



## Coral Reef Transplantation Towards Ecotourism on Pramuka Island

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### ABSTRACT

Indonesia is a country with high biodiversity. However, Indonesia also has the second highest rate of biodiversity decline in the world. Coral reef ecosystems are highly productive ecosystems that play an important role in terms of ecology and economy. One of the ecological conservation efforts that have been carried out by the community in the tourism sector on Pramuka Island is implementing the concept of ecotourism. Ecotourism is tourism with environmental and educational principles, and can be realized in natural environment restoration activities. One of the coral reef ecosystem restoration activities that has long been carried out on Pramuka Island is coral transplantation. 39% of tourists were satisfied with the concept of ecotourism. These tourists stated that the concept of ecotourism was appropriate to be applied in society, because it was considered capable of improving many sectors such as tourism and the economy, as well as improving ecological conditions for the better in a sustainable manner. There are several communities on Pramuka Island that are involved in the ecotourism sector, one of which is the Smiling Coral Indonesia (SCI) group. One of SCI's flagship programs is coral reef restoration based on sustainable tourism. Ecotourism can strengthen the community's economic sector, one of which is creating jobs. This means that ecotourism has two important roles that have good potential to be developed. Ecotourism has a positive impact on the ecosystem and is one of the community's economic resources.

**Keywords:** Coral reef ecosystems, coral transplantation, economic development, ecotourism, sustainability

## INTRODUCTION

Indonesia is a country with high biodiversity (Latupapua and Sahusilawane 2023). However, according to Setiawan (2022), Indonesia is also the second country with the highest rate of biodiversity decline in the world. Thus, an effort is needed to preserve the diversity of flora and fauna in Indonesia, one of which is the creation of national parks (Rhma 2019). There are 56 national parks in Indonesia, and one of them is the Thousand Islands National Park. The Thousand Islands National Park (TNKpS) is one of the protection and preservation areas for coral reef ecosystems in Indonesia (Suci *et al.* 2021). Pramuka Island is one of the islands in the Thousand Islands which is famous as a center for conservation, research, and monitoring of coral reef ecosystems in Indonesia. Apart from being a center for aquatic ecology studies, Pramuka Island

is also famous as a marine tourism destination (Agustin *et al.* 2022).

Coral reef ecosystems are highly productive ecosystems that play an important role in terms of ecology and economy (Ramadhan *et al.* 2016). Areas with high levels of development and tourism activities tend to be more at risk of experiencing a decrease in the percentage of coral cover (Indrabudi and Alik 2017). Tourism activities such as snorkeling activities have the potential to put pressure on coral reef ecosystems due to direct contact from tourists (Akhmad *et al.* 2018). One of the ecological conservation efforts that have been carried out by the community in the tourism sector on Pramuka Island is implementing the concept of ecotourism.

Ecotourism is tourism with environmental and educational principles, and can be realized in natural environment restoration activities (Lasaiba

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2022). One of the coral reef ecosystem restoration activities that has long been carried out on Pramuka Island is coral transplantation. Coral transplantation is a rehabilitation effort with the aim of accelerating the growth and spread of coral reefs in an area (Nurman *et al.* 2017). The concept of ecotourism has not been implemented optimally, this can be seen from the lack of knowledge and understanding of tourists about ecotourism and activities such as coral transplantation. coral transplantation. Through this research, an overview of ecotourism from the point of view of ecotourists and general tourists is presented with the aim of providing information and knowledge to readers about the added value of ecotourism on Pramuka Island which affects from an ecological and economic perspective, especially in coral transplantation activities.

## MATERIAL AND METHOD

### Time and Location

This research was conducted in the Thousand Islands National Park area, precisely on Pramuka Island, Panggang Island Village, North Thousand Islands District, Thousand Islands Regency, DKI Jakarta. This research was conducted on July 24-31, 2023.

### Research Methods

#### 1. Primary Data

Primary data sources were obtained from interviewees using in-depth interview techniques. Questions in the interview were arranged based on certain topics whose answers were used as basic information for the discussion (Firdaus *et al.* 2023). Interviews were conducted using instruments in the form of questionnaires and interview guides. Primary data collected included interviewees' perceptions of ecotourism, the role of stakeholders in ecotourism development, and the role of coral transplantation in coral reef ecosystems and sustainable economies.

According to Obilor (2023), the respondent selection method used purposive sampling. There are three categories of interviewees in this research. First, the resource person is a local stakeholder who is directly involved in ecotourism activities on Pramuka Island, namely Smiling Coral Indonesia (SCI). Smiling Coral Indonesia is a local community that carries out a movement concerned with environmental conservation. The second category is local stakeholders who regulate and support the development of ecotourism on Pramuka Island, namely TNKpS. And the third

category is outside tourists who come to visit Pramuka Island.

Num	Resource Person Category	Number of Respondents (person)
1.	<i>Smiling Coral Indonesia</i>	3
2.	TNKpS	1
3.	Tourists	13

#### 2. Secondary Data

Data on research can be complemented and strengthened with data from previous studies (Nahnudin *et al.* 2023). Data sources are obtained by literature study or library research. Literature studies are in the form of data presented in scientific journals, books, and stakeholder institutional data. In this research, the relevant stakeholders are Smiling Coral Indonesia and TNKpS.

