

Strengthening Local Community Participation for Coral Reef Ecosystem Conservation: A Wisdom-Based Approach

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Abstract: *The degradation of coral reef ecosystems is primarily caused by excessive exploitation without sustainable practices. As an archipelagic nation, Indonesia possesses vast coastal resources, necessitating urgent conservation efforts. This research highlights the importance of strengthening local community participation, particularly throughout traditional wisdom-based conservation methods such as awig-awig and sasi. By integrating local knowledge into policy frameworks, communities can actively participate in ecosystem preservation while ensuring sustainable livelihood. This study underscores the significance of incorporating indigenous practices in marine conservation policies to enhance ecological resilience and economic stability.*

Keywords: Coral Reef Ecosystem, Local Wisdom, Indigenous Coastal Communities, Marine Sustainability, Community-Based Management

1. Introduction

Sustainable development in Indonesia prioritizes various sectors, one of which is marine and fisheries ecosystems. The Sustainable Development Goals (SDGs) emphasize that marine and fisheries ecosystems play a crucial role in the nation's well-being.¹ Currently, coastal areas are in a highly concerning condition due to the expansion of hinterland regions and excessive exploitation of marine resources. Additionally, as common property, with no single entity claiming ownership, has led to negligence in their sustainability. This dynamic characteristic and perspective on coastal areas have resulted in environmental burdens, including habitat degradation of critical ecosystems such as mangroves, coral reefs, seagrass beds, seaweed, and estuaries, as well as excessive overfishing.

The management of coastal resources is fundamentally aimed at improving the well-being of all communities in a sustainable manner, particularly local communities residing in coastal zones. Therefore, in utilizing coastal resources, ecological aspects—such as resource conservation and ecosystem functions—must be upheld as the primary foundation for achieving sustainable well-being. The utilization of coastal resources should not lead to the destruction of fishing grounds, spawning grounds, or nursery grounds for fish. Additionally, it must not damage the ecological functions of mangrove forests, coral reefs, and seagrass beds, all of which are interconnected and essential for the sustainability of coastal resources.

The enactment of Law No. 23 of 2014 on Regional Government (Regional Government Law), which replaced Law No. 32 of 2004, has significantly impacted regional

autonomy in managing coastal areas and small islands. Article 27, paragraph (1) of the Regional Government Law grants provincial governments the authority to manage marine resources within their territories. This provision overrides Article 18, paragraph (1) of Law No. 32 of 2004, which previously granted districts and municipalities authority over marine resource management in their respective marine areas. Consequently, Article 27, paragraph (1) of the Regional Government Law effectively revokes the authority of districts and municipalities in marine resource management.

The significance of this law lies in granting greater autonomy to provincial governments in managing marine resources. During the New Order era (1966–1998), centralized marine resource management led to widespread degradation, including overfishing, coral reef destruction, and mangrove deforestation caused by harmful fishing practices like bombing and toxic substances. With the implementation of the Regional Government Law, the management of coastal and marine resources has shifted from a centralized to a decentralized approach.

The shift in coastal and marine development policies from a centralized to a decentralized approach—commonly referred to as marine policy based on regional autonomy—has led to significant consequences. District and municipal governments now have greater authority in managing artisanal fisheries. In coastal community development policies, local governments are expected to prioritize the aspirations, needs, and interests of local coastal communities while ensuring the conservation of natural resources and the environment. This effort aims to improve the well-being of

¹ Fadilla Elza Aida Putri, *Urgensi Perlindungan Ekosistem Terumbu Karang di Indonesia Guna Menyongsong Program Sustainable*

Development Goals (SDGS) Point 14, Jurnal Ilmiah Wahana Pendidikan, Desember 2024, p. 385.

coastal communities, particularly artisanal fishing households.²

Additionally, greater attention should be given to property rights in artisanal fisheries management, as well as the interactions among stakeholders in coastal regions and their impact on artisanal fishing communities. Furthermore, traditional social institutions within fishing communities should be developed and formally recognized within the legal and regulatory framework of coastal resource management.³

Coral reefs play a crucial role as a food source, habitat for economically valuable marine species, and an ecotourism asset due to their aesthetic appeal and genetic biodiversity reserves. They also contribute to beach sand formation and serve as natural barriers against waves and coastal erosion. According to Sawyer in Dahuri (1992)⁴, coral reefs are recognized as high-value conservation resources due to their rich biodiversity, beauty, and genetic reserves. Furthermore, Ruinteenbeek (cited in Sawyer, 1992)⁵ estimated that the economic value of coral reefs is approximately half that of tropical rainforests, reaching US \$1,500 per km² per year.

