. The investigation is based on a number of factors, including bio-ecology, policy, community behavior and institutions. The Spermonde Archipelago provide a good research setting since they have coral reef regions that are mostly degraded.

II. Material and Methods

Period and Location of Research

This study was place from January through April of 2022. The Spermonde Archipelago in Indonesia's South Sulawesi Province were chosen as the research location. The research will take place mostly on Barrang Caddi Island, Badi Island and Bontosua Island. The area was chosen because of (1) the state of the coral reef ecosystem, (2) the existence of a community-based coral reef ecosystem restoration program and (3) the fact that, despite being on small islands, transportation and communication facilities were excellent. Figure 1 shows a map of where this research was conducted.

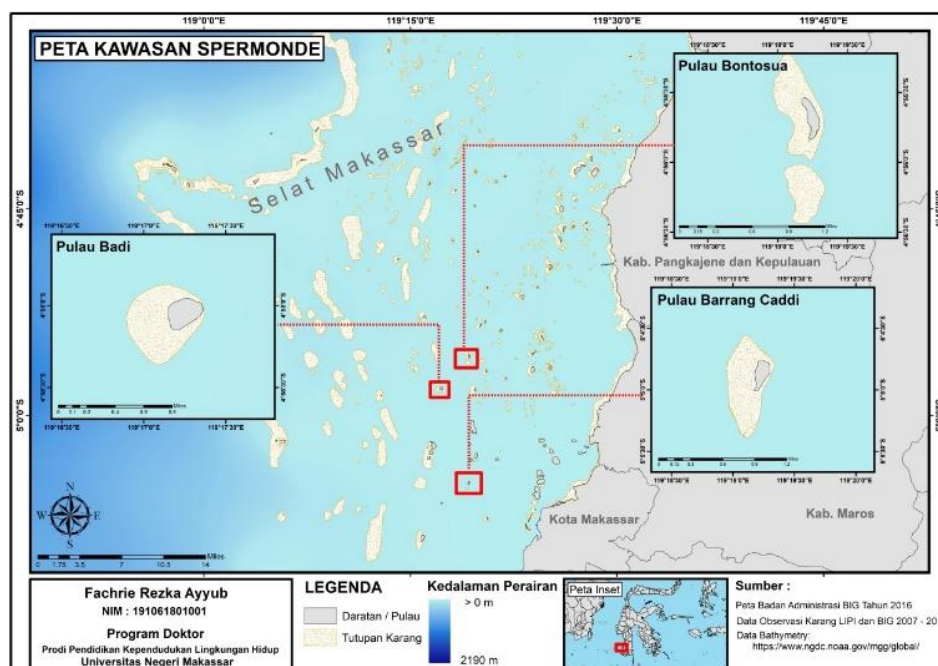


Figure 1. Research locations in South Sulawesi, Indonesia: Barrang Caddi Island, Badi Island and Bontosua Island

Data Collection

The information gathered is relevant to coral reef management. Policies for the rehabilitation of coastal areas and tiny islands in Indonesia, community participation and bio-ecological elements are all key issues in the Spermonde Archipelago' coral reef rehabilitation. The information was gathered using in-depth interviewing procedures ^[10]. In-depth interviews were conducted with stakeholders involved in coral reef management, ranging from policy aspects, community involvement, rehabilitation efforts and environmental protection and management, including the governments of both South Sulawesi Province and the country as a whole, universities, private parties and non-governmental organizations (NGOs). Officials from the Environmental Management Service, the Marine and Fisheries Service, the Sulawesi Maluku Ecoregion Development Control Center, the Makassar Coastal and Marine Resources Management Center, academics from Makassar State University's Postgraduate Program for Population and Environmental Education, Mars Sustainable Solutions and the Marine Conservation Foundation NGO are among the stakeholders. The community in the research location, in addition to these stakeholders, is a source of information and is referred to as responders. These data indicate perspectives of coral reef ecosystems in the Spermonde Archipelago, which are classified as Strength, Weakness, Opportunity and Threats based on social, economic, societal and institutional characteristics. Respondents' answers are deemed unbiased because they are expected to have information, attitudes and behavior related to coral reef rehabilitation. On Barrang Caddi Island, Badi Island and Bontosua Island, a total of 200 community members were chosen by stratified random sampling.

