

# Exploring the Impact of Gili Ayer, Gili Meno and Gili Trawangan Marine Protected Area From Resource Users Perspective

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## ABSTRACT

The establishment of a Marine Protected Area (MPA) is one strategy to manage potential marine resources. Managing a multiple-use MPA can be challenging, as it should have benefit for both human beings and the environment. The MPA management plan and zonation in Gili Matra MPA was enacted in 2014. Local communities in Gili Matra depend on the MPA for their livelihood in the fisheries and tourism sectors. Resource users' perception potentially to be used as the cornerstone for the management of the MPA. In this research, the socio-economic benefits of Gili Matra MPA post the zoning implementation are assessed from the resource users perspective. Questionnaires were used as the main instrument to collect the primary data. The respondents were local communities (53 fishers and 52 marine tourism operators) who lived in Gili Matra. The result from this research showed different perceived benefits in Gili Matra MPA between two groups of users, which can provide important information to improve the management in the future.

*Keywords: Gili Matra; Marine Protected Area, Community; Perception*

## 1. INTRODUCTION

There is a great interest in the establishment of Marine Protected Areas (MPAs) in many countries, including in Indonesia, as one of the strategies for managing marine resources. Gili Matra (Gili Meno, Gili Ayer and Gili Trawangan) is one of Marine Protected Areas in Indonesia which is being developed for marine tourism by using conservation principles. It is categorized as Marine Tourism Park and category V in [1], [2] categories [3].

The main goal of a MPA, including Gili Matra MPA, is to have benefits for both the environment and human beings [4]–[6]. However, the sustainability of MPA depends on its management system. Regarding the engagement of stakeholders in the management, local communities are a key stakeholder in the management of MPAs. Fishers and marine

tourism operators (resource users) are included as main stakeholders of Gili Matra MPA and are essential for the management of the Gili Matra ecosystem [7].

The Gili Matra MPA management plan and zonation has been enacted since October 2014, which regulates activities that may, or may not, be carried out within the MPA area [8]. Monitoring of fishers and marine tourism operator's perception towards Gili Matra MPA after the implementation of a management plan and zoning system in 2014 can become part of regular evaluation. Besides, it can measure the achievement of the goal; the resource users can also provide feedback for the current management system [9]–[11].

Bennett [11] stated that the study of community perceptions toward MPA management could deliver at least four types of

information for MPA managers. This included information about "social impacts of conservation, ecological outcomes of conservation, legitimacy of conservation governance, and acceptability of conservation management" [11, p.4]. Thus, this paper aims to explore the socioeconomic benefit of Gili Matra MPA from resource users perspective after four years of zoning implementation as a lesson learned.

## 2. METHODOLOGY

### A. Research design

The duration of the research was three months in total, consisting of one month for preparation and two months for data collection from October to December 2018. The study was conducted in Gili Matra MPA, Lombok Utara District, Nusa Tenggara Barat Province, Republic of Indonesia (Figure 1).

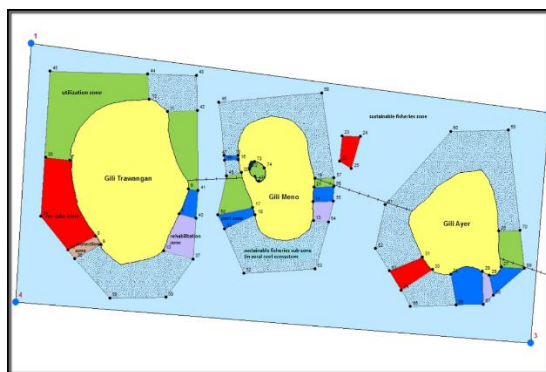


Fig. 1. Study Area consisting of Three Gili Islands [8], [13]

The population for this study was fishers and non-fishers (diving and snorkelling tourism service providers in the

Gili Matra MPA) who lived in the study site. Fishers and marine tourism service providers (non-fishers) were chosen because these two groups are the main stakeholder groups in the management of the Gili Matra MPA [7]. The target number of respondents from fishers and marine tourism service provider respondents was 53 and 52, respectively. This study also applied a purposive sampling technique to provide a representative sample for evaluating purposes [14] with the primary criteria being whether the respondent has worked in that area for at least five years before the date of the survey. All respondents were also screened for whether they know or did not know that Gili Matra is MPA.