With the rapid growth of the global population and the large-scale exploitation of natural resources without sustainability considerations, environmental quality—including coral reef ecosystems—has deteriorated. Globally, approximately 36% of coral reefs are in critical condition due to overexploitation, 22% are threatened by land-based pollution and erosion, and 12% face additional pollution risks (Bryant, 1998).⁶ In Indonesia, the Directorate General of Marine Spatial Management (RPL) under the Ministry of Marine Affairs and Fisheries (KKP) recorded that Indonesia's coral reefs cover 2.5 million hectares, hosting 569 species. Unfortunately, around 33.82% of these reefs are damaged or in poor condition. Additionally, according to a 2019 monitoring report by LIPI, only 28.8% of Indonesia's coral reefs have more than 50% live coral cover.

One example of coral reef degradation can be observed in Randayan Island and its surrounding areas. Population growth and increased human activities in this region have exerted significant pressure on coral reef conditions. Survey results indicate that in 2005, coral reefs in Randayan Island and its vicinity were generally in moderate to good condition, with live coral cover ranging from 50% to 74.9%. However, some areas within this region exhibited poor or damaged coral reef conditions.

Coral reef degradation, regardless of its scale, poses a serious threat to the ecosystem. Moreover, it has social and economic consequences for local communities, particularly traditional fishermen who rely on coral reef resources. Coral reefs play a crucial role in protecting local communities. Given that traditional fishermen often live below the poverty line, it is

essential to adopt sustainable coral reef management practices through the principles of Marine Protected Area (MPA) management, which emphasize integration, participation, and multi-stakeholder collaboration. Efforts to protect and conserve marine resources must involve all stakeholders, including local communities. Strengthening the role of local communities and their indigenous wisdom in coral reef conservation is expected to help minimize further degradation.

The massive exploitation of natural resources in coastal areas and small islands without sustainability considerations has led to environmental degradation, including the deterioration of coral reefs and their ecosystems. Without serious efforts to halt coral reef degradation, the damage will continue to expand, posing a greater risk to marine ecosystems. Recognizing this critical situation, strengthening community-based coral reef protection rooted in local wisdom is one of the key solutions to mitigate ongoing degradation and ensure the sustainability of coral reef ecosystems. This research is significant in advancing sustainable conservation efforts by demonstrating how indigenous knowledge can complement modern conservation strategies. Strengthening local participation can enhance ecosystem resilience while providing socio-economic benefits to coastal communities.

2. Problem

Based on the introduction above, the main research question is: How can coral reef ecosystem protection be achieved through strengthening local community participation based on indigenous wisdom? This study aims to investigate how strengthening local community participation based on indigenous wisdom contributes to the sustainable conservation of coral reef ecosystems in Indonesia.

3. Discussion

1) The Importance of Coral Reef Ecosystem Protection Through Conservation

The coral reef ecosystem is a highly important marine ecosystem due to its crucial role in supporting marine life. According to data from the Research Center for Oceanography (RCO), out of 1,153 coral reefs in Indonesia in 2019, 390 reefs (33.82%) were classified as poor, and 431 reefs (37.38%) were in fair condition. Additionally, approximately 69.15 reefs ($\pm 0.29\%$) had less than 50% coral cover. This data indicates that the condition of Indonesia's coral reefs remains concerning. Climate change, such as rising sea temperatures, has caused coral bleaching. It takes years for coral reefs to recover naturally. The negative impacts will be even greater when human activities are also involved, such as blast fishing, pollution, mining activities, and coastal land use. However, restoration efforts, such as

² Wahyono, A., Sudiyono dan F.I Thufail. 1993. "Aspek-aspek Sosial Budaya Masyarakat Maritim Indonesia Bagian Timur. Hak Ulayat Laut Desa Para, Kecamatan Manganitu, Sangihe Talaud." Jakarta: PMB-LIPI No. 4: 51.

³ Suhana. 2008. "Belajar dari Suku Bajau dan Kearifan Lokal Desa Autubun Kepulauan Tanimbar Maluku Tenggara Barat." Kebijakan Ekonomi Kelautan pada Pusat Kajian Suberdaya Pesisir dan Lautan. Jakarta: PKSPL-IPB.

⁴ H. Rochmin Dahuri. 1992. An Approach to Coastal Resources Utilization: The Nature and Role of Sustainable Development in East Kalimantan, Indonesia, PhD Dissertation, Canada: Dalhousie University. p.23. <http://hdl.handle.net/10222/55258>

⁵ Ibid

⁶ James W.Nybakken, 1992. Biota Laut: Suatu Pendekatan Ekologis (translation), Jakarta: Gramedia.

coral transplantation, can help coral reefs recover more quickly.