Data Analysis

A SWOT analysis was used to identify the formation of strategic recommendations to promote coral reef rehabilitation behavior among communities in the Spermonde Archipelago ^[11]. Through the identified internal and external factors, this investigation assesses major aspects of coral reef management in the Spermonde Archipelago. To build a coral reef rehabilitation management strategy, the data is categorized based on strengths, weaknesses, opportunities and threats ^[12, 13]. The phases are as follows:

Determination of Internal and Eksternal Factors

Interviews with respondents yielded results that were categorized into internal and external components. The Matrix Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) are used in this stage (EFE). Internal variables include all data classed as strengths and weaknesses, whereas external aspects include interview data categorised as dangers and opportunities (Table no 1).

Table no 1: The data is grouped in the first step of the SWOT analysis

Internal Factor Evaluation (IFE)	Strength	External Factor Evaluation (EFE)	Opportunity
	Weakness		Threats
	<ul style="list-style-type: none"> • S1: ... • S2: ... • S3: ... 		<ul style="list-style-type: none"> • O1: ... • O2: ... • O3: ...
	<ul style="list-style-type: none"> • W1: ... • W2: ... • W3: ... 		<ul style="list-style-type: none"> • T1: ... • T2: ... • T3: ...

Analysis Of Reasonable Strategy Valuation

The goal of this stage is to develop all feasible techniques for improving coral reef rehabilitation in the Spermonde Archipelago. A recommended strategy is created by combining external and internal components. The score acquired from each SWOT factor by multiplying the score (b) and rank is the result of this stage (r).

The worth of a score (b). Horizontal indicators (strengths and weaknesses) and vertical indicators (opportunities and threats) are given weights ranging from 1 to 4 in the SWOT framework, with the following meaning: (i) 1 = horizontal indicators are less important than vertical indicators, (ii) 2 = horizontal indicators are more important than vertical indicators, (iii) 3 = horizontal indicators are more important than vertical indicators and (iv) 4 = horizontal indicators are more important than vertical indicators.

A score (r). On a scale of 1 to 4, each SWOT factor is scored. A strength factor, for example, has the following characteristics: scores: I 4 = extremely powerful, (ii) 3 = powerful, (iii) 2 = weak and (iv) 1 = extremely powerful.

The IFE and EFE matrix analysis findings are plotted on a SWOT diagram or quadrant. The SWOT quadrant is a tool for systematically identifying and summarizing how opportunities and threats are matched against their strengths and weaknesses in a SWOT analysis. Following the four strategies, it will be observed which approach was determined to be created based on this SWOT analysis (Table no 2).

Table no 2: The segmentation of quadrants and the design of a plausible strategy based on the SWOT analysis

<p>Quadrant III (Turnaround Strategy)</p> <ul style="list-style-type: none"> • Possessing both opportunities and internal vulnerabilities, necessitating the implementation of a turnaround strategy. 	<p>Quadrant I (Aggressive Strategy)</p> <ul style="list-style-type: none"> • To develop aggressively, take advantage of favorable conditions, strengths and opportunities.
<p>Quadrant IV (Defensive Strategy)</p> <ul style="list-style-type: none"> • Unfavorable positions, weaknesses and difficulties must all be addressed at the same time, necessitating the use of a defensive approach. 	<p>Quadrant II (Diversification Strategy)</p> <ul style="list-style-type: none"> • Using strengths to diversify existing opportunities to reduce dangers.

III. Result and Discussion

Table no 3 shows six Strengths and seven Weaknesses (Internal Factors) in relation to coral reef rehabilitation in the Spermonde Archipelago area. Meanwhile, there are nine External Factors that are very essential and have an impact on coral reef rehabilitation: five Opportunities and four Threats. Bio-ecology, policy, community behavior and institutions are all covered by both internal and external factors.

