

Sustainable Development Goals (SDGs) Environmental Development Pillar: Underwater Nature Conservation in Sukarame Village, Pandeglang Regency

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Abstract. The Sustainable Development Goals (SDGs), which are universally applicable, have become a primary focus across various sectors. One of the issues related to the SDGs is environmental concerns, including biodiversity programs such as Underwater Nature Conservation. The Underwater Nature Conservation program was implemented by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem in Sukarame Village, Pandeglang Regency, West Java, Indonesia. This conservation program was driven by various factors, including natural and human-related ones. This study aimed to describe the procedures or methods in Coral Reef Conservation and examine the role of this conservation effort in contributing to the Village SDGs, specifically within the context of the Environmental Pillar. To achieve this objective, a qualitative descriptive approach with document analysis was conducted. The results indicate that the Coral Reef Conservation Program by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem significantly contributes to the 14th aspect, namely the Marine Environment Awareness in the Environmental Pillar of Village SDGs. Additionally, coral reef conservation improves water quality, prevents contamination, protects coastlines and other infrastructure, ensures sustainable fisheries and other habitats, reduces marine debris, absorbs CO₂, aids in climate change adaptation, and mitigates flooding and erosion. This effort also contributes to five other aspects of the Environmental Pillar of Village SDGs, including aspects 6, 11, 12, 13, and 15.

Keywords: *Underwater Nature Conservation, Coral Reefs, Environmental Pillar of Village SDGs, Sukarame Village.*

A. INTRODUCTION

Sustainable Development Goals (SDGs) have been widely discussed. This program emphasizes issues based on legal, social, economic, and environmental concerns that are sustainable (Mensah, 2019). Discussing these issues is particularly intriguing when it comes to environmental topics, though it should be noted that this does not imply that other issues are any less interesting. Over the past decade, environmental issues have become a hot topic of discussion and a critical factor for ensuring a better quality of life in the future (Abbass et al., 2022; Calculli et al., 2021). Moreover, almost all countries, particularly developing ones, face environmental challenges, including Indonesia (Tresea et al., 2021; Umar, 2018). Environmental issues are numerous and varied, including global warming, high pollution levels from industrialized countries, legal and illegal deforestation, water pollution, overpopulation, and the loss or degradation of biodiversity (Cardinale et al., 2012; Elisha & Felix, 2020; Shivanna, 2022). These environmental issues are indeed fascinating to discuss, but this study will specifically focus on biodiversity.

Biodiversity can be categorized into three types: genetic, species, and ecosystem diversity (Mokodompit et al., 2022). These three aspects are interconnected, but in this context, the emphasis will be on ecosystem diversity, which pertains to habitats, biological communities, and ecological communities in a particular area, including marine ecosystems. This is confirmed by (Paulus, 2021), who states that the deep sea is the largest habitat on our planet and supports an incredibly high level of biodiversity. Furthermore, underwater natural

habitats are also astonishing and diverse. The web of life, comprising beautiful coral reefs, lush seagrass beds, and magnificent mangrove forests, is crucial for the ecological balance of our Earth. Marine ecosystems offer numerous essential benefits, such as facilitating human physical activities, providing food, regulating the climate, and protecting coastlines from erosion (Maria Ulfah et al., 2023; Sutton-Grier et al., 2015; Zhang et al., 2024). However, overfishing, marine pollution, habitat destruction, and climate change are examples of human activities that threaten the beauty and richness of the underwater world (Aminuddin & Burhanuddin, 2023; Dewi, 2022). Therefore, to maintain the sustainability of marine ecosystems and ensure long-term benefits for humans and the environment, underwater nature conservation must be a top priority.

In response to these issues, PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem initiated a program on Underwater Nature Conservation, specifically focusing on coral reefs, making this initiative both relevant and important. This is confirmed by (Burkepille & Hay, 2008; Pilcher, 2001), who revealed that coral reefs are the centers of marine biodiversity but are among the most threatened ecosystems on the planet. If these issues are not addressed seriously, they will lead to coral reef destruction and have a lasting impact on both present and future life (Arifin & Nasruddin, 2022).

Coral reefs, according to several sources, are a type of fauna and one of the protected species. This is evidenced by the fact that nearly 29 million hectares of water in Indonesia have become conservation areas, and 44 percent of these areas are coral reefs (CNN Indonesia, 2023). This underscores the urgency of coral reef conservation. Moreover, based on bibliometric analysis on Google Scholar by analyzing approximately 1000 articles, several key aspects related to coral reefs were identified (see the image below).