Coral reefs consist of calcium carbonate (CaCO₃)-forming organisms inhabiting the seabed. The protection of coral reefs in Indonesia is an urgent issue that needs attention, considering the declining quality of coral reefs in the country. Most of the coral reefs in Indonesia consist of stony corals and calcareous algae. In general, coral reefs in Indonesia can be classified into four types: fringing reefs, platform reefs, barrier reefs, and atoll reefs.⁷

In 1998, the Indonesian government initiated a coral reef conservation program known as COREMAP (Coral Reef Rehabilitation and Management Program). COREMAP was introduced in response to global concerns over the declining quality of coastal areas, particularly coral reef ecosystems. This long-term program aims to protect, rehabilitate, and manage coral reefs and related ecosystems sustainably in Indonesia, ultimately supporting the well-being of coastal communities.⁸

The coral reef ecosystem inherently has multiple functions.⁹ In addition to being a habitat for various marine species, this ecosystem also serves as a biological resource, a source of natural beauty, and a physical protector of islands. As a habitat, the coral reef ecosystem provides shelter, protection, food, and breeding grounds for marine organisms, both those living within the coral reef and those from surrounding waters. As a tropical seabed ecosystem, coral reef communities are dominated by calcium-producing marine organisms, primarily stony corals (stony coral) and calcareous algae (calcareous algae). They can grow rapidly at an average depth of 2–15 meters, with light being the primary factor influencing their vertical distribution.¹⁰

Marine conservation areas are regions of marine waters, including coastal areas and small islands, that encompass flora and fauna as well as historical and socio-cultural heritage protected by law or other effective means, either by protecting the entire area or parts of it.¹¹ The history of development in Indonesia is a history of developmentalism, with growth as its primary paradigm. Beyond the various strategic considerations that underpinned this choice—such as catching up with developed nations—there were several significant implications. Among them was the increasing dominance of the state's role and position in overseeing ambitious targets set at the time. This dominance was further driven by two additional factors:

1) The large amount of development resources controlled by the state

2) The weak bargaining power of civil society, which remained fragmented into isolated interest and ideological groups.

The first condition mainly occurred throughout the 1970s and 1980s. During that period, the New Order government had access to a large flow of development capital from two main sources: the exploitation of natural resources, fully supported by massive foreign investment. Initially, the exploitation of natural resources focused on utilizing forest potential, known as "green gold." Later, efforts began to extend to marine resources, also referred to as "blue gold."¹² This process was carried out with the full backing of state power, ranging from regulatory policies and the enforcement of state corporatism mechanisms to the introduction of coercive measures.

Meanwhile, the second condition was marked by the fragmentation of civil society into various parochial categories, preventing them from exerting effective pressure on the state. Conversely, in the face of such widespread division, the state managed to assert itself as a dominant actor under the guise of national interest, leveraging the disunited socio-political forces within civil society.¹³

The two conditions above had a similar impact: the increasing powerlessness of civil society in confronting the state. Within such an institutional framework, all policy products found it difficult to demonstrate their alignment with the people's interests. On the contrary, the government could easily manipulate sectarian group issues into public issues. Under such circumstances, the government could focus more on developing autonomy, financial capacity, reach and responsiveness, and a strong legitimacy base.

- Autonomy relates to the state's ability to act independently and co-opt potential policy opponents.
- Financial capacity refers to the state's access to funding and revenue that can match (or exceed) societal demands (demand side).
- Reach and responsiveness indicate the extent to which the state successfully expands its ideological, socio-political, and administrative structures across all societal layers, as well as how its institutions respond to public needs and demands.
- Legitimacy concerns the state's moral authority—how far citizens accept and comply with government decisions without coercion or economic incentives.¹⁴

The ongoing coral reef degradation can no longer be addressed solely through local wisdom and traditional management without understanding its ecological dynamics. Mitigation efforts must adopt strategic and comprehensive

⁷ Fadilla Elza Aida Putri, Op.Cit, p.387.

⁸ Bappenas, ICCTF, Coremap-CTI, *Melestarikan Terumbu Karang untuk Kesejahteraan Masyarakat*, Profile Program Coremap-CTI, Papua Barat dan Nusa Tenggara Timur, 2022, p.2.

⁹ James W.Nybakken, 1992. Op.cit

¹⁰ Soewignyo, 1989. Avebrata Air, Lembaga Sumberdaya Informasi IPB, Bogor. P.29

¹¹ Agus Pakpahan, 1996. *Tuntutan IPTEK dan SDM di Abad 21 untuk Menunjang Pembangunan Benua Maritim*, Makalah pada

Lokakarya III Konvensi Nasional tentang Pengembangan Benua Maritim Indonesia, Jakarta.

¹² Conner Bailey, 1986. "Government Protection of Traditional Resource Use Rights – The Case of Indonesian Fisheries," dalam David Korten (ed.), *Community Management: Asian Experiences and Perspectives*, New Heaven: Kumarian Press, p.292-308.

¹³ Mas'oed, Mochtar, 1997. *Politik, Birokrasi, dan Pembangunan*, Yogyakarta: Pustaka Pelajar. p.41.