Table 3: List of coral reef rehabilitation Strengths, Weaknesses, Opportunities and Threats (SWOT) in the Spermonde Archipelago, South Sulawesi, Indonesia

No.	Factor	Study Aspect	SWOT Score
1.	Strengths		1,56
	1) Support for coral reef ecosystem protection in government policy	Policy	0,35
	2) The ecosystems of coral reefs can yet be repaired	Bio-ecology	0,38
	3) The value of local wisdom is still highly valued in practice	Community behavior	0,19
	4) The need of safeguarding coral reef resources is becoming more widely recognized in the social milieu	Community behavior	0,21
	5) Facilities and infrastructure for coral reef monitoring and repair are available	Institutional	0,16
	6) Biodiversity and endangered species are present in the economic biota	Bio-ecology	0,26
2.	Weaknesses		1,10
	1) In the Spermonde Archipelago, fishing sites are open to the public	Bio-ecology	0,24
	2) At the coral reef rehabilitation site, there is no regional water conservation area	Policy	0,16
	3) The remoteness of the island from the mainland explains the low intensity of surveillance patrol activity	Institutional	0,11
	4) There is a lack of understanding about the environment and coral reef ecosystems	Community behavior	0,13
	5) In the community, there are still aspects of attitude, commitment, concern and locus of control that need to be strengthened	Community behavior	0,14
	6) In coral reef ecosystem management, there are a limited number of extension workers and assistants	Institutional	0,17
	7) The Provincial Government, not the Regency/City Government, has control for marine management	Policy	0,16
3.	Opportunities		1,56
	1) The technology for rehabilitating coral reefs has a lot of support	Bio-ecology	0,27
	2) The willingness of private stakeholders and non-governmental organizations (NGOs) to promote community motivation	Policy	0,34
	3) Environmentally friendly fishing technology is being used	Institutional	0,30
	4) The existence of laws and regulations governing coral reef ecosystem management	Policy	0,49
	5) Coral reefs are still used for commercial purposes in a	Community behavior	0,16

	limited way		
4.	Threats		1,38
	1) Infrastructure is unprepared to handle pollution caused by land and maritime operations	Institutional	0,37
	2) When it comes to the utilization of water areas, there is a conflict of interest	Policy	0,20
	3) Abrasion of the coast and climate change	Bio-ecology	0,27
	4) Destructive fishing is still a common occurrence	Community behavior	0,54

Internal Factors: Strengths and Weaknesses of Coral Reef Rehabilitation in the Spermonde Archipelago

The Government of Indonesia and the Province of South Sulawesi continue to work together with relevant stakeholders to improve coral reef governance. To address technical challenges, one of these attempts is to produce and ratify particular policy products on coral reef management at the primary and secondary levels (Table no 4).

Table no 4: Laws and regulations on coral reef management in Indonesia and South Sulawesi Province

Constitutions	Government Regulations	Regulations and Decrees of the Ministerial	Regulations and Decrees of the Regional Government
<ul style="list-style-type: none"> • Law No. 27 of 2007 Jo. No. 1 of 2014 on Coastal Areas and Small Islands Management • Law No. 32 of 2009 on Environmental Protection and Management • Law No. 11 of 2020 on Job Creation 	<ul style="list-style-type: none"> • Presidential Regulation No. 121 of 2012 concerning the Rehabilitation of Coastal Areas and Small Islands • Presidential Regulation No. 85 of 2015 concerning the National Committee for the Coral Triangle Initiative for Coral Reefs, Fisheries, and Food Security • Presidential Regulation No. 18 of 2020 concerning the National Medium-Term Development Plan for 2020-2024 	<ul style="list-style-type: none"> • Decree of the Minister of Environment and Forestry No. 4 of 2001 concerning Standard Criteria for Coral Reef Damage • Regulation of the Minister of Marine Affairs and Fisheries No. 24/PERMEN-KP/2016 concerning Procedures for Rehabilitation of Coastal Areas and Small Islands • Regulation of the Minister of Environment and Forestry No. 27 of 2021 concerning the Environmental Quality Index 	<ul style="list-style-type: none"> • Regional Regulation No. 3 of 2014 on Environmental Protection and Management • Regional Regulation No. 2 of 2019 on Zoning Plans for Coastal Areas and Small Islands for the Years 2019-2039 • Regional Regulation No. 1 of 2019 Jo. No. 1 of 2021 on Regional Medium-Term Development Plans for the Years 2018-2023

The component of government policy has a SWOT score of 0.35, which places it second on the list of Strengths, according to this study (Figure 2). According to the respondent, the lack of a Regional Water Conservation Area at the coral reef rehabilitation site is a limitation in executing government policy in the Spermonde Archipelago. Apart from government policy, the ability to rehabilitate coral reef ecosystems is the most powerful component in determining an integrated management approach.

