# The Role of Local Institutions on Enhancing Public Participation in Conserving Coral Reef in Onna Village, Japan and Sukarame Village, Indonesia: A Comparative Study



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海洋汚染や海水温の上昇などによる珊瑚礁の破壊は海の生態系に深刻な影響を及ぼす。この貴重な天然資源の保護には地域住民の協力が欠かせないが、その実態をインドネシアと沖縄・恩納村のケーススタディで探った。

**Abstract**

Marine Protected Areas (MPAs) are increasingly becoming an important issue, since coral reef ecosystems are one of the most important ecosystems from the global biodiversity perspective. Despite their recognized biological, economic and aesthetic value, coral reefs are currently being degraded at an alarming rate globally. Some countries have experienced 50% of their coral reefs destroyed by human activities in the last 15 years. In Indonesia, more than 30% of the total area of coral reefs, covering an area of 18,000 km$^2$, was seriously damaged. While in Japan, as many as 70% of the biggest coral reef in Japan, namely Sekiseishoko（石西礁湖）corals, was badly damaged. Nevertheless, this situation encouraged local institutions to build local initiatives to restore the coral reef ecosystem. This paper examines the role of local institutions on enhancing public involvement in coral reef conservation using a comparative study in Onna Village（恩納村）in Okinawa, Japan and Sukarame Village in Pandeglang, Indonesia. This paper applies a qualitative research using a multiple case studies. The Onna Village Fisheries Cooperative (OVFC) plays crucial role on empowering local fishers and the local government to be engaged in the coral conservation activities. While, in Sukarame Village, The Konservasi Alam Bawah Laut (KABL), plays important role on transmitting the spirit of coral reef conservation to the public. KABL uses partnership as a strategy to gain attention from supportive actors.

**Keywords** local institutions, public involvement, coral reefs, conservation

## Introduction

Marine Protected Areas (MPAs) are increasingly becoming an important issue and a global concern. The 2002 world summit on sustainable development (WSSD), voiced the importance of establishing a global system of marine protected area networks in 2012 (WSSD, 2002). One of the drivers is that coral reef ecosystems are one of the most important ecosystems from a global biodiversity perspective. This ecosystem hosts various species of coral, fish, shellfish, and many other marine organisms (ADB, 2014). Coral reefs are the most diverse of all marine ecosystems. These ecosystems support communities directly and indirectly by building islands (Wolanski et al., 2003). Coral reefs are formed from the accumulation of biogenic remnants of carbonate-producing scroll organisms of both plants and animals that form in warm tropical seas and in some cases, semi-tropics (Maragos et al., 1996).

Despite their recognized biological, economic and aesthetic value, coral reefs are currently being degraded at an alarming rate throughout the world (Wolanski et al., 2003). This rate of destruction has removed 20% of all coral reefs in the world; Another 15% are projected to be at risk in the next 10 to 20 years, and 20% in 20 to 40 years (Wilkinson, 2008). In Indonesia, for example, more than 30% of the total area of coral reefs, covering

an area of 18,000 km$^2$, was seriously damaged. Climate change and overexploitation of natural resources are the main factors causing the damage (IPCC, 2007). As a result, over the last 50 years, the share of damage to Indonesia's coral reefs has increased from 10% to 50% (Burke et al., 2002). In Japan, the Ministry of the Environment said the most famous diving destination in Japan, namely Sekiseishoko, was badly damaged, where as many as 70% of Sekiseishoko's corals died (Antaranews, January 27, 2017).

One of the steps to slow down the degradation process of coral reef ecosystems while still receiving ecosystem services, is with appropriate restoration techniques (Aronson and Precht, 2006). However, lack of funding and stakeholder cooperation, as well as ineffective project planning and implementation (Rinkevich, 2008; Brooker et al., 2014) pose significant challenges. At the same time, it is important to create a socio-economic framework in which people can continue to build their communities with the blessings of nature they receive (Boakes et al., 2022). Indeed, every year coral reefs create billions of dollars in ecosystem services globally but coral reefs continue to experience rapid decline in the face of increasing climatic and anthropogenic disturbances. Urgent actions are needed together with local management forces to stop the decline and support coral reef resilience now and in the future (Hein et al., 2020; Jaap and Hudson, 2001).