¹⁴ Charles Victor Barber, 1999. "The Case Study for Indonesia," <http://www.library.utoronto.ca/pcs/indon/indonsum.htm>, p.1-4.

approaches based on the latest science and technology (frontier of sciences).¹⁵

Marine biodiversity conservation is one of the key approaches to managing marine ecosystems and preventing damage caused by human activities. Marine protected areas play a crucial role in conserving marine biodiversity. Although these areas were established more recently than terrestrial conservation zones, their identification, establishment, and management require specialized expertise. In marine conservation areas, natural resource utilization is typically regulated through designated zones, specifying permitted and prohibited activities. For example, restrictions are imposed on activities such as: Oil and gas extraction, Destructive fishing practices, Environmental destruction. These measures aim to ensure better protection for marine biodiversity.¹⁶

Research and observations on coral reef utilization indicate that degradation generally results from two main causes: Human activities (Anthropogenic causes) which are (1) Coral mining and extraction, (2) Destructive fishing methods, (3) Overfishing, (4) Water pollution, (5) Coastal development, (6) Upstream development activities, and Natural causes which are (1) Global warming, (2) Natural disasters (e.g., hurricanes, tectonic earthquakes, floods, tsunamis), (3) Climate phenomena (e.g., El Niño, La Niña).

All issues—except those caused by natural factors—that contribute to coral reef degradation essentially stem from several underlying driving factors. Based on identification and analysis, there are ten root causes of coral reef degradation: (1) Inconsistent policy implementation, (2) Inadequate management methods, (3) Weak legal instruments and law enforcement, (4) Lack of awareness and understanding of the strategic value of coral reefs among policymakers, business owners, and the public, (5) Poverty, (6) Greed, (7) Limited capacity and capability of reef managers, (8) Market demand and consumer behavior, (9) Cultural factors, traditions, and habits, (10) Coral reef areas being open-access zones.

Broadly speaking, the degradation of coral reef ecosystems in Indonesia is caused by six main factors: (1) Coral mining for construction materials, road building, and decoration, (2) Destructive fishing methods, including blast fishing, poison fishing, and other harmful techniques, (3) Marine tourism activities that neglect environmental conservation, (4) Pollution from land-based and marine-based economic activities, (5) Sedimentation caused by poor upland area management, disregarding ecological principles, (6) Coastal reclamation for settlements, businesses, and industries, such as in Manado, Lampung, and Carita Beach, (7) Natural causes, including global warming, which leads to coral bleaching, and outbreaks of crown-of-thorns starfish (*Acanthaster planci*).

Given the factors that threaten coral reefs in Indonesia, protection efforts must involve all stakeholders—government agencies, businesses, and local communities.

According to Jamaluddin Jompa, there are five key strategic solutions for the future management of Indonesia's coral reefs:

- 1) Reducing and mitigating damage to coral reef ecosystems
- 2) Implementing an ecosystem-based approach to coral reef resource management
- 3) Maintaining and enhancing ecosystem resilience
- 4) Establishing a well-managed network of marine conservation areas
- 5) Adopting adaptive management strategies, including climate change adaptation.¹⁷

To safeguard marine ecosystems, the Ministry of Marine Affairs and Fisheries (KKP) has introduced five blue economy priority programs:

- 1) Expanding marine conservation areas
- 2) Implementing quota-based sustainable fishing
- 3) Developing sustainable marine aquaculture
- 4) Monitoring and controlling coastal and small island areas
- 5) Reducing plastic waste in the ocean through fisherman-led cleanup initiatives

Conservation efforts focus on monitoring coral reef conditions, restoration activities, and policy implementation. The key to conservation planning is gathering data on coral reef conditions, including water quality and biodiversity. It is not only the government's responsibility—local communities should also actively contribute to coral reef conservation.¹⁸

Managing coral reefs within Regional Marine Conservation Areas (KKLD) is part of coastal and small island management, guided by Marine, Coastal, and Small Island Spatial Planning Regulations, under the authority of provincial governments as outlined in Indonesia's Regional Government Law. This management approach requires sustainable environmental planning and development, covering coastal and marine areas, with a community-based focus.

As for the management of coastal areas and small island itself has a Legal Framework such as:

- **Law No. 1/2014** (amending **Law No. 27/2007**) defines coastal and small island management as an integrated process of planning, utilization, supervision, and control of coastal and small island resources to improve community welfare.
- **Law No. 31/2004** (revised by **Law No. 45/2009**) on **Fisheries** and **Law No. 27/2007** on **Coastal and Small Island Management** (revised by **Law No. 1/2014**) mandate marine conservation area development.
- **Article 7 of Law No. 45/2009** states that the Minister of Marine Affairs and Fisheries has the authority to designate marine conservation areas to support sustainable fisheries management.
- **Article 28(2) of Law No. 27/2007** allows parts of coastal and small island areas to be designated as conservation zones.

¹⁵ Jamaludin Jompa, Terumbu Karang Indonesia Di Tengah Globalisasi Dan Ancaman Pemanasan Global. Oration for Acceptance of Professorship, Universitas Hasanudin, Makassar, January 25, 2011.