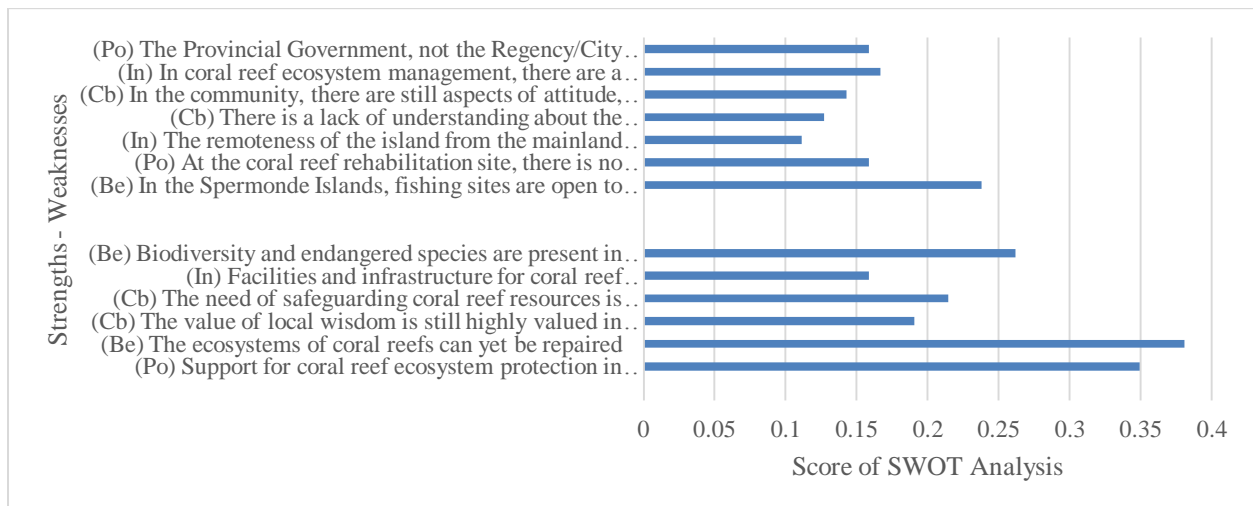


Figure 2. SWOT analysis scores for internal factors. Information: Be = Bio-Ecology, Po = Policy, Cb = Community Behavior and In = Institutional.

Other bio-ecological issues that require care, on the other hand, include the still-existing biodiversity of biota with commercial worth and endangered species. However, there is a contradiction in the bio-ecological component, which also has the highest score, namely unfettered access to the waters of fishing zones in the Spermonde Archipelago, which is also on the list of Weaknesses. This situation resulted in a high level of disruptive fishing by anglers from outside the area, as well as difficulties for cops in terms of patrolling oversight^[14]. This destructive fishing has an adverse effect on coral reef rehabilitation efforts, both in terms of care and the availability of coral seedlings and other associated biota^[15].

There is just one institutional strength in coral reef rehabilitation, which is the existence of facilities and infrastructure for coral reef monitoring and rehabilitation. Meanwhile, two factors are seen as flaws: a) the low intensity of surveillance patrol activities due to remote access from the mainland, and b) the small number of extension workers and assistance in coral reef ecosystem management.

Last but not least, there are two Strengths and two Weaknesses in society's behavioral aspects. This aspect's strengths are that a) local wisdom values are still widely practiced, and b) there is widespread social awareness of the significance of safeguarding coral reef resources. Meanwhile, the community's limitations are a) a lack of understanding of the environment and coral reef ecosystems; and b) factors such as attitude, commitment, care, and locus of control that need to be strengthened.

