

# Discovering sustainable coastal tourism in Dodola-Island, Indonesia

## Abstract

This research was done based on the author's curiosity to know how sustained the performance of Dodola island. During the time, the island had declared as a virgin beach. Moreover, Ministry of Tourism collaborated with the Government of Morotai District launched the program Wonderful Morotai Island. Through their program's aims to increase the number of tourists visiting the area. The program combined the natural, marine, cultural and artificial attractions. This study conducted based on the concept of coastal tourism in a sustainable manner. The concept was very realistic to be implement on improving their performance to build coastal ecotourism in the area that has a very limited number of human resources, funding and time. This study had conducted for a year with quantitative and qualitative mixed mode research. The questionnaires distributed purposively and tabulated using content analysis. The results of the study showed that in addition to coastal tourism facilities and infrastructure, it was also necessary to socialize with all stakeholders on technology and coastal tourism development in a sustainable manner. This collaboration had improved the performance of coastal tourism on the island.

**Keywords:** Sustainable coastal-tourism, Infrastructure, Socialize, Collaboration

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Hengky SH

Universitas Bina Darma, Kent Polytechnic, Indonesia

**Correspondence:** Hengky SH, Universitas Bina Darma, Kent Polytechnic, Shine Institute, Indonesia, Email hengky\_halim@yahoo.com.au

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## Introduction

The Ministry of Tourism with the Government of Morotai District launched the program Wonderful Morotai Island 2016. Through the program, the island government aims to increase the number of tourists visiting the area. The Ministry of Tourism targets up to 500,000 tourists visiting the island by 2019. The program combines the natural, marine, cultural and artificial attractions of the island through various festivals that will be hold throughout March to December 2016. The festivals include cultural festivals, coastal village festivals, Dodola island festivals, and World War II festival festivals.<sup>1</sup> It becomes an effort to accelerate the development of North Maluku tourism to become excellent tourism destinations and international competitiveness. Morotai locates in Maluku that has its own uniqueness. It is located in the path Sailing Asia and Australia. In addition, to having a beautiful nature and unique culture. Through the program, they believe the island will soon become one of the excellent destinations that would be relied to attract foreign tourists.

To realize the program of the Ministry of Tourism, it needs an effort to manage and to enhance the performance of the island to become its appeal, especially for the Dodola coast. The Island is located in South Morotai District can be reached from Daruba ferries port or harbor Lastori for approximately 30 minutes. This beach is very beautiful and ramps with fine white sands. It has length of 10 miles. The beach has a coconut trees background. The beach is featuring also a clear sea and beautiful scenery and the island. Dodola Island divided into two, namely large and small Dodola. Big Dodola Island has characterized by a wooden dock that jutted into the sea. They separated by a seawater during tides. The island is available facilities that support for tourism such as resorts, inns and docks. It is just that the condition is not maintained and maintained. Factually, this island there is a beach that is most in demand by visitors both Morotai community itself and Nusantara and foreign tourists. To increase the number of tourists visiting this beach is necessary to improve the performance of this beach. Therefore, this study aims to respond to programs made by the Ministry of Tourism and explore the performance of sustainable

coastal tourism (SCT) in Dodola Island and the possibility to improve it.

Byrd<sup>2</sup> stated that stakeholder participation is rooted in business management and public administration. Stakeholder participation is not prominent in strategic management. Stakeholders are groups or individuals who can influence by the achievement of organizational goals. Previously, Donaldson and Preston<sup>3</sup> argue that stakeholders are groups or individuals who have legitimate interests in the organization.