<https://www.antaraneews.com/berita/243257/kearifan-lokal-tidak-bisa-cegah-degradasi-terumbu-karang>

¹⁶ Sukarno, 1995. Op.cit

¹⁷ Jamaludin Jompa, Op.Cit

¹⁸ Fadilla Elza Aida Putri et al, Op Cit, p.387

Before the Law No. 31/2004 about Fisheries Law, the term Marine Conservation Area (KKL) was commonly used. The government later introduced: Regional Marine Conservation Areas (KKLD)—managed by local governments. There are also conservation areas which are smaller in area and are at the Village-level Marine Protected Areas (DPL)—smaller conservation zones at the village level. With the issuance of Government Regulation No. 60/2007 on Fishery Resource Conservation (KSDI), the official term became Marine Conservation Areas (KKP). Additionally, Ministerial Regulation No. 17/2008 categorizes marine conservation areas as:

- Coastal and Small Island Conservation Areas (KKP3K)
- Maritime Conservation Areas (KKM)
- Marine Conservation Areas (KKP)
- Coastal Buffer Zones.

2) Strengthening Local Community Participation in Protecting Coral Reef Ecosystems Based on Local Wisdom

Local wisdom and local knowledge possessed by a society are obtained through a long process. Their existence is the result of adaptation through a process of social learning to environmental conditions and dynamics, both natural and social environments. Thus, local wisdom and knowledge have been tested and always undergo contextualization in line with developments and changes that occur. Consequently, local wisdom and knowledge are not static but always develop cumulatively, in line with the progress of the society.¹⁹

Local wisdom defines a nation's cultural identity, enabling the assimilation of external influences while preserving traditional values. Local wisdom is also defined as the ability to adapt, manage, and foster the influence of nature and other cultures, serving as the driving force for transformation and the creation of Indonesia's extraordinary cultural diversity.

In the context of coral reef protection, community participation through their local wisdom is crucial. The wisdom of local communities in managing their coastal resources has been proven over generations to ensure the sustainability of their lives. Therefore, the government needs to strengthen and empower such local wisdom. This means that the role of indigenous legal communities needs to be positioned as one of the key pillars and the foundation of conservation area management in marine waters.

Local wisdom, which is still preserved among indigenous legal communities, has led some areas to be designated as traditional fishing zones, which simultaneously function as conservation zones and no-take zones. This local wisdom allows marine ecosystems and the biota within them to reproduce and recover more quickly.

Local wisdom in coastal communities represents cultural capital that must receive attention. *Awig-awig Laut* in Lombok and *Sasi Laut* in Maluku are examples of environmental conservation awareness independently practiced by communities. In general, *awig-awig* and *sasi* are prohibitions or regulations (management) on harvesting certain natural resources within a specific area and for a specific period to ensure better yields. They can also be understood as efforts to regulate human behavior regarding particular natural resources, especially those with economic value.

Awig-awig and *sasi* are **unwritten rules (jurisprudence) and local agreements** that govern the utilization of natural resources. The local wisdom that developed in the past and persists to this day, despite the dynamics of modernization and cultural shifts, evidently possesses an institutional force that remains firmly upheld by its adherents.

Culture, as a system of thought, encompasses ideas, concepts, rules, and meanings that underlie and manifest in life and are acquired through learning processes.²⁰ Culture is a shared system of meaning and is the result of a social, not individual, process.

Koentjaraningrat²¹ translates the term **institution** from the word *institution*, referring to a body or organization that functions in a particular field of societal life. Institutions or **pranata** govern the patterned behavior of humans within their culture. The manifestation of culture is the totality of patterned human behaviors along with their components, namely systems of norms and codes of conduct along with the tools associated with them. The individuals who carry out these patterned behaviors form an institution or *pranata*.

The extensive coastline of Indonesia, ranking second after Canada, makes the **fisheries sector a promising natural resource** that must be preserved. The vast coastal areas, combined with diverse ethnic groups, result in nearly every coastal region in Indonesia having **varied customs and traditions**. The customs of coastal communities, predominantly fishermen, include local wisdom or *local wisdom*.²²

Local wisdom is a system of life values passed down from one generation to the next in the form of religion, culture, or customary traditions, usually transmitted orally within the social system of a community. The existence of local wisdom in society is the result of a long-term adaptation process over many generations to an environment, either one they inhabit or where interactions frequently occur.²³

Thus, local wisdom has become an essential part of community life, especially for indigenous legal communities. This wisdom does not descend from the sky but develops through a long process and is inherited from generation to

¹⁹ Esty Haraswati et al., The Role of Local Wisdom of the Bajo Tribe in Supporting the Management of Conservation Areas in Wakatobi Regency, article in the Journal of Fisheries and Marine Extension, March 2017, p. 11.