In recent years, restoration efforts have expanded, resulting in various projects that are broadly classified as improving the condition of reefs damaged by various human activities (Chou et al., 2009). Coral reefs require the attention of the wider community, because of their high biodiversity in the tropical marine biosphere and the ecological services they provide (Nurdin et al., 2016; Maragos et al., 1996).

So far, the restoration project has not explored the human aspect in the context of the relationship with the marine conservation area. Kittinger et al., (2012), stated that coral reef restoration projects need to use a human dimension framework that recognizes the role of local institutions in increasing public participation. Yamashita (2021) argued that this means that many local people and the wider community are not interested in participating in coral reef restoration due to the absence of clear restoration goals. Even though, people, who live close to resources and whose livelihoods directly depend on them, have more interest in sustainable use and management rather than a distant state or corporate authority (Li, 2002, p.2; Lynch and Talbott, 1995).

The previous studies that explored the human aspect related to the relationship with the marine conservation area are still limited. Despite the recognition of the role of humans in coral reef destruction, most research has focused on the ecological dimension rather than the relationship between humans and coral reefs (Kittinger et al, 2012). For example, Kuwamura (2022) conducted field research on the behavioral ecology of coral reef fish and coral bleaching effects at Sesoko Station. Meanwhile, Onaka et al., (2013) study on large-scale coral transplantation to measure survival and growth rate. Moyer (1989) conducted a study of important spawning sites within the shiraho reef system. In addition, several scientists (Muko et al., 2019) assessed the status of coral communities between 2000 and 2017 in Sekisei Lagoon and surrounding areas in Okinawa. This assessment uses analysis of monitoring data collected from 196 study sites.

Various previous studies according to Kittinger et al., (2012) has limited understanding of social relationships with the environment and how they affect the implementation of potential solutions for coral reef recovery. In Japan case for instance, Yamashita (2021) said it still need increasing participation in coastal activities, such as coral reef restoration is a crucial challenge for coastal environmental planning. Research conducted by Widyantari and Sukana (2021) shows that coral reef damage in Indonesia, due to limited local and public participation.

Discussions regarding institutions emerged in the social and political sphere in the eighties and most of these discussions were to define and explain formal institutions. At the same time, the role of local institutions in managing common pool resources has been an interesting research topic much discussed (Berkes, 1989; Ostrom, 1990; 2010). The term institutions covers

a wide range of social structures including the public, civil and private sectors and at different scales such as local and national (Agrawal and Perrin, 2009; Uphoff et al., 2006). According to Uphoff (1984) generally the terms of institution and organization are used interchangeably and give a double meaning and confusion. Hendropuspito (1989) defines institutional as a form of organization composed of behavior patterns, roles and relationships as a way of binding in order to achieve basic social needs. Wibowo (2011) defines an organization as a cooperative activity carried out by several people in an effort to achieve the goals that have been set.

Meanwhile, local institutions are not only organizations that have offices, but the rules that exist in the community can be categorized as an institution. This paper, therefore, examines both formal and informal institutions (i.e., customary institutions) that operate in coral reef restoration activities, focusing on their roles to increase community participation in conserving coral reefs. This includes an exploration of the problems, challenges, and strength that they have to deal with.

## Research Method

This study uses a qualitative approach through interviews with key informants (i.e., Local people, NGOs officers, Local government representatives, local facilitators, and tourism business actors) to explore the process of constructing reality (Anas and Ishaq, 2022; Bryman, 2012; Bryman and Beardsworth, 2006; Cresswell, 1994). This research uses the multiple case study method (Yamashita and Moonen, 2014; Gerring, 2007; Yin, 2003). The first case study was conducted at Onna Village Okinawa, Japan, while the second case was carried out in Sukarame Village, Pandeglang, Indonesia.

Data were collected using in-depth interview towards informants, who were representing the local institutions in both research sites. Those informants were asked about the their role to deal with coral reefs conservation endeavours, such as (1) what is the current situation of coral reefs conservation activities in the site; (2) who are the local institutions and how did they manage the resource mobilization in engaging and increasing public involvement in coral reef conservation; (3) how did they mediate the various interests between actors and the approaches used; and (4) how did they construct a culture of coral reef conservation in the midst of dynamic biophysical and socio-economic and political changes. The four topics mentioned above serve as anchor points in this research, and during the interviews, researchers delved deeper into each topic to obtain specific information.