### Data Analysis

This research uses a qualitative approach with a descriptive analysis method. Qualitative research focuses on an in-depth understanding of a problem to find solutions to research (Abdussamad 2021). Furthermore, the data is processed and presented descriptively, meaning that it is arranged in the form of words and language in a special natural context (Adlini *et al.* 2022). From the data presented, inductive conclusions are drawn, namely facts from specific phenomena that can be concluded in general (Sari 2016).

## RESULT AND DISCUSSION

Thousand Island is located at the coordinates 106°19'30" - 106°44'50" east longitude and 05°10'00" - 05°57'00" south latitude in the northern part of the Java Sea. South latitude in the northern part of the Java Sea. According to the Decree of the Director General of Natural Resources and Ecosystem Conservation Number: SK.386/KSDAE/SET/KSA.0/9/2016 states that there is a zoning division of the Thousand Islands National Park area including the core zone, marine protection zone, utilization zone I, and utilization zone II. Based on its geographical location, Pramuka Island is included in utilization zone II. Utilization zone II is an area

that has potential natural resources that support the development of the tourism sector, as well as community empowerment such as traditional scale fisheries and coral transplantation.

## Result

### General Tourists Views on Ecotourism

#### Knowledge about Ecotourism

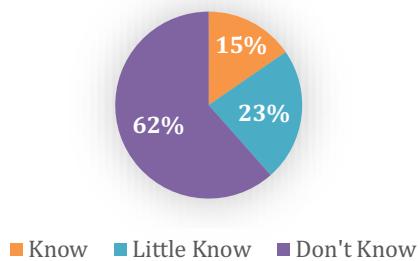


Figure 1 Percentage of tourists knowledge level on ecotourism

The diagram presents the percentage value of the grouping of respondents' answers when given questions about ecotourism knowledge in general. The results obtained are 62% of tourists do not know about ecotourism, 23% of tourists know a little about ecotourism even though it is only limited to the definition, and another 15% know about ecotourism.

#### Level of Satisfaction with Tourism

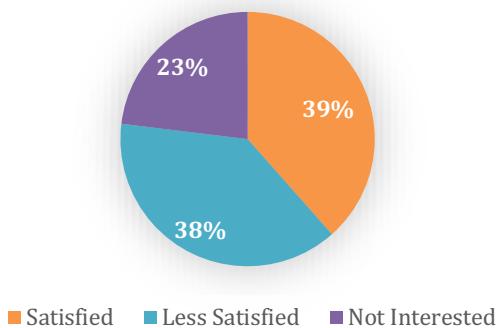


Figure 2 Percentage level of tourist satisfaction with tourism on Pramuka Island

The diagram above presents the percentage value of the results of grouping respondents' answers regarding the level of effectiveness of the ecotourism concept. This opinion was collected after the respondents were given a brief explanation

of the concept of ecotourism, especially those on Pramuka Island. The results obtained stated that 39% of tourists were satisfied with the concept of ecotourism.

### A. Role of Stakeholders in Ecotourism Development

Local community of Pramuka Island has an awareness of the importance of conserving coral reef ecosystems, which is then realized through a community of people who care about the environment. There are several communities on Pramuka Island that are involved in the ecotourism sector, one of which is the Smiling Coral Indonesia (SCI) group. SCI is a community engaged in science, marine, nature conservation, and sustainable tourism development since 2010.

### B. Coral Transplantation as Ecotourism to Coral Reef Ecosystems

Coral transplantation has added value in the ecological sector, namely to restore the condition of coral reef cover (Ramadhan *et al.* 2016). Tanjung Elang is one of the cultivation areas owned by the Smiling Coral Indonesia (SCI) community.

### C. Coral Transplantation as Ecotourism towards Sustainable Economy

Table 1 SCI profit estimation

Year	Area (m <sup>2</sup> )	Modals (%)	Price (rocklife)	Profit Estimation
2022	300	36%	500.000	96.000.000
20xx	5.000	36%	500.000	1.600.000.000

The table presents one example of the estimated benefits that SCI will get if ecotourism activities, especially coral transplantation, continue to be carried out in the future. This means that ecotourism shows prospects that can support the economy in a sustainable manner, especially for SCI members themselves.

## Discussion

### General Tourists Views on Ecotourism

According to law number 10 of 2009 concerning tourism, tourists are people who do tourism. Pramuka Island is one of the tourist destinations with a variety of tourists who come to visit for work, research, and regular vacations. General tourists' understanding of ecotourism on Pramuka Island is still relatively small and uneven.

According to a statement from the TNKpS, initially the empowerment related to ecotourism carried out focused on the local community of Pramuka Island first with the aim of strengthening internal awareness.