The general goal of sustainable development are to meet the economic needs of the community and expand the business opportunity and to improve the quality of life.<sup>4</sup> To achieve this goal, social, economic and environmental balance requirements must be meet. First, the social structure that facilitates the source of technical knowledge. Second, an economic system capable of producing sustainable resources. Third, the protected coastal environment. Sustainable development is flexible and adaptable.<sup>5,6</sup>

Studies undertaken by Nara Mao Yen<sup>7</sup> explored coastal tourism environmental management policies in addressing environmental impacts and implementing sustainable development. They argue that environmental management policies can be useful in solving the environmental impact on implementing SCT development. Sustainable tourism is a key factor in the successful management of natural resources in coastal areas.<sup>8</sup>

Cucculelli and Goffi<sup>9</sup> expanded models on the competitiveness of coastal ecotourism destinations by introducing a series of sustainability indicators and testing their roles in explaining sustainable coastal competitiveness. The model tested for a unique dataset of destinations of excellence, a remarkable tourist destination recognized by national and international awards. Empirical results indicate that the factors that refer to sustainability have a positive impact on all indicators of coastal tourism competitiveness. Furthermore, the role of sustainability as an important determinant of competitiveness of a coastal tourist destination.<sup>10,11</sup>

Stojanovic et al.<sup>12</sup> argue that communities can be adequately involved in the application of concepts. They are components of the socio-ecological system. They also given the latest social theory. Increased criticism of social science by applying social entities to the concept of a socio-ecological system. Ecologically, communities show a real emphasis on land-use, economic incentives, and social learning. Their findings indicate that the social and ecological component are relevant<sup>5,6,13,14</sup> because of the central insight into the dynamics between humans and the environment. Its prominent critique of the need for a multidisciplinary approach to solving real-world problems.

However, the concept of coastal tourism that becomes the current and future tourism trends. The implementation of the concept has proven to be a tourist attraction in several coastal tourism locations both in Indonesia and outside the country.<sup>2,9,13-20</sup> There are several things that stakeholders have to prioritize and to improve the performance of coastal tourism on the island. Previous study about 141 destinations based on sustainable (coastal) tourism<sup>7,8,21-23</sup> from 2011 to 2016 indicated that most of the destination lacks of government regulation and conserved (coastal) environment.<sup>13,14,17-20</sup> Moreover, he argues that sustainable coastal-tourism is among the activities of tourists visiting coastal or coastal areas and represents the fastest and largest industrial growth in the world. The coastal tourism well managed by using a component of an integrated approach to coastal and marine management need some of the strategies used to manage tourism sustainably that focused on the environmental impacts on tourism activities specifically. The basic concept of sustainable coastal-tourism as the basis of sustainable development. These include Coastal - marine management and policy plan, environmental facilities and infrastructure care, social learning and technical knowledge, and economic development for support natural resources.

## Materials and methods

This one-year study had conducted descriptively from May 2015 - May 2016 at Dodola Island, Maluku, Indonesia (Figure 1).

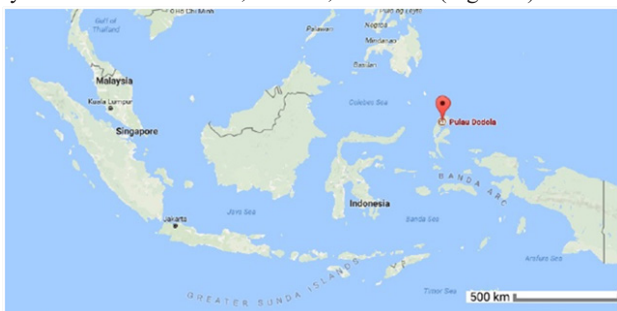


Figure 1 Dodola Island (in red color), Maluku, Indonesia.

The investigation had conducted on Dodola Island using qualitative and quantitative methods of the islands.<sup>24</sup> A number of respondents only 180 had responded to a number of questionnaires consistently. Purposively questionnaires had distributed over tourists, tour guides, and tour operators. In addition, it distributed among hotel and restaurant staff, anglers, local residents, stakeholders, local government officials, and diver guides. Furthermore, the study also submitted questionnaires to tour bus drivers, travel agents and agents. Finally, the questionnaires had distributed over the Department of Culture and Tourism, local traditional food traders, souvenir sellers, indigenous people, parking attendants, and tourist associations.