Interviews were conducted by visiting informants at their offices or homes. With the informant's permission, the researchers recorded the entire interview using an audio recording device. Each interview with an informant took approximately one to two hours. The audio data from the interviews were manually transcribed into text format by the research team. Data analysis commenced during the transfer of audio data to text. Researchers listened to the audio recordings repeatedly and transcribed them into text using Microsoft Word. The text data were then coded to classify themes emerging from each response. Once consistent patterns regarding specific themes were identified, the results of the analysis were presented descriptively.

During the data collection through in-depth interviews, interviews were conducted with 12 informants, where 5 informants were interviewed in Onna Village, Okinawa, and 7 informants were interviewed in Sukarame Village, Pandeglang. The informants interviewed were representing both formal and informal institutions involved in coral reef conservation activities at both research sites. The number, code, and institutions of the informants are indicated in Table 1.

**Table 1. Characteristic of Informants**

| No. | Informant's Code | Institution |
|---|---|---|
| [1] | [2] | [3] |
| 1 | OCL | Ota Community of Onna Village |
| 2 | OVA | Onna Village Administration Office |
| 3 | OVFC | Onna Village Fishery Cooperative |
| 4 | JO | JICA Okinawa |
| 5 | SK | Saga University of Ocean Energy |
| 6 | KABL | Konservasi Alam Bawah Laut |
| 7 | SVO | Sukarame Village Office |
| 8 | KTS | Karang Taruna of Sukarame Village |
| 9 | PTO | Pandeglang Regency Tourism Office |
| 10 | HPI | Himpunan Pramuwisata Indonesia |
| 11 | FGC | Fishermen's Group at Carita |
| 12 | MFA | Marine and Fisheries Affair Services |

## Results and discussion

### *Onna Village*

Onna Village is a village located along Onna Beach in the Okinawa region. Apart from having an attractive coastal area as a tourist destination, this village also has a relatively small agricultural area because it directly borders the highland sub-tropical forest that surrounds the village. The average area of agricultural land for villagers is only around 4000 $m^2$. Onna Village is a well-known tourist destination in Okinawa Prefecture. This village has a population of 11,000 people. Community is divided into small groups (4 small groups) where one community of Onna village residents has a population of 312 people with 102 heads of families.

From a historical perspective, Onna Village before the 1970s was a poor area because of its geographical condition, which was located in an area directly bordering sub-tropical hill forests. In the past, there were a lot of rice paddy fields in the 1970s. After that, the government project came to improve productivity through the introduction of sugarcane plantations. As a result, some farmers converted paddy rice into sugarcane. The sugarcane is suitable for planting due to the climate and soil conditions. Currently, 80% of villagers have planted sugarcane and 20% rice fields, including mangoes. This situation was also encouraged by the establishment of a sugarcane factory located in the surrounding village. (OCL)

Before the development of the tourism industry, which was followed by the clearing of land for investment in hotels and other tourism-supporting infrastructure, the livelihood of the village population was 80% farmers, 10% fishermen, and the remaining 10% public service. However, now the composition has changed to 20% farmers 10% fishermen and the remaining 70% public services (village government and tourism industry) as depicted in table 2. There are about 107 fishermen who are members of the Fishermen Cooperative, and the rest of about 129 have become associate members or semi-members. (OCL)

**Table 2. Villagers' Occupation**

| Villagers Occupations | Before 1970s (%) | 2023 (%) |
|---|---|---|
| [1] | [2] | [3] |
| Farmer | 80 | 20 |
| Fishermen | 10 | 10 |
| Village administration & tourism | 10 | 70 |

Source: interview with informant OCL (2023)

The composition of tourism industry workers is 20% village residents and 80% come from outside Onna village. According to informant OCL, only fishermen in Onna village grow *mozuku* sea weed but the price is not stable. In addition, the fishermen are also developing *umibudo* (sea grapes).

### *The role of local institutions in Onna*

Conservation of coral reefs in Onna Village is considered one of the best in the world. Since 2018, the village has been declared a coral reef village. However, efforts made for coral reef conservation are not easy.