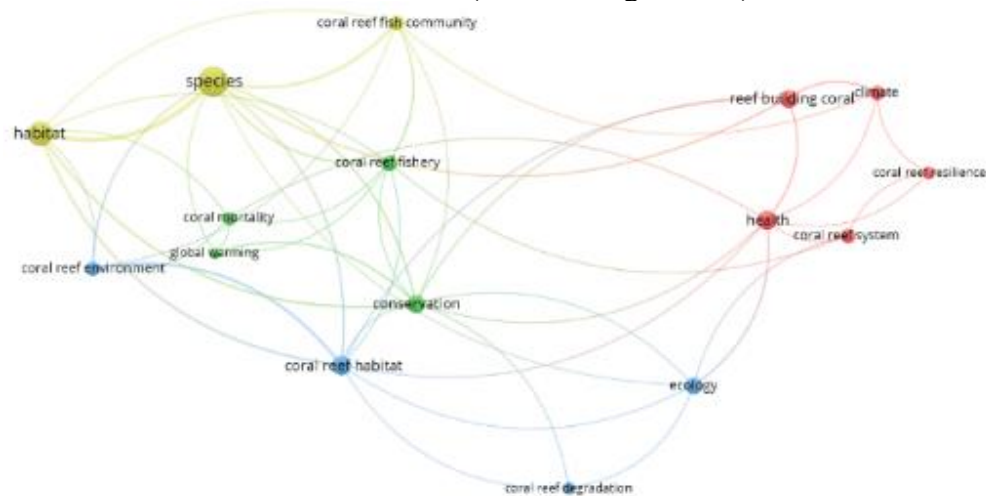


Figure 1. Bibliometric Analysis of Coral Reefs

Source : Analysis/Personal Data

Based on the image above, there are 16 items grouped into 4 clusters, all of which are interconnected with coral reefs. The first cluster includes five items: climate, coral reef resilience, coral reef system, health, and reef-building coral. The second cluster contains four items: conservation, coral mortality, coral reef fishery, and global warming. The third cluster consists of four items: coral reef degradation, coral reef environment, coral reef habitat, and ecology. The fourth and final cluster includes three items: coral reef fish community, habitats, and species. However, the focus will be on the item “conservation” within these clusters (refer to the image below).

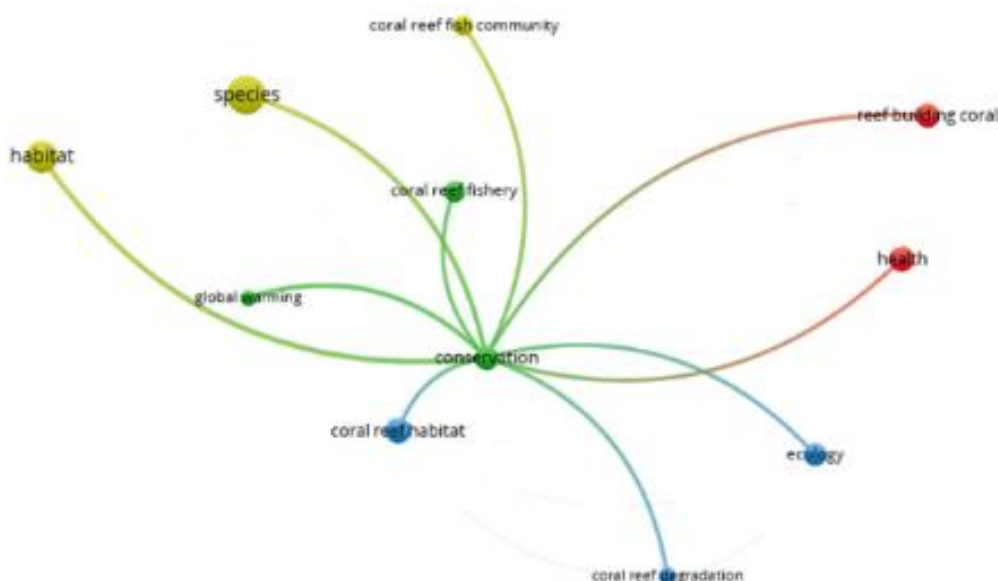


Figure 2. The Interconnection of Coral Reef Conservation in Bibliometric Analysis

Source : Analysis/Personal Data

The image above indicates that conservation is strongly associated with health, environment, global warming, habitat, species, and coral reefs. Furthermore, referring to the official SDGs page of Sukarame Village, the overall average score is 37.55, and the aspect of the Environmental Pillar remains significantly low, as shown in the image below:



Figure 3. SDGs of Sukarame Village

Source : (Sistem Informasi Desa, 2024)

The image reveals that the Environmental Development Pillar Village SDGs in Sukarame, when averaged, only scored 0.23 (23%). This highlights another critical indicator that needs improvement. Based on the explanation above, it can be concluded that underwater nature conservation, especially for coral reefs, is of great urgency as it significantly impacts the survival of all living beings on Earth. It is hoped that the program initiated by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem will have a significant impact, considering the previously discussed urgent aspects, and contribute greatly to life in the future.