One of the most critical factors in the sustainable management of coral reef ecosystems is knowledge. Knowledge, particularly those incorporating local wisdom, can be used to prevent coral reef overexploitation^[16]. In addition, in social activities, rules and taboos form guidelines^[17]. Because the link between humans and nature has a long history that is represented in diverse cultural rituals, knowledge can also assist speed up the regeneration of damaged coral reef ecosystems^[18]. Coral reef rehabilitation programs can take into use community knowledge organized through traditional institutions^[19].

Unfortunately, these findings show that the residents of the Spermonde Archipelago still have limited knowledge, with a weakness score of 0,13. (very low). This demonstrates that the influence on the development of coral reef rehabilitation strategies is similarly minimal. To ensure an ecosystem's long-term viability, knowledge must be sufficient^[20]. In the Spermonde Archipelago, the neighboring community and coral reef management officers must have a high level of trust. The sustainability of the Spermonde Archipelago' coral reefs may be jeopardized due to a lack of information regarding long-term coral reef management and a lack of extension staff.

As a result, through extensive and planned counseling, training, or comparative studies, it is required to raise the awareness of the community and managers (fishery extension personnel and environmental educators) about sustainable coral reef management based on specific field conditions. Individual status and the amount of time a community group has been founded influence the type of training required to increase skills, knowledge, attitudes and motivation^[21]. Regulation of the Minister of Marine Affairs and Fisheries No. 24/PERMEN-KP/2016 about Procedures for Rehabilitation of Coastal Areas and Small Islands must direct efforts to improve this knowledge. Increasing the community's capacity for the conservation of marine biodiversity, particularly coral reefs, by taking into account social and economic factors.

The knowledge of the apparatus is also needed in the context of coral reef maintenance in the Spermonde Archipelago. A Community Monitoring Group was developed to help the limited number of extension workers and supervisors in the management of coral reef ecosystems^[22]. The surrounding community's cooperation in

preserving the Spermonde Archipelago' coral reefs is critical to ensuring the rehabilitation initiatives' long-term viability. However, there are certain benefits to including the community, such as the availability of fish supplies for daily requirements and additional money from wages for participation in rehabilitation efforts such as artificial reef construction and coral transplantation.

In addition, the legality of the region for coral reef protection is required. There has yet to be established a Regional Marine Conservation Area for the Spermonde Archipelago. This has an influence on fishermen who are unaware of the location where coral reef rehabilitation is taking place, which should be a location for coral seedling recruitment and fish stock recruitment. The area's legality as a best practice for long-term coral reef management. Participation of key agencies and the local village government, in addition to community participation, is critical. A particular management agency at the site level, according to one key informant, is required to meet coral reef management goals.

Because the Marine Service Branch in Pangkep Regency and Makassar City is unable to provide optimal management, a Regional Technical Implementation Unit for Water Conservation Areas, such to the one developed in the Raja Ampat Islands ^[23], is required. In addition, for coral reef areas beyond the protected area, an Essential Ecosystem Area can be established ^[24]. As a result, the bounds of the function of marine space for conservation, fishing, cultivation, sea lanes, and other uses are legally defined.

External Factors: Threats and Opportunities for Coral Reef Rehabilitation in the Spermonde Archipelago

On a larger scale, key informants reported that pollution, climate change and destructive fishing are the primary drivers of coral reef deterioration, which includes both coral reefs with ecological and economic purposes. The entire conversation process with various stakeholders in this study demonstrates that not all new hazards are caused by natural factors (Figure 3).