### B. Research variable

The selection and measurement of indicators for this research is adapted from IUCN's guidelines for Evaluating Marine Protected Area Management Effectiveness [4], [15] and Evaluating effectiveness: A framework for assessing the management of protected areas [16]. Based on IUCN's guidelines, there are three categories of indicators: biological, socio-economic and governance [4], [15]. However, in this paper, the indicators focused on socioeconomic as it related to the benefit of MPA for the target groups. The target groups are direct users of the MPA and gain benefits from its utilization. Another consideration for selecting indicators is based on research that has previously linked the variables with socioeconomic indicators [4], [15], [17]–[21].

### C. Data Collection and Analysis

The research variables for this study were assessed using a semi-structured questionnaire, which consisting of both close-ended and open-ended questions which were delivered in the Indonesian language. Respondents were asked three questions related to the socio-economic benefits of the Gili Matra MPA after the zoning system was implemented (Table 1). The numerical data set was then analyzed using SPSS 22.0 to produce general descriptive and percent frequency response data from the survey responses. The final score for each indicator, representing the perceived benefits from the MPA, was derived by calculating the percentage of the obtained score divided by the maximum score [22], [23]. A higher score or percentage represents higher perceived benefits of the MPA to the community.

Table 1 Socioeconomic Indicators

Indicators	Description
Increasing value	Respondent's perception of the personal benefits of the MPA to increasing value (fish catch or tourism value) Yes = 1 No = 0
Financial benefit	Respondent's perception of their personal financial benefits from the MPA Yes = 1 No = 0
Equality in benefit	Respondent's perception that the MPA has the same effects on all people in the community Yes = 1 No = 0

The final score of achievement is the percentage of the obtained score over the maximum score [22], [23]. The composite score was not assumed to represent a latent variable [21], [24]. Non-statistical analysis, using content analysis, was used to classify all open-ended responses [14], [25]. As well as supporting the results of statistical analysis, the content analysis study aims to present the strengths and challenges in the management of Gili Matra MPA. The indicators measured

the impact of MPA after the zoning rules are implemented; thus respondents were informed that the assessment is limited to the period between 2014 and 2018, was done so that their perceptions related specifically to the period post-implementation.

### 3. RESULT AND DISCUSSION

All fishers (N= 53) perceived that after the implementation of the zoning system, the MPA had no direct impact on their fish catch. In contrast, 75 % of marine tourism providers (N=52) believed that the MPA had positive impacts on improving tourism value. Regarding economic benefits, the majority of fishers (74 %) reported that the MPA had no impact on increasing their income. The majority of fishers (74 %) also reported that the benefits of the MPA were not equally perceived. In contrast to fishers' perceptions, the majority of marine tourism operators perceived that there were financial benefits from tourism activities in the MPA (Table 2).

Table 2 Percent of resource user responses to the perceived benefit and equality benefit of the MPA

		Fishers N = 53		Non-Fishers N = 52		Total N = 105	
			%		%		%
Increasing value	No	53	100%	13	25%	66	63%
	Yes	0	0%	39	75%	39	37%
Financial benefit	No	39	74%	14	27%	53	50%
	Yes	14	26%	38	73%	52	50%
Equality of benefit	No	39	74%	16	31%	55	52%
	Yes	14	26%	36	69%	50	48%

Perceived benefits of Gili Matra MPA on socioeconomic are mixed. It has had fewer positive responses on fishers, and more positive responses on tourism, on all three indicators, resulting in an overall 50% achievements in equality share of benefit among respondents.