B. METHOD

This research employed a descriptive qualitative method. The approach was largely narrative or descriptive and inductive, tending to use analysis (Fadli, 2021; Malahati et al., 2023). The data collection technique in this research leans toward document study from PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem. Document study itself refers to the collection of data from documents, archives, and other written materials (Ardiansyah et al.,

2023). The sources of data for the document study in this research include both primary and secondary data.

Data analysis in this research used the Miles and Huberman method, which involves data collection, data reduction, data display, and conclusion drawing, or verification (Rijali, 2018). After all stages of data analysis were conducted, data validity tests were applied, including data and source triangulation techniques (Mekarisce, 2020). The research questions include: 1) what are the procedures or methods employed by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem in conducting Underwater Natural Conservation in Sukarame Village; 2) what is the role of Underwater Natural Conservation conducted by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem in the Environmental Development Pillar of the Village SDGs?

C. RESULTS AND DISCUSSION

1. Brief Description of Research Site

Pandeglang Regency consists of 35 districts, one of which is Carita District. Carita District includes 10 villages or subdistricts as of 2019, including Sukarame Village (BPS Kabupaten Pandeglang, 2020). Sukarame Village, also known as Sukarame Tourism Village, is located at the westernmost point of Banten and is renowned for its beach tourism. The distance from Sukarame Village to Jakarta is approximately 2 hours and 30 minutes by car. One of the key potentials of Sukarame Village lies in its handicrafts and cultural arts, particularly the Pandeglang Batik. Pandeglang Batik features 14 motifs, each representing a different district within Pandeglang Regency, including Sukarame Village. Additionally, Sukarame Village is known for its handicrafts, including rhino-shaped carvings, shell-based crafts, and bamboo crafts, all of which are distinctive to Pandeglang Regency (Sukarame Website, 2023). Below is a brief overview of Sukarame Village:

Table 1. Overview of Sukarame Village

Aspect	Overview of Sukarame Village								
Area	1.76 Km ²								
Population	Male							2,742	
	Female							2,754	
Education	Education Unit	TK	SD	SMP	SMA/K	P	PT	LP	
	Number of Schools/Pesantren	9	3	1	1	3	0	0	
	Number of Teachers /Ustaz, Ustazah	41	20	13	13	37	0	0	
	Number of Students/Santri	300	549	63	65	53	0	0	
Health	Health Facilities	Midwife Practice Place			Posyandu				
		1			8				
	Family Planning Services	KB Post		Posyandu		Practicing Midwife			
		1		8		1			
Employment	Agriculture, Livestock, Fisheries						45.2%		
	Industry and Handicrafts						22%		
	Trade, Hotels, and Restaurants						46.1%		
Religion	Islam						5.495 (100%)		
	Mosque						7		
	Mushola						8		
	Majlis'talim						12		
Sports Facilities	Football Fields						3		
	Volleyball Courts						8		
	Badminton Court						1		
	Table Tennis						1		

	Beach	Yes
	Lodges/Budget Hotels	48
Tourism and Supporting Facilities	Star Hotels	2
	Restaurants	15
	Food Stalls	14
	Grocery Stores	4

Notes: TK (Kindergarten); SD (Elementary School); SMP (Junior High School); SMA/K (Senior High School/Vocational School); P (Islamic Boarding School); PT (Academic & Applied College); LP (Training Institute); KB (Family Planning)

Source: (BPS Kabupaten Pandeglang, 2020)

According to Figure 5 and Table 1, in 2023, Pandeglang Regency, Banten Province, had 35 districts, one of which was Carita District, comprising 10 villages or sub-districts in 2019. Analyzing BPS Pandeglang Regency data for 2024, about 65% of natural tourism in Pandeglang Regency is distributed across various regions, including Sukarame Village. At its peak in 2022, PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem implemented the Biodiversity Protection Program Work Plan, including the Underwater Natural Conservation Program. Specifically, this program involved: 1) the transplantation of Coral Garden Acropora Tabulate and the provision of Monitoring and Evaluation Equipment for Coral Reefs; and 2) the transplantation of Coral Reefs with a Security Guard System in the Underwater Natural Conservation Area of Ketapang Beach, aimed at protecting and enhancing coral reefs in the conservation area (Jamil & Fajri, 2023). In fact, since 2017, PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem has been developing a Biodiversity Protection Program Work Plan, to protect biodiversity with a target biodiversity index of 1% in the PT Pertamina (Persero) TBBM Tanjung Gerem area. The Biodiversity Protection Program involves four major aspects, two of which are related to underwater conservation in Sukarame Village.

2. Procedures or Methods Implemented by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem in Conducting Underwater Natural Conservation in Sukarame Village

The Underwater Natural Conservation Area is specifically located in the Ketapang Beach area, which is situated in Sukarame Village, Carita District, Pandeglang Regency, Banten Province, Indonesia. Below is a visualization of the Underwater Natural Conservation Area.