Moreover, SCT could improve the performance of coastal tourism destinations.<sup>9-11</sup> In terms of sustainability, a unique destination of excellence, a remarkable tourist destination had a positive impact on

coastal tourism competitiveness. Furthermore, the role of sustainability as an important determinant of competitiveness of a coastal tourist destination.<sup>7,8,21-23</sup> The basic concept of sustainable coastal-tourism as the basis of sustainable development. These include Coastal - marine management and policy plan, environmental facilities and infrastructure care, social learning and technical knowledge, and economic development for support natural resources.<sup>14-20</sup>

The data collected had calculated using content analysis<sup>25-27</sup> based on the concept of SCT. Firstly, Coastal - marine management and policy plan.<sup>14-20</sup> Secondly, environmental facilities and infrastructure development and care.<sup>9</sup> Thirdly, social learning and technical knowledge.<sup>15,16</sup> Finally, economic development for support natural resources.<sup>7,8,21-23</sup>

The data collected had done by triangulation technique. This made in three steps that included observations, open interviews, and secondary data for proof.<sup>28</sup> In terms of opinions, topics, interests, or views of respondents, interview results significantly had influenced by the situation of the interviewer. Briefly, content analysis proceeds with SCT to explore dissent, and post each attribute. The frequency of consistent answers is calculated, and arguing to measure existing and expected performance.<sup>29-33</sup>

## Results and discussion

Data collected had tabulated by using content analysis (Table 1), this study found that coastal tourism performance on Dodola Island is sustainable (K = 0.6167). The indicator showing its superiority is the excellence of coastal and marine policy planning (0.2883). Another advantage is the development and maintenance activities of facilities and infrastructure for coastal tourism activities (0.2523). Meanwhile, the economic development to support natural resources had not balanced yet with the coastal policy-planning program (0.2342). It is evident that much needed socialization and knowledge of the tricks to manage coastal natural resources to support coastal tourism in a sustainable manner (0.2252).

Table 1 Existing performance of sustainable coastal tourism in Dodola Island

Existing performance of coastal tourism	Value	% freq
Coastal - marine management policy plant	32	0,2883
Environmental facilities and infrastructure development and care	28	0,2523
Social learning and technical knowledge	25	0,2252
Economic development for support natural resources	26	0,2342

Kappa Coefficient:  $K_1: 0,6167$ .

Existing performance of Dodola Island located in the western part of the island of Morotai. It is located in North Maluku district, Morotai Islands known as the outermost region because of its location on the lips of the Pacific. Therefore, the local government mentions the island as a pearl on the lips of the Pacific. The reason for the mention of Dodola Island as a pearl on the lips of the Pacific because of its charming island. This island has its own characteristics. It is suitable as a beach tour. There are two small islands. Little Dodola and Big Dodola. The two islands had separated by a sea, with a distance of approximately 500 meters. That makes these two small islands unique that the seawater recedes. Imagine, the beach lips of the two islands had adorned with white sand connected to one.

Stunning white sand dunes spoil every eye watched it. After all, the time span of the morning until the evening. During that time, tourists had pampered with the beauty of the beach. The sand is white, smooth as wheat flour. The blistering reflection of the sun on the white sand was even dazzling with the eye. The air of the beach makes the tourists feel lulled as they relaxed to enjoy the beauty of the beach. Not to mention the small waves creeping rhythm adds to the island’s silence. They can order a local-culinary such as coconut water and fried bananas on enjoying the beauty of this island. Fried bananas on Dodola Island are tastier because of the sauce. The kitchen spice dough from North Maluku makes them taste of fried bananas on dabu-dabu available. Bananas are tasty, as the people there have their own way of frying bananas.

There is a split sea phenomenon. The ocean had split that tourists could walk there and cross two islands. It namely the small island of Dodola and the big Dodola Island. Actually, the state of this sea is the condition that the sea watered between the two islands subsided and looks like a split. As the natural phenomenon occurs, the two islands separated by the ocean seen and had connected that a water receded. The sand like a long road that connects the two islands.