According to Eriksson et al. [26], the main utilization of Gili Matra MPA were small scale fisheries and marine tourism. Since then, however, the marine tourism activity has likely dominated the utilization on Gili Matra, as evidenced by the different proportions of the population associated with each activity. Based on the results of a household surveys in Gili Matra in 2017, it showed that from total of 116 respondents in the survey, more than half (51.35%) of respondents depend on the tourism sector (for example marine tourism services, hotel industry, shopping centres and restaurant) for their livelihood and only a small percentage (9.01%) of respondents depend on the fisheries sector [27].

Providing an equal distribution of Gili Matra MPA benefits on all people in the community, with two contrasting user types in MPA utilization, would be challenging. Measuring the perceived benefits of MPA is suggested to become an iterative process in the management of MPA to gain input and feedback from the primary stakeholder in an MPA [11].

Analysis of the results of open-ended questions is divided into two categories, namely, the reasons for positive responses and the reasons for contra responses (Table 3).

**Table 3 Categories of Responses**

Contents Meaning Units	
Reason for "Yes" responses	Reason for "No" responses
<ul style="list-style-type: none"> <li>The MPA protects the attractive habitat allowing the coral reef ecosystem to recover, protects the diversity of biota, which is an essential asset for tourism in Gili Matra;</li> <li>Gili Matra MPA is a tourism asset thus the utilisation of the MPA can provide employment opportunities and income sources for the local community;</li> <li>The zones in Gili Matra are multiple-use areas for both fishing and tourism activities at the same time</li> <li>Fishers could catch fish outside the Gili Matra MPA;</li> <li>No-take zones were established to aid recovery in the fish population, which is beneficial for both fisheries and tourism.</li> </ul>	<ul style="list-style-type: none"> <li>The MPA has limited fishers' access to their fishing grounds;</li> <li>Fishing activities compete with tourism activities in the fisheries zone;</li> <li>Competition from other fishers who originate from outside three Gili islands;</li> <li>The number of fish caught is related to other factors such as natural factors (related to the season)</li> <li>There were other reasons for tourists to visit Gili. It is not only because of the value of the underwater scenery but also the tranquillity of the small islands and the safety, hospitality and facilities on the island.</li> <li>The impact of the MPA is more favourable for tourism</li> </ul>

All positive responses indicate optimism from resource users in Gili Matra toward the management of the MPA, which needs careful analysis to interpret [28]. The positive responses of the respondents showed the potential strength and opportunities for the management of Gili Matra MPA, for example viewing the MPA as an asset that should be preserved shows the importance of MPA for resource users. Contra responses may indicate management challenges, as well as aspects that might need improvement.

Although the results of this study cannot be assumed to represent the situation in other MPAs, the socioeconomic impact in Gili Matra, specifically for fishers as extractive users, consistent with those shown in other MPAs such as in Thailand. The local communities around 17 MPAs in Thailand perceived less impact on the implementation of MPAs for their livelihood because it decreased their access to the utilization of natural resources [9].

Perceived impact in socioeconomic may not be similar to the actual impact; the strong dichotomy in responses to socioeconomic benefits is in itself is useful for managers [9]. The results presented in this study point to a complex relationship between fishers and marine tourism operators in Gili Matra, and also resource users from outside Gili, in the implementation of zoning rules. The challenges in the management of Gili Matra are not only synergising the two utilization segments, fisheries and tourism,

but also on how managing the access between local users and outsiders.

It is worth to acknowledge that in most analysis of the indicators on this research, resource users were considered as one group to allow for adequate sample sizes for analysis. The aggregation of data precluded more detailed comparative analysis of individual user groups [18] based on their location (Gili Meno, Gili Air and Gili Trawangan) and main occupation (fishers, dive operator, snorkelling operator and boatman). Thus, the result cannot be applied specifically for those different groups.

#### 4. CONCLUSIONS

Having more than one mandate which should be attained, the achievement of Gili Matra MPA may indicate reasonable progress during the implementation of MPA zoning regulations. This research showed the importance of community involvement in the assessment process. It is suggested to integrate the result of scientific research and local knowledge perspectives to evaluate the progress of MPA in the future.

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