²⁰ Poerwanto, Hari, 2000. **Culture and Environment in an Anthropological Perspective**. Yogyakarta: Pustaka Pelajar.

²¹ Koentjaraningrat, 2002. **Culture, Mentality, and Development**. Jakarta: Gramedia Pustaka Utama, p. 45

²² Ekonomi, D. A. N., & Pengembangan, P. (2021). **Biophysical Characteristics of Marine Waters, Social and Economic Factors Supporting the Development of Marine Ecotourism in Togeang Islands National Park**. JFMR-Journal of Fisheries and Marine Research, 5(2). <https://doi.org/10.21776/ub.jfmr.2021.005.02.14>

²³ Ibid

generation. It has been proven that indigenous legal communities living in coastal areas consistently preserve coral reef ecosystems and their environment.

Community-based coastal management is an approach that places local communities as the main actors in efforts to manage and conserve coastal resources. This approach integrates traditional knowledge and local wisdom with modern management methods to create a sustainable management system. Local communities are actively involved in every stage of management, from planning and implementation to monitoring and evaluation, fostering a sense of ownership and responsibility for coastal sustainability (Susanto, 2019). In Aceh, the Panglima Laot system is a successful example of community-based coastal management that has lasted for centuries. Panglima Laot functions as a customary leader who regulates fishing activities, resolves conflicts between fishers, and establishes conservation rules such as fishing bans during certain periods (keuneunong). This system also manages the fair distribution of catches and preserves marine ecosystems by prohibiting the use of destructive fishing gear (Devy & Rahmi, 2019).

In Raja Ampat, West Papua, community-based management is applied through the Sasi system, a customary rule that limits the time and area for harvesting certain marine resources. Local communities, in collaboration with local governments and NGOs, have successfully developed co-managed marine conservation areas. This program has not only protected coral reefs and fish populations but also developed community-based ecotourism that provides alternative income for local residents (Persada et al., 2018).

In East Lombok Regency, West Nusa Tenggara, the Awig-awig system is used in coastal area management. Awig-awig is a customary regulation that governs the use of marine resources, including zoning of fishing areas, permitted fishing gear, and penalties for violators. This system is strengthened by forming community monitoring groups (POKMASWAS) responsible for enforcing regulations. As a result, there has been an increase in coral reef coverage and fish populations, as well as higher fishers' income (Wirasandi et al., 2021).

In the Kei Islands, Maluku, the Sasi Laut practice has successfully managed marine resources sustainably. Sasi regulates the opening and closing times for harvesting sea cucumbers, trochus shells, and other marine resources. This system is managed by a customary institution called Kewang, which ensures compliance with regulations and imposes penalties on violators. This program has successfully maintained target marine species populations and provided stable income for the community (Indriana et al., 2023).

In Mayalibit Bay, Raja Ampat, local communities implement a traditional zoning system that divides coastal areas into utilization zones and protection zones. This system is reinforced with community empowerment programs such as seaweed farming training, ecotourism development, and seafood processing. Women's involvement in coastal resource

management is also strengthened through creative economic empowerment programs based on marine products. This program has successfully improved community welfare while maintaining coastal ecosystem sustainability (Trinanda, 2017).

Regulations and Policies on Coastal Management

Coastal area management regulations and policies in Indonesia are governed by various legal instruments, with Law No. 27 of 2007, which was updated to Law No. 1 of 2014 on Coastal Area and Small Island Management, serving as the main legal framework. This law comprehensively regulates the planning, utilization, management, control, and supervision of coastal areas and small islands. It also recognizes the rights of indigenous and local communities in coastal management and provides mechanisms for public participation in every stage of management (Rofiah, 2020).

The government has issued Government Regulation No. 64 of 2010 on Disaster Mitigation in Coastal Areas and Small Islands, which regulates disaster risk management efforts in coastal areas. Additionally, Minister of Marine Affairs and Fisheries Regulation No. 40 of 2014 on Community Participation and Empowerment in Coastal and Small Island Management specifically governs the mechanisms for community involvement in coastal area management. These regulations are complemented by various technical guidelines and standard operating procedures to ensure effective implementation (Wijanarko et al., 2020).

In the context of decentralization, regional governments have significant authority in coastal area management as regulated in Law No. 23 of 2014 on Regional Government. Provincial governments have jurisdiction over marine areas up to 12 nautical miles from the coastline, while district/city governments have authority over coastal management within their territories. This enables regional governments to issue local regulations (Perda) governing coastal management according to the characteristics and needs of their regions while still referring to national regulations (Khairi, 2020).

Coastal management policies in Indonesia adopt an Integrated Coastal Management (ICM) approach, which considers various aspects such as ecology, economy, socio-culture, and institutions. This is reflected in planning instruments such as the Coastal and Small Island Strategic Plan (RSWP3K), Coastal and Small Island Zoning Plan (RZWP3K), Coastal and Small Island Management Plan (RPWP3K), and Coastal and Small Island Management Action Plan (RAPWP3K). These instruments are systematically developed from national to regional levels, involving the participation of various stakeholders (Hafsaridewi et al., 2019).