Once upon a time, this island is part of the ternate sultanate. At the end of the 17th century, Morotai Island became a joint venture of the VOC. At that time the purpose of cooperation between the VOC - the sultanate of Ternate was to get the spices easily. However, because of the Japanese colonized Indonesia, this cooperation should end in 1942. In addition, Dodola Island is a favorite island of tourists to do diving and snorkeling in North Maluku. Uniquely, they will find warplanes and ships relics of the second world war on the island. This relic has overgrown by fish and coral reefs. It sank in the Second World War. In the colonial era, the island of Dodola is an island that had contested by allies and Japan because of its beauty.<sup>34,35,24</sup>

In addition to the remains of World War II, there are also a number of historical sites that have high historical value, including Kedaton Sultan Ternate on this island. Kedaton is the pride in Ternate residents. To the south of Ternate City, there is Kalamata Fortress. In 1540, Portuguese army built this fort. Until now, the fort still established firmly. From this place, Maitara Island and Tidore Island are visible from a distance. As seen in the picture of a thousand rupiah denomination. In a row of limestone hills near Daao Village and the Tanjung Pinang shelter. There are cave niches be inhabited by prehistoric humans. There is also a rather large residential niche. It located in the hills on the beach.

Unfortunately, the remains of shipwreck, plane, tank and bunker remainder of World War II has been missing many. The looting of iron from the relics of the war on 1980 by a local community. The iron is a white iron anti-rust collected by residents around and by outsiders, who then sold it to artisans that distribute the production of necklaces, bracelets and rings to More 30 merchants of white jewelry crafted in Ternate city. Morotai people do not see the legacy of the war as a relic of history that had preserved and had utilized for historical tourism. With the enormous impetus to meet the necessities of life and lack of knowledge, they instead use the relics of war as a source of their livelihood.<sup>36</sup>

The easiest access to this island is from Tobelo, a sub-district in North Halmahera District, Province of North Maluku. In Tobelo has been available passenger ships that serve the route Daruba-Morotai as much as 3 times a week. Arriving at the port of Daruba, tourists could rend a fishing boat or called Ketinting. They had advised to participating in fishing with anglers. The experience of finding fish

in the sea adds an imposing impression of them during the trip to this island.

The tabulation results of Table 2 indicate a change of priority over the second priority became the third. These attributes are from the second performance attribute of SCT Environmental facilities and infrastructure development and care (0.2374) to Social learning and technical knowledge (0.2518). It is clear that they need a training program and knowledge on how to manage the tourism and reduce negative environmental impacts. Therefore, they get to understand on how to achieve the tips of facilities management and development and infrastructure management they can make in their efforts on generating the economy to support the management of natural resources (0.2302).

**Table 2** Expected performance of sustainable coastal tourism in Dodola Island

Expected performance - sustainable coastal tourism	Value	% Freq
Coastal - marine management policy plant	39	0,2806
Environmental facilities and infrastructure development and care	33	0,2374
Social learning and technical knowledge	35	0,2518
Economic development for support natural resources	32	0,2302

Kappa Coefficient:  $K_1; 0,7722$ .

Tabulation results from Table 3 indicate that there is a gap between expected performance and existing on Dodola island (0.1556) indicating that it should be corrected (0.1556). It clearly shows that they need social learning and technical knowledge with a gap of 0.0266 especially in terms of sustainable tourism management. The socialization of the lessons greatly helped them in understanding our techniques and tips for managing coastal tourism sustainability that involves them indirectly and contributes economically to local residents and local governments in preserving the coastal environment due to tourism activities.

**Table 3** Performance gap of sustainable coastal tourism in Dodola Island

Performance gap of sustainable coastal tourism	Existing	Expected	Gaps
Coastal - marine management policy plant	0,2883	0,2806	-0,0077
Environmental facilities - infrastructure development – care	0,2523	0,2374	-0,0148
Social learning and technical knowledge	0,2252	0,2518	0,0266
Economic development for support natural resources	0,2342	0,2302	-0,0040

Kappa Coefficient Gaps: 0.1556.

The current performance, they do not meet the targets that have been planned local governments, but the number of foreign and domestic tourists increased last year. They understand the fundamental problem of coastal tourism on the island is the transportation from and to Morotai. Similarly, lodging accommodation on the island is still very limited. This island is like a beautiful girl that never left the room, who would want to see. He hopes the province-central government can seriously help Morotai to bring in foreign tourists and investors to develop the region. To achieve these targets, there is a need for comprehensive readiness, in terms of attractions, accessibility, and amenities. The district secretary of the island revealed that a number

of preparations have been made to realize his program. In terms of accessibility, there are already flights of and from this island via Leo Wattimena Airport every day, and by sea route every five time a week available ferry routed Tobelo-Morotai. From the land route, he said that the District Government is working to improve the outer ring road to the island. In terms of amenities, will be the construction of power plants, the provision of secondary distribution networks of water, the development of hospitality and communication facilities, as well as the construction of resorts and golf courses. He also admitted that the island still has many shortcomings. However, he believed that while walking the tourism activities will be cultivated integration and priorities to realize the plan.