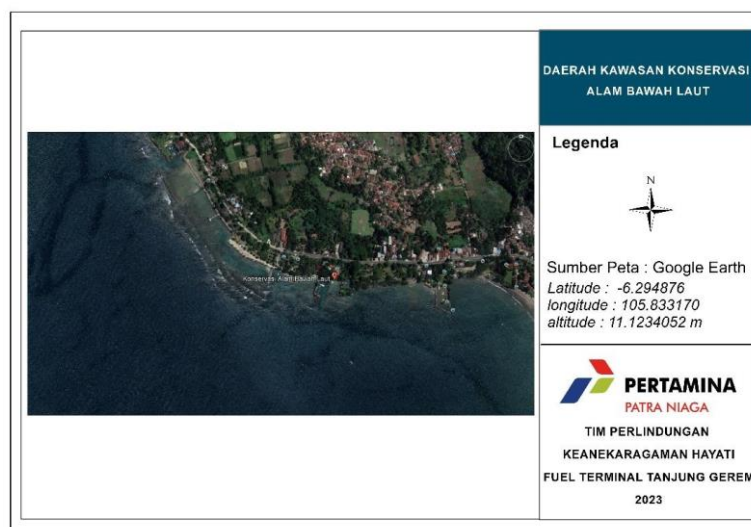


Figure 4. Underwater Conservation Area Sampling Location Map

Source: (Tim Monitoring Keanekaragaman Hayati, 2023)

In examining the *Biodiversity Monitoring Report of PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem 2023; Sustainability Conservation Report: Understanding the Role of Biodiversity in Ecological Balance 2023 PT Pertamina Patra Niaga Western Java Region and the Environmental & Social Innovation Award (ENSIA) Innovation* paper, specifically on the programs: 1) Coral Garden Acropora Tabulate Transplantation and Provision of Monitoring and Evaluation Equipment for Coral Reefs by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem; 2) Coral Reef Transplantation with Security Guard System in the Underwater Natural Conservation Area of Ketapang Beach; and 3) RESTACK: Coral Reef Restoration with Wave-Resistant Branch Implantation System. Four procedures or stages, including methods, were identified, including preparation, process, analysis, and the presentation of findings, as well as innovations or changes related to coral reefs (Darmaputra et al., 2023; PT. Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, 2024; Tim Monitoring Keanekaragaman Hayati, 2023). This can be illustrated as shown in the figure below:

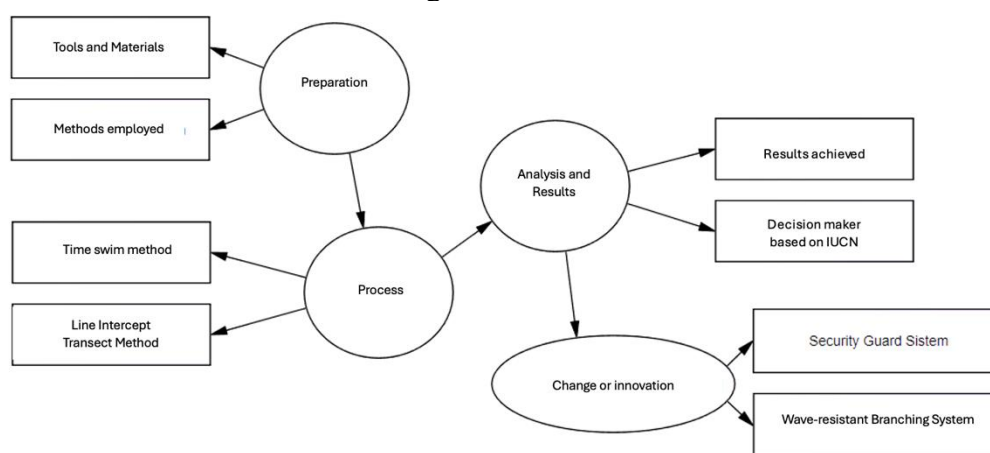


Figure 5. Coral Reef Conservation Procedures or Methods

Source: Analysis/Personal Data

In the preparation stage, researchers from PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem prepared the tools, materials, and methods to be used. The tools and materials utilized in the Underwater Natural Conservation Area include: a roll meter, GPS, skindive, SCUBA, slate, writing tools, underwater camera, thermometer, pH meter, and refractometer, and they (the divers/researchers) employed the time swim method and Line Intercept Transect (LIT) method for collecting coral reef condition data.