These tourists stated that the concept of ecotourism is suitable to be applied in the community, because it is considered capable of improving many sectors such as tourism and economy, as well as improving ecological conditions for the better in a sustainable manner. According to TNKpS, there are several efforts that have been made to develop ecotourism on Pramuka Island. For example, introducing ecotourism early on through counseling to school children to local tour guides, so that people on Pramuka Island are evenly familiar with this tourism-based conservation concept. However, on the one hand, ecotourism branding, especially on Pramuka Island to outsiders, is still considered uneven. This can be seen from the percentage value of 38% of tourists feeling dissatisfied with the concept of ecotourism on Pramuka Island. Specifically, these tourists feel unfamiliar with the concept of ecotourism, even though ecotourism has actually existed and is quite developed on Pramuka Island. Therefore, ecotourism branding must be further improved in the future.

Solution is needed that can reduce the percentage value if currently 23% of tourists are still not interested in ecotourism. For example, by marketing ecotourism activities online on social media platforms. Through digital marketing, the ecotourism market will be wider and more developed (Rhama 2019). One of the ecotourism activities that has great potential to become a tourist attraction on Pramuka Island is coral transplantation. Based on the research, there was one respondent who was interested in knowing more about coral transplantation on Pramuka Island.

### ***Role of Stakeholders in Ecotourism Development***

Ecotourism development is considered successful when the concept implemented is in accordance with the plan and all parties involved play their respective roles optimally (Lubis *et al.* 2023). SCI is an example of a community that is considered to have succeeded in maximizing the concept of ecotourism because it is able to manage funds independently and sustainably for activities carried out, especially coral transplantation. Coral transplantation is an effort to multiply coral colonies through asexual reproduction with the aim

of accelerating the regeneration of damaged corals (Paulangan *et al.* 2023). One of SCI's flagship programs is coral reef restoration based on sustainable tourism. The principle of sustainable tourism is the optimal use of natural resources for tourism development but still prioritizes the balance and preservation of natural ecosystems (Yoeti and Gunadi 2013).

### ***Coral Transplantation as Ecotourism to Coral Reef Ecosystems***

Based on the ecological data obtained, the percentage of coral cover at the Tanjung Elang observation station is in the poor category at 14.20%. However, this value is better when compared to the condition of the coral reef ecosystem in Tanjung Elang seen from the percentage of hard coral cover in 2019 which amounted to 5.35% (Hermansyah *et al.* 2020). The condition of a coral reef ecosystem can be seen from the distribution of live coral cover in the area (Sinaga *et al.* 2023). Live coral cover in an area can experience a periodic decline due to external threats that affect faster than the rate of recovery (Permana *et al.* 2020). This shows that in Tanjung Elang Pramuka Island there is actually an effect of coral transplantation carried out, although it takes more time to recover as a whole (Riyantini *et al.* 2023).

### ***Coral Transplantation as Ecotourism towards Sustainable Economy***

Coral transplantation activities also play a role in the development of the ecotourism sector. Ecotourism is a tourism activity with the principle of prioritizing the environment and education, and knowing preventive actions to prevent damage to natural ecosystems (Asy'ari *et al.* 2021). So, from what was previously limited to marine tourism, it finally developed into the concept of marine ecotourism. Ecotourism can strengthen the community's economic sector, one of which is creating jobs (Angela 2023). For example, the local community of Pramuka Island who are members of SCI. SCI members have different backgrounds ranging from undergraduate to high school graduates. There are SCI members who have other jobs outside of membership such as fishermen and tour guides. Through SCI, members are fostered and facilitated to become human resources who care about the environment and are skilled, especially in transplantation and monitoring of coral reef ecosystems.

One of the coral transplant media developed by SCI is rocklife media. Rocklife utilizes coral rocks

(massive dead coral) as a medium for coral placement and to put corals into place, cement and salt mixture are given. This method can accelerate the coral recovery process (Subhan *et al.* 2022). There are 6-8 coral seedlings that can be placed on one rocklife media. In addition, SCI also facilitates visitors who are interested in adopting corals with the paralon method, which can be placed up to 16 coral seedlings on each media.

According to SCI's data for the past 3 years, it can be projected that the allocation of group income funds is 59% from coral transplantation ecotourism activities, and 36% is capital used as the cost of coral transplantation activities including module construction to maintenance or monitoring of coral transplantation results, and the remaining 5% is used as a fund for preserving natural ecosystems. SCI has a cultivation area of 10 hectares in Tanjung Elang, Pramuka Island, and 5 hectares specifically for coral transplantation. Currently, the cultivation area that has been transplanted corals in Tanjung Elang is 300 m<sup>2</sup> or 0.03. If the area of one coral transplant medium is 1m × 1m, then the net profit obtained by the ecotourism actor group on coral transplantation activities can be projected.

It is only a preliminary overview, as it does not include all options that can be offered to increase profits such as mangrove planting services and others. SCI's cultivation area is not only on Pramuka Island, but also on other islands such as Panggang Island and Karang Bongkok (Laguna Village). If ecotourism continues to grow, then the potential for expansion of cultivation areas for coral transplantation ecotourism will be even greater.

## CONCLUSION

Ecotourism is able to bring the tourism and economic sectors into a more environmentally friendly concept. This means that ecotourism has two important roles that have good potential to be developed. Ecotourism has a positive impact on the ecosystem and is one of the community's economic resources.

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