According to informant SK, the major threats to coral reefs are COTS (Crown of Thrones Sea Star), red soil, bleaching, and SPSS (Suspensible Particles in the Sea Sediment). Nevertheless, red soil remains the main challenge affecting the coral reef ecosystem in Onna Village until now. According to informant JO, red soil pollution occurs due to natural disasters such as heavy rain and floods. Informant OVCF mentioned that three years ago, a significant amount of soil from the Pacific

volcanic eruption reached the coastal line of Onna Village. "It caused some fishermen difficulty in moving their boats. Villagers then cleaned up the coastal line from those soils," said informant OVFC.

Nevertheless, informant OCL argues that another cause of red soil polluted coral reef habitats is the massive development of resorts for tourism. "More than 18 resort hotels have been established near the beach, causing red soil to flow into the coast and affecting the coral reef habitat" says informant OCL.

Coral reef conservation governance is very complex due to the involvement of many institutions (polycentric governance). This includes not only local entities such as the fishery cooperative, village government, and community associations but also the central government and Okinawa regional government (prefecture). This research indicates that both local and national institutions play a role in coral reef conservation. These include the Onna Village Administration Office, Onna Village Fishermen Cooperative, Onna Village Community, Non-Governmental Organizations such as JICA Okinawa, as well as the Prefectural Government of Okinawa and the National Government of Japan. Especially in Onna Village, however, currently, JICA is no longer involved in collaborating with the Onna Village Fishery Cooperative in coral reef conservation there. When we interviewed a respondent from JICA, he did not state clearly the exact reason for this.

The role of OVFC is crucial in coral reef conservation activities. In addressing the issue of red soil, for example, OVFC has a routine agenda for cleaning the beach. "Once a year, there is a beach cleaning event that involves more than 40% of households, with 10% being local residents and 90% comprising company workers and outsiders. This annual activity actively engages tourism workers, farmers, and school children," said informant OVFC.

Not a few farmers who work on agricultural land are also involved in planting anti-run-off plants. They planted plants that could withstand red-soil run-off along small rivers that flowed into the sea.

The fishery cooperative has also involved children aged between 10-12 years old in junior school to get hands-on learning on coral reef conservation, seaweed culture, and *mozuku* culture. "They not only learn about coral reef conservation, but they also practice how to plant and grow *mozuku* and *umibudo*," says informant OVFC.

Meanwhile, JICA Okinawa is committed to protecting the richness of natural resources and coastal areas by providing support for research and capacity building. Informant JO emphasizes the importance of community involvement in coastal areas, stating that merely prohibiting people from coming to the coast is not enough. "They need to generate income to live. Ecotourism is the best choice to improve the community's economy and preserve the environment. The community must possess effective management skills to safeguard against over-tourism, ensuring the continuous preservation of coral reefs from damage," says informant JO.

Additionally, JICA Okinawa undertakes prevention measures such as beach cleaning activities involving multiple parties. Furthermore, environmental education is conducted. "The government, through the Ministry of Education, provides education for teachers regarding environmental education to be periodically taught to their students," says informant JO.

The role of governmental institutions at the local, prefectural, and national levels is to support the budget, ensuring the implementation of coral reef conservation activities. According to informant OVA, the total budget from the national government and Okinawa Prefecture is 5,289,000 yen, with 2,970,000 yen coming from the national government. Meanwhile, the budget for natural conservation in the village is approximately 3.7 million yen, sourced from the national budget and the Okinawa Prefecture Government. This budget has been allocated to fishery cooperatives to protect natural resources, including coral reefs, and is utilized for activities such as transplanting coral reefs, monitoring, and evaluation.

"The process of obtaining these budgets was conducted through a negotiation process and partnership between the village administration office and the fishermen's cooperative," said informant OVA. Currently, the budget is sufficient to run conservation programs, however, there is no guarantee of receiving the same amount in the future.

***Sukarame Village***

Sukarame Village is a village located in the Carita District, Pandeglang Regency, Banten Province, Indonesia. This village is situated on the western side of Java Island, bordered by the Sunda Strait, with a travel distance from the capital city Jakarta of approximately 2 hours and 30 minutes.

Currently, Sukarame Village covers an area of 1.76 $km^2$ with a total population of 5,930 people, consisting of 1,423 households. The village is divided into 2 sub-villages, 5 neighborhood units (RW), and 21 community units (RT). The livelihoods of Sukarame village residents predominantly consist of tourism makes up 46.1%, farming and fishing, accounting for 45.2%, while industry and craftsmanship constitute 2.2% (BPS, 2020; Desa Sukarame, 2024).