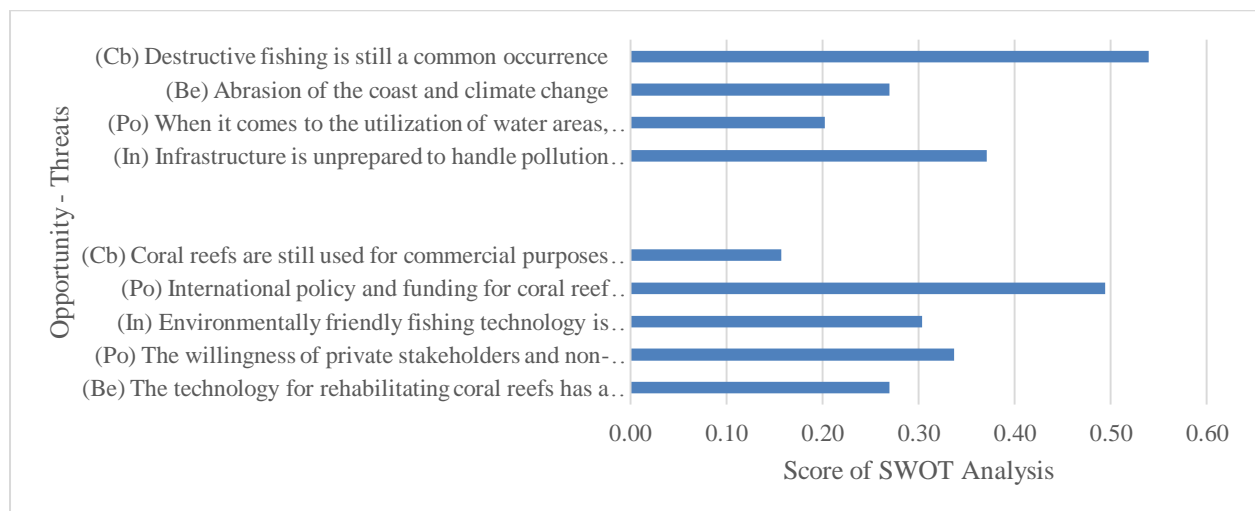


Figure 3. SWOT analysis scores for external factors. Information: Be = Bio-Ecology, Po = Policy, Cb = Community Behavior and In = Institutional.

According to the study findings in Figure 3, the most serious danger to coral reef management and rehabilitation is the prevalence of damaging fishing operations on a regular basis. The unpreparedness of infrastructure for regulating environmental pollution from land and shipping activities, according to the findings of this study, affects water quality and has implications for coral reef degradation ^[25]. Coastal erosion and climate change are the next two factors that pose a concern. This forces the local community to adapt and mitigate climate change, such as by creating embankments along the shoreline and shifting fishermen's occupations to fish or seaweed farmers.

Because coral reef restoration works are thought to reduce fishing, seaweed culture and disturb sea lanes, there is a conflict of interest in the utilization of water areas (with the lowest threat value). As a result, the parties recommend that a Marine Protected Area be established to provide a clear delineation for the use of marine space.

Although dangers to the Spermonde Islands' coral reefs persist, there are opportunities due to external influences. The existence of international regulations and funding connected to the management of coral reef ecosystems is the most valuable potential. The Coral Reef Rehabilitation and Management Program (Coremap) ^[26], a program that lasted a long time, was felt by responders. Additionally, there is a chance to improve community motivation through increasing the willingness of private stakeholders and NGOs. Mars Sustainable

Solutions ^[27] carries out activities that are deemed to be quite successful and still exist. Coral transplantation utilizing spider skeletons is the activity that is being carried out. The coral transplantation procedure is not only simple to imitate, but it is also reasonably inexpensive and has a high success rate.

Another element to consider is the use of environmentally friendly fishing equipment, as well as the support of coral reef rehabilitation technologies and the use of coral reefs for limited commercial purposes. According to key informants, these three factors are critical for accelerating the rehabilitation of degraded coral reef ecosystems, together with national policies that benefit local residents. Apart from that, the community as a whole must develop policies at the local level to promote the sense of ownership of the Spermonde Islands' coral reef ecology. The community will act on its own. Some people believe that national policies can affect their economy ^[26], hence multi-stakeholder participation should be a top goal for research.