The policies implemented by the Indonesian government in efforts to preserve coral reefs as a national treasure include:²⁴

- 1) Establishing laws and regulations for coral reef protection to prevent legal gaps in law enforcement for coral reef conservation and protection.

²⁴ H. Rochmin Dahuri, Jacob Rais, Sapta Putra Ginting, 1996. *Integrated Coastal and Marine Resource Management*, Jakarta: Pradnya Paramita, p. 64

- 2) Promoting efforts to raise public awareness and encourage community participation in coral reef conservation.
- 3) Supporting training, research, and education initiatives for coral reef conservation efforts.
- 4) Managing coral reef ecosystem conservation areas to ensure their optimal and beneficial use for the community.

The minimal role of local communities, as has been the case so far, has actually existed since the Dutch colonial administration. Since then, the management of natural resources has been politicized, marked by the marginalization of local community interests and the hegemony of state interests. Barber²⁵ observed that for a long time, various natural resources had been turned into political commodities that served to support the legitimacy of ruling regimes. All issues surrounding their management were successfully suppressed using various coercive-corporatist state mechanisms until fundamental changes occurred in the mid-1990s. Horizontal and vertical conflicts became increasingly unavoidable, forcing the government to restructure its development ideology, particularly the ideology of natural resource management, including the management of coral reef ecosystems and all their potential. Reform became a national credo, with a shared consensus that the management of natural wealth must also involve local communities, as they are not only the original owners but also the group most affected by the negative consequences of resource mismanagement.

In a more specific context, this can be achieved through community empowerment, with the main goal of enhancing their ability to independently manage natural wealth. The foundation of such management can be found in various forms of local knowledge and institutions.

The resurgence of discourse on local knowledge cannot be separated from the excessive dominance of knowledge produced by higher education institutions in developed countries. This type of knowledge is often regarded as a superior variety that surpasses all other forms of knowledge considered traditional. With such a characteristic, modern knowledge, when carelessly adopted in development and applied generically, does not only experience a normative leap—also known as *ecological fallacy*—but more importantly, it lacks sensitivity toward marginalized groups, who predominantly inhabit poor and developing countries.²⁶

Therefore, advocacy, conservation, protection, facilitation, and similar efforts are needed, with a primary focus on reinstating local values as the core of development management. These efforts serve as a prerequisite for fostering dialogue and cooperation so that development can address its deepest essence—accommodating the aspirations and interests of local communities. In other words, local problems must also be met with local solutions (Hess in Agrawal, 1998:38).

Besides local knowledge, another crucial aspect to consider is the development of local institutions (*local institutional building*). This needs attention for at least two reasons. First, the institutional approach is regarded as quite effective in introducing change, including within the context of local community development. Institutional penetration through the formation of community organizations has several advantages, such as:

- 1) Institutions or organizations embody power. In a collective setting, aspirations can be more easily pursued because organizations serve as collective platforms that more authoritatively represent power.
- 2) Institutions or organizations can strengthen and ensure continuity and sustainability.
- 3) Institutions or organizations significantly help their members by gathering and distributing information and knowledge, enabling them to better understand and become more aware of what they are fighting for while enhancing their capacity to achieve their goals.
- 4) Institutions or organizations can respond to surrounding developments and complexities more quickly and effectively.²⁷

These advantages are reinforced by local development experiences through the formation of small organizations in several developed countries such as the United States and Europe through the *Community Development Corporation (CDC)* concept. This is a long-term and comprehensive development approach that requires institutions capable of developing and supporting consistent yet flexible strategies carried out by professionals within them.²⁸ This approach adopts private-sector development techniques for public purposes, directs outcomes to the communities and individuals most in need, mobilizes local initiatives to achieve local priorities, is long-term, connects planning with implementation, links complementary projects with a comprehensive strategy, integrates private and public policy processes, utilizes both private and public resources, operates on a small scale with incentives for efficiency, and transfers capacity to run various programs.

The importance of developing local institutions lies in the contradictory reality of development practices in Indonesia, which are highly inconsistent with the theoretical prescriptions of the institutional approach. Despite the inherent advantages of local institutions, the Indonesian government has long implemented homogenization policies. As a result, institutional development efforts have largely been about integrating the state into society rather than integrating society into the state's decision-making machinery.²⁹ Consequently, state-created institutions tend to represent government interests and its clients rather than the real interests of the community. Worse, these institutions have become instruments of state patronage within the framework of enforcing a corporatist state structure. In such a format, the interests and aspirations of communities, especially marginalized groups, are difficult to accept, let alone advocate for.