In addition, they also invited Taiwan businesspersons to invest in the development of tourism infrastructure worth billions of USD. Later the island could develop well as a performance of Singapore located in eastern Indonesia. Chief Trade-Economic Representative of Taipei in Indonesia had honored by the invitation. He said it was trying to continue to follow up the island development agreement with various parties of Indonesia. Companies from Taiwan are ready to help develop fish farming, agriculture, tourism and the banking industry. He estimates that many Indonesians will migrate to the island to work in fisheries, eco-tourism and infrastructure. Tourism experts on the ministry of maritime resource coordinators stated that coastal tourism would serve as the main developmental core of the island. Some investors from Taiwan, USA, Japan and China have stated that they intend to invest. From several offers then he was working on the rules. So that, everything runs smoothly.

## Infrastructure

The current need are the need for scheduled boats to large and small Dodola islands. In addition to the necessary public facilities such as toilets, need a simple dock, drinking water needs and home stay. The promise of local water utility companies to improve water service performance has not yet materialized. The current quality of water have not feasible in the consumption of the citizens. The bad performance of the company re-appear citizen's complaints.<sup>37</sup>

Bank Tabungan Negara can contribute to the development of tourism in Morotai in accordance with the competencies. Suppose, they can build a home stay on the island that has a clear sea and a beautiful white sandy beach. Foreign tourists will come if there are home stay or hotel. Furthermore, PT Morotai Jababeka is positive about developing a priority destination in Morotai. Furthermore, PT Morotai Jababeka is positive about developing a priority destination in Morotai. They will collaborate with executives from Taiwan to build amenities and attractions in an area of 1,200 hectares. This location is already a Special Economic Tourism Area. The big picture is developing the agriculture, fishery, and trade industries, including cooperating with Taiwanese technology. Fisheries and agriculture. Collaborative development began to be designed program. Jababeka who succeeded in developing Cikarang industrial area to become the largest in Southeast Asia invited Taiwan investors to build tourism schools in Morotai and train local employees. They will grow the business in the Morotai area gradually. In the initial phase, they will build 10,000 homes for a middle class targets, and a hotel of 10,000 rooms. Furthermore, the company will build a place of tourism, schools to supply human resources there.

As abovementioned, it is important to develop tourism infrastructure to support SCT in Dodola. Moreover, social learning became the second priority that should make accordingly improving the competitiveness of Dodola coastal tourism. There are so many

coral reefs around Dodola coast become marine tourism. The stakeholder had to learn about the utilization of coral reefs enhanced the performance of SCT. It had ecological, economical, and social benefit.

## Coral reefs

The types of coral reefs found on this island are *Acropora polifera*, *Acropora Hyacinthus*, *Porites nigrecens*, *Pocillophora verrucosa*, *Porites lutea*, *Porites lutea*, *Porites nigrecens*, *Pectinia lactuca*, *Seriatophora caliendrum*, *Stylphora pistillata*, *Sunilaria sp.*, *Sarcophyton sp.*, and *Favites abdita*. They have great benefits of human life and the environment. It is not just a place to live and develop marine biota. It has functions and roles that cannot be underestimate for the environment and for human life as a whole both on the sea, coastal, and on land.

Benefits of coral reefs are socially supporting educational and research activities. Coral reefs are useful in educational activities especially to recognize coastal ecosystems, recognize marine plants and animals, and love nature education. In addition, coral reefs also play a role as a research tool. Furthermore, the community can use coral reefs with their beauty as recreation facilities. These are the various roles and benefits of coral reefs for both ecological, economic, and social. Given the amount of benefits that can be feel by humans either directly or indirectly. It needs to be preserved. Similarly, if coral reefs damaged, they need rehabilitation efforts. The damage could be a coral reefs bleaching.