The area of Sukarame village is well-known for its beach tourism, waterfalls, rivers, rice fields, and forests. Conservation activities such as coral reef rehabilitation and anemone cultivation, combined with cultural tourism, have placed Sukarame village among the top 50 best tourism villages in Indonesia in 2021.

Most of the coastal communities of Carita Beach, including Sukarame village, depend on fishing for their livelihood. The coastal area of Carita Beach is also a well-known tourist destination. This area has been developed since the 1970s during the Suharto regime, resulting in the control of the area by large hotels and land speculators. Consequently, some residents have encroached upon the state forest of Carita, while others continue to work as fishermen, forming a marginalized population group.

The local communities living around the coast of Sukarame Village, particularly fishermen and traders, are highly vulnerable to various economic shocks and natural disasters. In 2018, a tsunami severely impacted the coastal area of Carita, resulting in 430 deaths, 150 missing persons, and 16,000 displaced individuals (Antaranews, December 23, 2019). The tsunami also caused damage to the coral reefs surrounding Carita Beach. Similarly, COVID-19 has significantly reduced the number of tourists visiting Carita Beach (Fernanto et al., 2023). As a consequence, the livelihoods of fishermen and local communities have been economically affected, with many fishermen struggling to sell their catch, and other residents around Carita Beach losing their jobs and income (Fernanto et al., 2023).

***The role of local institutions in Sukarame***

In Sukarame Village, local initiatives to restore coral reefs began in 2017, with the establishment of the Underwater Natural Conservation Group or KABL (Kelompok Konservasi Alam Bawah Laut) officially recognized by a public notary on January 17, 2018. This initiative was spurred by the local community's recognition of the underwater potential along Sukarame Village's beaches and the observed damage to coral reefs.

The primary causes of coral reef damage around Sukarame Carita beach include the unsustainable exploitation of fish, such as the use of anchors that harm reefs, and the use of potassium to catch ornamental fish. Additionally, natural factors like red soil carried from rivers during heavy rains, westward wind waves, and tsunamis 2018 contribute to coral reef degradation. "During the westward wind season in December to March, for instance, large waves can damage coral reefs, while strong river currents often carry sedimentation of red soil that covers coral reefs. Even large coral reefs were damaged and overturned during the 2018 tsunami" says informant KABL.

The governance of coral reef conservation in Sukarame Village is complex, which involves various local institutions, including KABL (NGO), the village government, the village youth group (Karang Taruna), fishermen, the tourist guide association, and local government bodies such as the Maritime and Fisheries Affairs Services or MFA (Dinas Kelautan dan Perikanan Pandeglang) and the Pandeglang Regency Tourism Office or PTO (Dinas Pariwisata Pandeglang). This research highlights KABL as the most influential institution initiating coral reef conservation efforts in Sukarame Village, with others playing supporting roles.

The role of KABL is crucial in coral reef conservation in Sukarame Village as a local initiator. This local institution was established in 2016 and it has started to