²⁵ Charles Victor Barber, 1999. *Op. cit.*

²⁶ *Ibid*, p.19

²⁷ Rubin & Rubin, 1986, *Organization Theory: Structure, Design, and Applications*, New Jersey: Prentice Hall, p. 121

²⁸ Edward J. Blakely, 1989, *Planning Local Economic Development: Theory and Practice*, California: Sage Publications, p. 202

²⁹ Mochtar Mas'od, 1997, *Politics, Bureaucracy, and Development*, Yogyakarta: Pustaka Pelajar, p. 49

Realizing this mistake, serious efforts and a firm commitment are needed to restore the institutional approach to its proper course. This means directing the institutional approach toward involving the community through structural reform by establishing local organizational units that are easily accessible to grassroots communities and can play a positive role in stimulating local group involvement and interest.³⁰ In line with this expectation and the spirit of regional autonomy, the existing local institutions within a community need to be developed and utilized as one of the fundamental assets for development.

Strengthening local community participation based on their local wisdom—especially for those who have long depended on the generosity and availability of coral reef resources—is often equated with poverty alleviation efforts aimed at achieving a more decent standard of living by increasing their capacity. In this context, strengthening local community participation based on local wisdom is an effort to enhance their access to various opportunities that enable them to live decently. At a minimum, improvements should be made in four key areas: access to resources, access to more efficient technology, access to markets, and access to funding sources.

Although these four aspects are crucial, they alone do not provide a final solution for the sustainable management of coral reef ecosystems. If the issue of powerlessness is understood solely as an economic phenomenon, then improving access to these four aspects would certainly be helpful. However, there is no guarantee that the desire to exploit nature will cease or become more environmentally sensitive—thereby ensuring sustainability. Therefore, social interventions, reinforced by political interventions, are essential.

Integrating these various initiatives is necessary, given the strategic role of coral reef ecosystems on one hand and the diverse causes of their destruction on the other. Coral reef ecosystems serve as a vital source of livelihood for approximately 22% of Indonesia's population living in coastal areas, employing no less than 16% of the total workforce, and representing a key resource for future development. Unfortunately, the survival and sustainability of this critical ecosystem are increasingly threatened by various factors—most of which stem from human activities—whether driven by capitalist motives or mere survival needs, such as coral mining, reef fish exploitation, and the use of destructive materials to extract marine wealth.

These harmful behaviors cannot be addressed simply by providing access to economic opportunities; they must be accompanied by value transformation, moral reinforcement, ethical improvement, and attitude change. Expecting this transformation to occur naturally is as fatal as allowing the exploitation of coral reef ecosystems to continue unchecked. Hence, an intervention model is needed that integrates various dimensions—social, cultural, and political—alongside the economic dimension.

By focusing on the socio-cultural dimension, empowering local communities in sustainable coral reef management

views them as active subjects. Without hindering economic progress, enhancing the capacity of local communities will yield more sustainable long-term benefits. Relying on local knowledge and institutions, community empowerment becomes even more effective when supported by political measures—specifically, policies that foster local community empowerment.

In this context, policies aimed at empowering local communities should maximize opportunities for them to determine their own needs and how those needs should be met. The greatest benefits of empowerment efforts should be enjoyed by the community itself, and they should also be responsible for evaluating and improving the performance of various activities. This is the essence of empowerment, as expressed by Rubin and Rubin³¹ through their DARE concept (*Determine, Act, Receive, and Evaluate*). This approach is believed to foster local community commitment, a sense of ownership, and responsibility.

The effectiveness of this approach can be further enhanced by several key steps, such as:

- 1) Increasing local residents' understanding of the importance of an ecosystem, specifically coral reef ecosystems.
- 2) Providing incentives for local communities to maintain ecosystem sustainability.
- 3) Implementing disincentives for activities that disrupt ecosystems.

Based on the above discussion, it is clear that strengthening the role of local communities based on their local wisdom in protecting coral reef ecosystems is a solution that must be pursued by the government through relevant policies and regulations. Coastal indigenous communities, in particular, still uphold local wisdom passed down through generations. Involving local communities in the management of conservation areas based on their local traditions—such as *awig-awig*, *sasi*, and others—is a solution that must be realized. This approach aims not only to protect coral reef ecosystems but also to provide economic benefits for communities, ensuring they can achieve a decent standard of living.

4. Conclusion

The conservation of coral reef ecosystems is vital to mitigating degradation in Indonesia. This study highlights the strategic role of indigenous community participation through local wisdom-based conservation methods. Government policies must integrate these traditional practices such as *awig-awig* and *sasi* into national conservation strategies to foster ecological sustainability and economic benefits for coastal communities. Future research should explore the long-term impacts of community-led conservation initiatives on biodiversity and socio-economic development.

³⁰ Jim Iffe, 1996. *Community Development*, Melbourne: Longman, p. 84

³¹ Rubin & Rubin, 1986. *Op. cit.*

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