The process of coral reef formation is from limestone, which had produced by coral. The reefs had formed into sedimentary limestone rock deposits in the ocean. Corals are animals that produce lime for the skeletons of their body. As the number of thousands of corals forms a colony, they form a reef. Coral reefs can also grow very well in very clear and shallow water conditions. With a good depth of seawater for coral reefs, grow no more than 18 meters deep. Moreover, if it growth deeper than the water surface, it was not good. In addition to having these conditions, coral reefs also have salinity conditions in high seawater. Therefore, the coral reefs are very difficult to live near the river estuary. That the salt contented in the seawater is less due to the influx of river water into the sea. Coral reefs must be protecting from damage and extinction. It has many uses. The benefits of coral reefs can have economic, ecological, or socioeconomic properties.

Broadly speaking, the functions and benefits of coral reefs for the environment and humans can be range of three groups, namely ecological, economic, and social benefits. Ecological benefits mean the role of coral reefs in the mutual relationship between living things and their environment. Ecology had interpreted as a reciprocal relationship between living things and the environment. Therefore, the benefits of coral reefs ecologically mean the role and function of coral reefs for the natural environment and for other marine biota. The environment can be a habitat around the coral reefs located globally. It is including coastal and inland areas.

The description of the benefits of coral reefs (a). Benefits of the economy that it is a source of food, sources of drugs, and as a marine or marine tourism object. (b). Ecological benefits, namely the suppression of seawater waves that can result in abrasion on the beach. (c). Benefits of the socio-economic, which is a source of fishery cultivation that can boost the income of the anglers. In addition, coral reefs can also be an attraction in marine tourism objects that can increase the incomes of residents in tourism areas along the coast.

## Economical benefits

The benefits of coral reefs economically, directly or indirectly, are the economic source of the community. The economic benefits of coral reefs are the source of food, the source of basic ingredients in medicine and cosmetics. As a tourist attraction of the sea, the source of livelihood, and the source of seedlings cultivation.

As a food source indirectly, coral reefs become part of the food chain of other marine animals such as fish and other marine animals. In addition, it becomes a place to live and breed a variety of marine biotas. Humans then use not a few of these biotas as a source of food. Like seaweed that made jelly, various types of fish, shrimp, crab, and sea cucumber. Furthermore, it also serves as a source of basic ingredients of medicine and cosmetics. Various types of algae had utilized in the manufacture of cosmetics and capsule wrapping materials. Various marine animals had known to have chemical compounds that are useful as an antibiotic, anti-inflammatory, and anti-cancer. In addition, it had believed, there are many more types of marine biotas that has not been explored its potential. In this island, there are groupers, white snapper, napoleon fish, marine ornamental fish, lobster shrimp, pearl shells, and seaweed.

Capture fisheries produce various types of catches, in the form of high economic value fish such as big pelagic fish such as Cakalang (*Katsuwonus pelamis*), Tuna (*Thunnus spp.*), Tongkol (*Euthynnus spp.*). Besides, there are small pelagic species such as Kembung (*Rastrelliger*), Layang (*Decapterus*), Tembang (*Sardinella*), Selar (*Selaroides*) and several other types of economic pelagic ads caught by fishing communities around the coastal waters. Some types of demersal fish cultivated by fishing communities. Fisheries businesspersons include Grouper (*Ephinephelus spp.*), Lolosi (*Caesio spp.*), Beronang (*Siganus spp.*), Kakatua (*Scars spp.*), Kakap (*Lates spp.*).

In addition to the types of fish resources, several types of resources have high economic value and had utilized by fishing communities in coastal areas and small islands, such as the types of crustaceans, sea cucumbers (*Holothuroidea*), mollusks and seaweed. The fishing equipment used by most anglers in the North Halmahera region is traditional, such as nets and other fishing gear, equipped with fishing facilities such as boats / motor boats.

The extent of coastal and marine areas with water quality allows for the development of marine aquaculture, especially grouper, lobster, seaweed and pearl. Sloping coastal types of some areas. The availability of the quality fresh water supply is one of the land suitability for the development of brackish water cultivation. Even some areas have a source of quality fresh water as an alternative to the development of freshwater aquaculture.