In the process stage, researchers from PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem used the time swim and LIT methods. According to (Maisaroh et al., 2022), the time swim method is essentially performed by swimming parallel to the shoreline for several minutes to observe the condition of coral reefs in the area being studied. Meanwhile, LIT is a monitoring method where a straight line is drawn using a transect roll meter, and the life form types and percentage cover of the benthic community to be studied are recorded (Isdianto & Luthfi, 2020). These two methods were applied by researchers from PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem. During the time swim method stage, researchers conducted a brief dive on the water's surface, parallel to the shoreline, to observe the condition of the coral reefs in that area, enabling an estimation of the overall condition of the coral reefs at the research site. For more detailed data collection, the LIT method was used. This method is employed to record the percentage cover of the benthic community, such as corals, soft corals, sponges, algae, natural rocks, and dead corals. Data collection with the LIT method involves laying out a 50-meter transect line over the coral reef substrate, parallel to the shoreline, at a depth of 4 to 5 meters.

The third stage is analysis and results, which involves analyzing and interpreting the findings, and then making decisions based on the conservation categories of the International Union for Conservation of Nature and Natural Resources (IUCN). These categories include nine levels: Extinct (EX); Extinct in the Wild (EW); Critically Endangered (CR); Endangered (EN); Vulnerable (VU); Near Threatened (NT); Least Concern (LC); Data Deficient (DD); and Not Evaluated (NE) (Linardich et al., 2017)

Table 2. Findings of Coral Reefs in the Underwater Natural Conservation Area

Type of Coral Reef		IUCN Category	Number of Individuals*
Local Name	Latin Name		
Coral Reef	<i>Acanthastrea</i>	VU	40
Ginger Coral***	<i>Acropora***</i>	NT***	350
Coral Reef	<i>Alveopora</i>	VU	270
Coral Reef	<i>Cyphastrea</i>	VU	10
Coral Reef	<i>Ctenactis</i>	NT	60
Coral Reef	<i>Diploastrea</i>	NT	110
Coral Reef	<i>Echinopora</i>	VU	30
Coral Reef	<i>Favia</i>	VU	530
Coral Reef	<i>Favites</i>	VU	960
Coral Reef	<i>Fungia</i>	VU	10
Coral Reef	<i>Goniastrea</i>	VU	80
Coral Reef	<i>Goniopora</i>	VU	350
Coral Reef	<i>Leptoria</i>	VU	160
Coral Reef	<i>Merulina</i>	NT	410
Coral Reef	<i>Montastraea</i>	VU	10
Coral Reef***	<i>Montipora***</i>	NT***	740
Coral Reef	<i>Oulastrea</i>	LC	410
Coral Reef	<i>Pachyseris</i>	VU	42
Coral Reef	<i>Padabacia</i>	NT	110
Coral Reef	<i>Plerogyra</i>	VU	40
Coral Reef	<i>Pocillopora</i>	VU	90
Coral Reef	<i>Porites</i>	EN	1985
Coral Reef	<i>Stylophora</i>	EN	103
Coral Reef	<i>Turbinaria</i>	VU	1130

Source: IUCN (International Union for Conservation of Nature); *(Data for 2023); ***/Highlighted in Yellow (Protected According to IUCN); EN (Endangered); LC (Least Concern); NT (Near Threatened); VU (Vulnerable)

Source : (Suryani & Arief, 2023; Tim Monitoring Keanekaragaman Hayati, 2023)

According to Table 2, there are 24 types of coral reefs within the underwater natural conservation area. Among these, the most prevalent species in the conservation area are *Porites* (1985 individuals) and *Turbinaria* (1130 individuals).

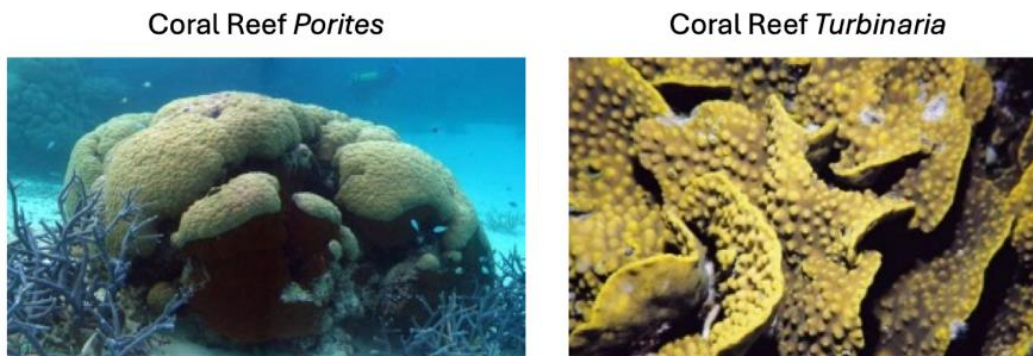


Figure 6. Types of Coral Reefs Prevalent in the Conservation Area

Source: (FPK Unair, 2023; Pichon, 2011)

Figure 8 presents examples of the *Porites* and *Turbinaria* coral species, which are abundant in the Underwater Natural Conservation Area. In contrast, the least abundant coral species are *Cyphastrea*, *Fungia*, and *Montastraea*, with only 10 individuals each. The visualization below shows these three types of coral reefs.