**Table 3. Comparison between Onna village and Sukarame village.**

| | |
|---|---|
| Onna Village | |
| Major threat | ○ Red Soil pollution caused by heavy rain, floods, volcanic eruption, tourism construction. |
| Institutions involved | ○ Onna Village Fishermen Cooperative (OVFC).<br>○ Onna Village Administration Office (OVA).<br>○ Onna Village Community.<br>○ NGO-JICA Okinawa.<br>○ Prefectural Government of Okinawa.<br>○ National Government of Japan. |
| Role of institutions | ○ OVFC: cleaning beach from red soil by involving tourism workers, farmers, and school children; campaign on coral reef transplantation, seaweed and *mozuku* culture.<br>○ OVA: funding, administration, and networking.<br>○ Onna Village Community: supports fishermen activities and member of OVFC.<br>○ JICA Okinawa: beach cleaning, environmental education.<br>○ Prefectural Government of Okinawa: funding.<br>○ National Government of Japan: funding. |
| Challenges | ○ Massive tourism infrastructure development.<br>○ Uncertain amount of money as financial support from the government.<br>○ Uncertain price of *mozuku* seaweed and sea grapes.<br>○ Potentially shortage of successors to look after the sea (young people tend to leave Onna search for livelihoods elsewhere). |
| Strengths | ○ OVFC has clear program and business operation (coral reef for tourism and seaweed production).<br>○ Strong support from tourism industries and restaurants (seaweed consumption as a longer lifestyle).<br>○ OVA actively promotes the coral reef conservation.<br>○ OVFC manages marine areas for coral reef conservation and seaweed production.<br>○ OVFC marketing locally crafted products such as *mozuku*, sea grapes (*umibudo*), and coral rock brown sugar cubes at Onna no *Eki Nakayukui* market as souvenir items.<br>○ Has been and is currently instilling environmental education in young generations in Onna. |
| Sukarame Village | |
| Major threat | ○ Unsustainable fishing (e.g. fishermen anchors harm reefs, using potassium to catch ornamental fish), red soil pollution caused by heavy rains, strong waves, tsunami. |
| Institutions involved | ○ NGO-Underwater Nature Conservation (KABL).<br>○ Village government.<br>○ Village youth group.<br>○ Fishermen group.<br>○ Tourist guide association.<br>○ Pandeglang Regency Maritime and Fisheries Affairs Services (local government).<br>○ Pandeglang Regency Tourism Office (local government).<br>○ Private sectors/corporation.<br>○ Schools.<br>○ Traditional cultural group. |
| Role of institutions | ○ KABL: local initiator, beach cleaning (involving visitors, companies, school children), campaign on coral reef transplantation and conservation knowledge, fund rising to companies.<br>○ Village government: administrative assistance and networking.<br>○ Village youth group: member of KABL.<br>○ Fishermen group: member of KABL, underwater tourism service provider.<br>○ Tourist guide association: promoting underwater tourism.<br>○ Maritime and Fisheries Affairs Services: legal support to KABL, networking.<br>○ Pandeglang Regency Tourism Office: promoting and assisting underwater tourism management.<br>○ Private sectors/corporation: CSR funding providers.<br>○ Schools: clean up the beach.<br>○ Traditional cultural group: promoting Carita beach conservation by cultural music performance. |
| Challenges | ○ Uncertain income (rely highly on tourists/visitors).<br>○ Uncertain status of the land occupied by KABL used as office and conservation activities.<br>○ Centralized local initiative by KABL elite.<br>○ Rely highly on CSR funding/No financial support from the government.<br>○ Coastal land areas are controlled by investors.<br>○ Institutional fragmentation at the local level (i.e. KABL and village tourism institutions and tourism awareness group).<br>○ No seaweed production development as an alternative source of income.<br>○ Mobilizing villagers to be involved in conservations and mobilizing funding due to limited budget. |
| Strengths | ○ Their contributions to coral reef conservation are recognized by local and national governments. |

conduct coral reef conservation efforts until currently. For example, KABL conducts beach clean-ups to remove sedimented red soil, and coral reef transplantation, and provides awareness sessions in elementary and junior high schools, in both invited schools or attending sessions to the school near the coast, about the importance of coral reef conservation. "We regularly involve students in beach clean-up activities and conservation education by engaging them in coral reef transplantation," says informant KABL.

KABL also actively seeks corporate social responsibility (CSR) funds from companies to run the coral reef conservation program. This research identifies large companies such as Pertamina, Chandra Asri, Indonesia Power, and Krakatau Posco as having provided CSR funds to support coral reef transplantation conducted by KABL. "CSR funds are currently the only financial source supporting coral reef conservation activities in Sukarame," says informant KABL. This research found that since 2017, KABL has rehabilitated 80m² of coral reef out of the planned 17,000 ha.

The village government's financial support presence is not quite substantial. The Sukarame village office can only provide administrative assistance to KABL as they apply for fundraising proposals and promote KABL activities to potential donor institutions. "The village government cannot yet support funding for KABL activities, but we always support the necessary administration to seek CSR funds and build networks with donor institutions," said informant SVO.

Meanwhile, the village youth group (Karang Taruna) has limited contributions as its members only participate as volunteers in coral reef conservation activities. "Some members of the youth group are also members of KABL, while others are not. However, we always provide manpower for conservation activities carried out by KABL," says informant KTS.