Previously, tourists saw a part of the whale shark (*Rhincodon typus*) and shark hammerhead (*Sphyrna sp.*) on the island. It obtained from local anglers. They caught the shark in March-April 2015. Sharks had found by them on various types of contours from the plains (Ariman Point, Gurango Terminal, and Gurango Market). Its located around the same coral reefs between the islands of Matita and Cape Dahegila. The moderate slope-flat sharks (Blacktip Point, Niomi Point, Big Fish and Bells) are found in islands In the village of Wawama at a depth of  $\pm$  18 meters, the gray coral shark was found only five times in different locations. Local angler found four of these sharks in the riverbed contour waters of the island.<sup>35,38</sup>

## Ecological benefits

Ecologically, coral reefs have the benefit of life support, a high

source of biodiversity and coastal's protection. The ecosystems can be protected, and reduce global warming. As a life-support, coral reefs directly support the lives of different types of living things that are in the vicinity. Coral reefs provide shelter, feeding, and breeding for a variety of marine biotas. Damage to coral reefs can directly affect the survival and sustainability of various animals and plants with the sea.

As a source of high biodiversity, coral reefs become ecosystems with the highest biodiversity compared to other marine ecosystems. With high levels of biodiversity, coral reefs are a source of genetic diversity and species. Genetic diversity has led to the discovery of a diversity of living masses that have higher survival rates. In addition, species diversity means more types of biota that had been utilizing. Furthermore, coral reefs can minimize wave energy that leads to land. This energy had further reduced by the presence of seagrass and mangrove forests. Therefore, the waves do not damage the beach or cause beached abrasion and coastal ecosystems had been protect. However, coral reefs can reduce global warming. CO<sub>2</sub> gas is absorbed by seawater. Through chemical reactions and rocks, CO<sub>2</sub> had converted into a limestone reef raw material. In the process referred to as this calcification, corals had aided by zooxanthellae, a single-celled planted that lives in coral tissue.

## Social benefits

As a tourist attraction, the beauty of coral reef ecosystems to amaze the tourists. Coral reefs had used for marine parks, snorkeling, diving and other marine tourism. Furthermore, it also provides benefits of coastal communities as a source of their livelihood. The existence of coral reefs supporting the economy of the surrounding community. The community has a good livelihood as anglers, seaweed farmers, and so forth. The development of coral reefs into tourist objects was able to create various jobs of the community. Their professions ranging from tour guides, lodging, boat rentals, food stalls and souvenirs, as well as other professions. Moreover, it also supports the source of seedlings cultivation. Various types of fish, sea cucumbers, and seaweed that live on coral reefs can be use as seed for cultivation.

## Conclusion

This study provides useful recommendations of all stakeholders. They had to prioritize the settlement of tourism infrastructure and enhanced infrastructure development by using sustainable development technology. The local government socialized the management of coastal and marine resources in a sustainable manner. It needed coastal superiority - marine management policy plant based on the concept of SCT that guided them to improve the performance of SCT's destinations on the island. Furthermore, they had improved the social learning and knowledge of tourism management techniques in the coastal and marine areas. It increased gradually by collaborating with entrepreneurs from Taiwan who will teach local communities and stakeholders in the development of fish farming, agriculture, tourism and the banking industry. This can improve the performance of human resources, infrastructure, financial management, fisheries, and agriculture coastal communities. All that will increase the economic contribution to them and the local government. The immediate impact, the tourists satisfied with enjoying their vacation to the island. Moreover, access to reach the tourist destination became easier. However, they could improve the performance of SCT by realizing of infrastructure and educational or training facilities. It enhanced the competitiveness of SCT in Dodola coast.

## Implication

Recommendations made, in the long term can be felt benefits,

especially for local communities. They are easy to get knowledge - information related to sustainability. The main thing is they can realize the target of their daily life. These activities can increase business opportunities and work in the tourism sector in a sustainable manner.

### Limitation of study

Due to time and cost constraints, research on the conservation of coral reefs and marine biota can further contribute important information for coastal tourism in a sustainable way in the future.

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### Conflicts of Interest

None.

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