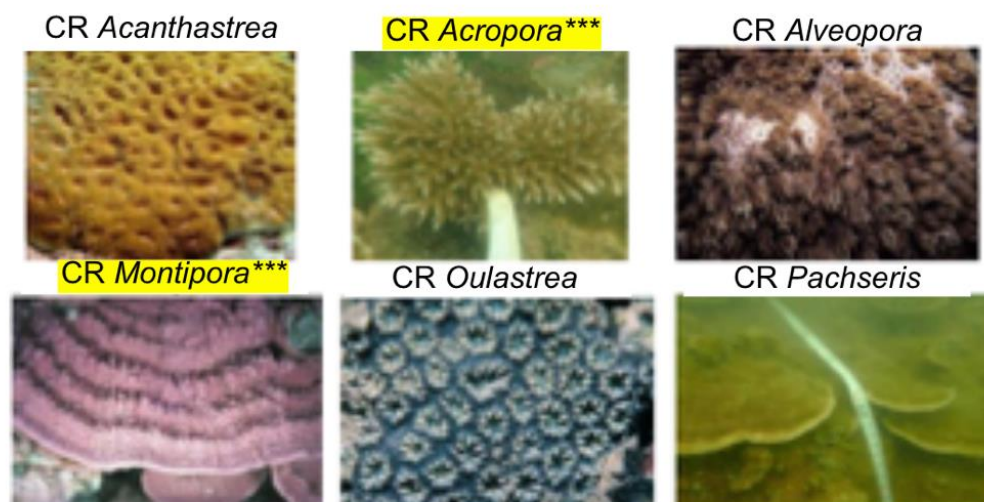


Note : CR (Coral Reef)

Figure 7. Few Types of Coral Reefs in Conservation Areas

Source : (Cetz-Navarro et al., 2013; Oku et al., 2020; Samiei et al., 2013)

Based on Table 2, Figures 8 and 9, it can be observed that two coral species dominate the marine conservation area: *Porites* and *Turbinaria*. In contrast, *Cyphastrea*, *Fungia*, and *Montastraea* are the least prevalent species, with only 10 individuals recorded for each. The following section presents some documentation of the findings in the marine conservation area.



Note: CR (Coral Reef); ***/ Highlighted in Yellow (Protected According to IUCN))

Figure 8. Some Documentation of Coral Reefs in Conservation Areas

Source: (Tim Monitoring Keanekaragaman Hayati, 2023)

According to the IUCN categories, four classifications were identified among the 24 coral species found in the marine conservation area: EN (Endangered) with 2 species (8%); LC (Least Concern) with 1 species (4%); NT (Near Threatened) with six species (25%); and VU (Vulnerable) with 15 species (63%) (Tim Monitoring Keanekaragaman Hayati, 2023).

The final stage involves implementing changes or innovations using the Security Guard and Wave-Resistant Branching System (Restack). These methods were applied at the Ketapang Beach Marine Conservation Area in Sukarame Village. The Security Guard System involves protecting and augmenting coral seedlings with iron bars, while the Wave-Resistant Branching System (Restack) focuses on restoring the coral reef ecosystem by transplanting corals onto robust, wave-resistant artificial structures. Coral seedlings are attached using non-sag epoxy adhesive on wave-resistant branching pillars. The species included in Restack are *Acropora* branching and *Acropora* tabulate fragments (as seen in Figure 11). In this context, the innovation and protection efforts target corals categorized by the IUCN as near threatened, specifically *Acropora* and *Montipora* species (see Table 2 and Figure 10 for details) (Jamil & Fajri, 2023; Suryani & Arief, 2023).

This approach is corroborated by (Sahetapy et al., 2021), who identified several protected coral species, including *Acropora gemmifera*, *A. humilis*, *Montipora carpicornis*, *Pachyseris speciosa*, *Tubastrea micrantha*, *Turbinaria reniformis*, *Halomitra pileus*, *Herpolita limax*, *Polyphyllia talpina*, *Merulina ampliata*, *Galaxea fascicularis*, *Mycedium elephantotus*, *Oxypora lacera*, *Pectinia lactuca*, *Pocillopora eydouxi*, *P. verrucosa* (Near Threatened Species) and *Acropora tenuis* (Least Concern Species). Additionally, it is noteworthy that *Acropora* species, while protected, do not naturally occur in Indonesia (Tim Monitoring Keanekaragaman Hayati, 2023). However, aside from IUCN protection, there are other reasons why PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem has implemented the Security Guard System and Wave-Resistant Branching System (Restack). The Ketapang Beach Marine Conservation Area, owned by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, features several tourist attractions, including swimming, sand play, water sports, and diving. Diving activities near coral reefs pose a risk of contact between tourists and the coral ecosystem, leading to potential coral damage. Furthermore, although *Acropora* coral species proliferate, they are highly susceptible to damage. Given that this is a tourist area, human

activities in the sea, tourism activities, and natural factors such as strong currents during the west monsoon can impede coral development (Darmaputra et al., 2023; PT. Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, 2024). The following section presents documentation of the Security Guard System and the Wave-Resistant Branching System (Restack) implemented by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem.