Strategy to Improve Coral Reef Rehabilitation Behavior in Spermonde Archipelago Communities

As shown in Figure 4, the difference between internal and external factors in coral reef rehabilitation efforts in the Spermonde Islands is 0,45 and 0,18. The final result is in Quadrant I, indicating that the plan to encourage coral reef rehabilitation behavior in the Spermonde Islands will be based on the Strength and Opportunity variables. The ability of the federal and provincial governments, the corporate sector, and non-governmental organizations (NGOs) involved in coral reef management to use Strengths and Opportunities to accelerate rehabilitation in the Spermonde Islands is advantageous. Unfortunately, only one Opportunity Factor, the existence of international policies and funds relevant to the management of coral reef ecosystems, is regarded strong enough with a value of 0,49. Each factor's other variables are lower or weaker. This indicates that attempts have been undertaken thus far as a result of external encouragement rather than the conduct of the surrounding community.



Figure 4. Internal and external factors influence SWOT scores

As a result, an adequate strategy leveraging the incremental and aggressive integration of Strength and Opportunity variables is required to increase coral reef rehabilitation behavior among communities in the Spermonde Islands. This conversation is projected to result in a variety of research methodologies, policy initiatives, and high social engagement activities ^[26], particularly in the Spermonde Islands' community capacity building. Community Monitoring Groups and Environmental Cadres, according to a key informant, are used to incorporate the social and economic components of community involvement into national policy. Infrastructure development, enhancing the intensity and efficacy of technical counseling on coral reef ecosystem management, including local content in environmental education, and enlisting local community groups in coral reef rehabilitation efforts are among the other activities. Despite the fact that some communities may not want to participate, it is believed that these activities have no direct impact on their fishing output. However, research shows that, in order to restore marine biodiversity, integration measures must be implemented gradually and vigorously (Table no 5).

Table no 5: Integrated coral reef management and rehabilitation strategy

	Strengths	Quadrant I (Aggressive Strategy)	Opportunities
Bio-Ecology	<ul style="list-style-type: none"> The ecosystems of coral reefs can yet be repaired Biodiversity and endangered species are present in the economic biota 	<ul style="list-style-type: none"> Using good and correct methods for coral reef rehabilitation Using environmentally friendly fishing technology, processing and marketing of fishery products 	The technology for rehabilitating coral reefs has a lot of support
Policy	Support for coral reef ecosystem protection in government policy	<ul style="list-style-type: none"> Incorporating conservation areas into the zoning plan for coastal and marine areas Developing reception facilities, communal wastewater treatment plant and integrated garbage dump in coastal areas 	<ul style="list-style-type: none"> International policy and funding for coral reef ecosystem management exist The willingness of private stakeholders and non-governmental organizations (NGOs) to promote community motivation
Community Behavior	<ul style="list-style-type: none"> The value of local wisdom is still highly valued in practice The need of safeguarding coral reef resources is becoming more widely recognized in the social milieu 	<ul style="list-style-type: none"> Increasing local community participation in coral reef rehabilitation Enhancing community capacity for climate change adaptation and mitigation 	Coral reefs are still used for commercial purposes in a limited way
Institutional	Facilities and infrastructure for coral reef monitoring and repair are available	<ul style="list-style-type: none"> Improving facilities and infrastructure for monitoring coral reef ecosystems Developing ecotourism to help the community's economy 	Environmentally friendly fishing technology is being used

These strategies include: (i) using good and correct methods for coral reef rehabilitation; (ii) using environmentally friendly fishing technology, processing and marketing of fishery products; (iii) incorporating conservation areas into the zoning plan for coastal and marine areas; (iv) developing reception facilities, communal wastewater treatment plant and integrated garbage dump in coastal areas; (v) increasing local community participation in coral reef rehabilitation; (vi) enhancing community capacity for climate change adaptation and mitigation; (vii) improving facilities and infrastructure for monitoring coral reef ecosystems; and (viii) developing ecotourism to help the community's economy.

IV. Conclusion

According to the SWOT analysis, efforts to improve coral reef restoration behavior in the Spermonde Archipelago have not been adequate thus far. As a result, we propose that initiatives to promote coral reef rehabilitation behavior in the Spermonde Archipelago make progressive and aggressive use of Strengths and Opportunities. The implemented strategy must support efforts to protect biodiversity and exploit maritime resources sustainably.

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