Fishermen groups are actors who benefit from coral reef conservation activities. Informant FGC describes that after coral reef conservation efforts, the catch quantity increases, and the distance to fishing locations becomes closer. "Previously, fishing grounds were over 1 km away and only squid and anchovies could be caught. Now, with the coral reef in good condition, the fishing grounds are less than 1 km away and various types of fish and lobsters can be caught," says informant FGC. Out of the 10 members of FGC in Sukarame Village, some are involved as members of KABL. This research indicates that besides being fishermen, some fishermen also provide services as boat operators to serve tourists to the pontoon for snorkeling and as banana boat operators.

The direct contribution of Indonesian Tourist Guides Association or HPI (Himpunan Pramuwisata Indonesia) to coral reef conservation is non-existent. The role of HPI is primarily in promoting to visitors to visit coral reef conservation sites that offer underwater attractions through snorkeling. This research reveals that out of 40 members of HPI, there are 4 tour guides who collaborate with KABL. The presence of these four individuals competes with 50 unofficial tour guides, who are called *Calo*, operating around Sukarame Carita Beach. "The presence of illegal guides sometimes harms tourists and HPI guides, for example, by insisting tourists visit snorkeling locations even in bad weather. This disappoints tourists and tarnishes the image of HPI tour guides," says informant HPI.

Local government is a formal institution that plays a crucial role in supporting coral reef conservation activities. The Maritime and Fisheries Affairs Services of Pandeglang (MFA) is involved in the legal aspects of the KABL group, providing assistance with pontoons, and establishing partnerships between KABL and the central government or CSR funding companies. "After obtaining legal legitimacy in the form of a Decree in 2017, many CSR funds came in to support KABL activities, and we merely facilitated," says informant MFA.

Additionally, the MFA also contributes to assisting in the procurement of snorkeling pontoon docks through coordination with the central government. However, according to the informant MFA, KABL's weakness lies in human resources that have not been able to work systematically. "I see that the main actors are still focused on the KABL chairperson because other members-only work when instructed by the chairperson," says the informant MFA.

Meanwhile, the Pandeglang Regency Tourism Office (PTO) plays a role in supporting the sustainable growth of tourism following the success of coral reef conservation in Sukarame. The economic impact is evident in the increasing occupancy rates of homestays. "The success of coral reef conservation activities have become one of the reasons why tourists come to Sukarame. Tourists want to snorkel and see the friendly clownfish around the anemones," says the informant PTO. However, the weakness of KABL is the lack of a permanent location as a tourist reception area. "The land occupied by KABL as its secretariat currently belongs to another party, so we cannot provide support for infrastructure development if the land legal status is unclear," adds the informant PTO.

Based on the explanation above, a comparative analysis summarizing the situation between Onna Village and Sukarame Village is depicted in Table 3.

## Conclusion

The lessons learned from these experiences could be stated that, the issue of coastal conservation is the responsibility of all elements, not only tourists, innkeepers, and traders but also local communities, and the community of school children who are the generation of hope in saving coastal ecosystems. From the experience of working together, Elementary, Junior, and Vocational high school students exhibit great enthusiasm for conservation endeavours.

Learning from the case in Onna Village shows that the development of *mozuku* production, strengthened by the development of supply chains, has made cooperatives more independent and coral reef conservation more sustainable. With sufficient capital resources, resource mobilization for coral reef conservation will be improved. Unlike in Carita, KABL has limited funding sources. To overcome this, KABL can learn and try to replicate ways of developing businesses through seaweed production. However, because KABL is a non-profit organization, it can establish this as a separate business unit, such as a cooperative or joint business group in the field of seaweed production. Ten years ago, this location was once a seaweed-producing centre, which then began to decline due to over-exploitation without further development planned.

However, the communities in Sukarame, who depend on fishing for their livelihoods, especially fishermen and boat operators, have thus far encountered difficulties in environmental stewardship. Despite a significant decrease in environmental violations, they still anchor in areas rich in coral reefs, leading to considerable damage to the reefs. Another issue arises during peak tourist seasons when there is a high influx of visitors (up to 570 per day) interested in snorkeling and diving, resulting in coral reef damage. Some visitors accidentally step on the reefs or deliberately take coral. With the large number of tourists, controlling and monitoring them becomes challenging. If not properly anticipated, institutional fragmentation in Carita may disrupt the optimization of coral reef conservation as it could impede the mobilization of local resources.

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