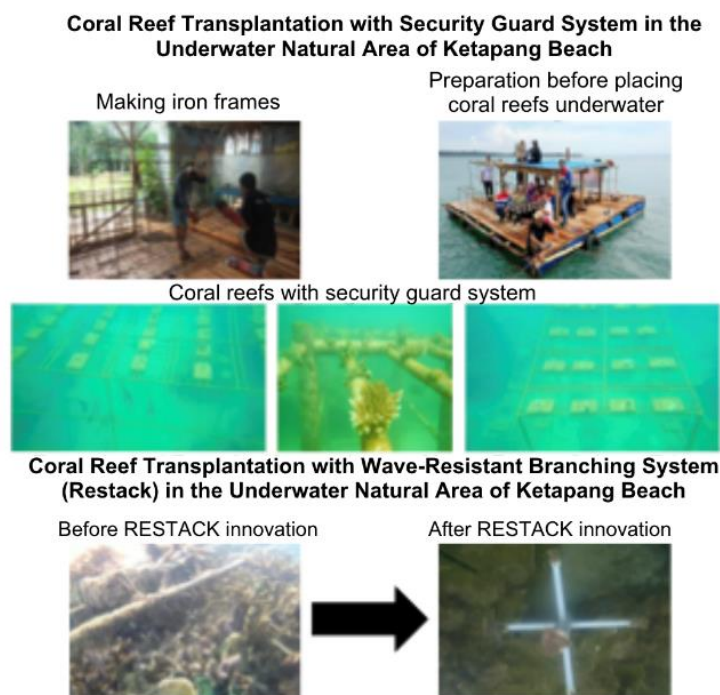


Figure 9. Coral Reef Transplantation with Security Guard System and Resack
Source : (PT. Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, 2024; PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, 2023)

3. The Role of Marine Conservation Conducted by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem about the Environmental Pillar of the Village SDGs

The Village SDGs, particularly the Environmental Development Pillar, encompass several key points. There are at least six points associated with this pillar, including: Clean Water and Sanitation (Point 6); Safe and Comfortable Village Settlements (Point 11); Environmentally Conscious Consumption and Production (Point 12); Climate Change Responsive Villages (Point 13); Marine Environment-Conscious Villages (Point 14); and Land Environment-Conscious Villages (Point 15) (Rahmaddhani & Prasetyoningsih, 2023). When we relate the role of Marine Conservation, particularly the Coral Reef Transplantation Program, to the Environmental Pillar of the Village SDGs, it is highly relevant and impactful on Point 14 (Marine Environment-Conscious Villages). However, it should be noted that the other five elements of the Environmental Pillar of the Village SDGs will also benefit, although they may require mediation with other aspects. Discussing the role is closely tied to discussing impact. Impact can be seen as the consequence of a role, but it can also be viewed the other way around, depending on our perspective. However, in this context, the author will illustrate that the role is the cause, while the impact is the effect.

Reflecting on some important previous points, the program of PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, particularly in marine conservation, consists of three main activities: monitoring and evaluating the conservation area, and implementing or

transplanting coral reefs using the Security Guard System and Restack method (see Figure 7 for details). The monitoring and evaluation stages start with preparation, process, analysis, and results, focusing on identifying the coral species in the conservation area and analyzing which coral species should be protected according to the IUCN conservation categories. After obtaining this information, they proceed with changes or innovations using the Security Guard System and Restack, referred to as Coral Reef Transplantation (documentation of the Security Guard System and Restack can be seen in Figure 11). This transplantation emphasizes the coral species protected by the IUCN, namely *Acropora* and *Montipora* (examples of these coral species can be seen in Figure 10).

Coral Reef Transplantation focuses on the recovery and preservation of existing coral reefs. This process involves transplanting colonies or fragments of healthy corals into damaged or degraded areas to enhance biodiversity and improve the health of the coral reefs. This approach is key to the successful implementation of coral reef ecosystem restoration activities (Kusuma et al., 2023; Pancrazi et al., 2023). This method does not create new coral species but rather aids in the recovery and maintenance of the existing ecosystem. The impact of this transplantation contributes to the Environmental Development Pillar of the Village SDGs, specifically Point 14 (Marine Environment-Conscious Villages). This is confirmed by the report “Sustainability in Continuity: Understanding the Role of Biodiversity in Natural Balance 2023 by PT Pertamina Patra Niaga Regional West Java and the Environmental & Social Innovation Award (ENSIA) Innovation Paper,” which reveals that 1) PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem received the Indonesia Sustainable Development Goals Award (**ISDA AWARD**) 2022 in the Silver category; 2) Fuel Terminal Tanjung Gerem was certified as a Green Building (pioneer) with the **EDGE ADVANCE** predicate in 2021; and 3) it has been certified with ISO 14001:2015 (Environmental Management System), ISO 9001:2015 (Quality Management System), and ISO 45001:2018 (Occupational Health & Safety Management System) (Darmaputra et al., 2023; PT. Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, 2024).

Furthermore, in 2024, the RESTACK Program: Coral Reef Restoration with the Wave-Resistant Branching System by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem also contributed to achieving SDGs Goal 14 with a specific target on SDGs 14.2, focusing on indicator SDG 14.2.1, which involves implementing an ecosystem-based approach to marine area management. This achievement is evidenced by their success in winning **the Best of the Best ENSIA AWARD in 2024** (Nurdiansyah, 2024; PT. Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, 2024). This indicates that PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem is highly concerned with environmental issues, including coral reefs, particularly about the Environmental Pillar of the Village SDGs, including Point 14 (Marine Environment-Conscious Villages). This is further emphasized by (Ruban & Saiful, 2023), who state that the richness of coral reef ecosystems is an asset for national development and prosperity, given that 60% of Indonesia’s population resides in coastal areas, thus making the dependence on these ecosystems quite high.

Based on this description, it can be concluded that the Marine Conservation Program of PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem significantly contributes to Point 14 of the Environmental Development Pillar of the Village SDGs, encompassing Biodiversity Conservation, Education, and Awareness of the importance of the environment (such as the program conducted by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem). Additionally, this initiative will gradually have a positive impact on other aspects of the environmental pillar, such as 1) improving water quality; 2) preventing contamination, including waste and other pollutants; 3) protecting coastlines, including their infrastructure; 4) supporting the sustainability of fisheries systems and other important habitats; 5) absorbing carbon (CO₂) and

adapting to climate change; 6) reducing flooding and erosion; and 7) managing the interaction between terrestrial and marine environments (Bowden-Kerby, 2022; Burke & Spalding, 2022; Escudero et al., 2021; Maharmingnastiti et al., 2015; Nama et al., 2023; Triwibowo, 2023; Wibawa & Luthfi, 2017; Wiryawan, 2006). In other words, there are numerous benefits of coral reefs, and their conservation will have a significant and widespread impact on the environment. When linked to the Environmental Development Pillar of the Village SDGs, this relationship can be illustrated as shown in the table below:

Table 3. Potential Impacts of Coral Reef Conservation on the Environmental Development Pillar of the Village SDGs

Environmental Development Pillar of the Village SDGs	Potential Impacts of Coral Reef Conservation
Clean Water and Sanitation (Point 6)	Improved Water Quality, Contamination Prevention
Safe and Comfortable Village Settlements (Point 11)	Coastal Protection and Infrastructure Security
Environmentally Conscious Consumption and Production (Point 12)	Sustainable Fisheries Practices and Other Habitats, Reduction of Marine Waste
Climate Change Responsive Villages (Point 13)	Carbon (CO ₂) Absorption, Climate Change Adaptation
Land Environment-Conscious Villages (Point 15)	Flood and Erosion Reduction, Integration of Land and Marine Conservation

D. CONCLUSION

Based on the previous descriptions, we can conclude that the Coral Reef Conservation Program implemented by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem has been successfully realized. This is evidenced by the program's contribution to the 14th aspect of the Environmental Pillar of Village SDGs, namely the Marine Environment-Conscious Villages, and by the various awards and certifications received by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, including the EDGE ADVANCE in 2021, the ISDA AWARD in 2022, and the Best of the Best ENSIA AWARD in 2024. Moreover, this program is expected to positively impact other aspects of the Environmental Pillar of Village SDGs, such as Aspect 6 (Clean Water and Sanitation), Aspect 11 (Safe and Comfortable Village Settlements), Aspect 12 (Environmentally Conscious Consumption and Production), Aspect 13 (Climate Change Responsive Villages), and Aspect 15 (Land Environment-Conscious Villages). Coral reef conservation will improve water quality, prevent contamination, protect coastlines and other infrastructure, ensure sustainable fisheries and other habitats while reducing marine waste, absorb CO₂, assist in climate change adaptation, and reduce flooding and erosion.

The scope of this study is focused on the Biodiversity Program, specifically on the Marine Conservation of Coral Reefs by PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem, covering the procedures or methods of Coral Reef Conservation to the Environmental Development Pillar of the Village SDGs. Future research is recommended to continue exploring the progress of PT Pertamina Patra Niaga Fuel Terminal Tanjung Gerem's programs, as there are more Biodiversity-related programs planned for 2023 to 2028.

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