

Ecotourism and Coral Reef: Analysis of Coral Reef Conservation Awareness among Stakeholders in Perhentian Island, Malaysia

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Abstract This study assessed stakeholders' level of awareness and involvement in coral reef conservation activities in Perhentian Island, Malaysia. A total of 200 respondents consisting of the Besut District Department of Marine Parks (Terengganu) staff, local entrepreneurs and tourists were selected to answer the survey questionnaire. The findings revealed a difference in the level of awareness among stakeholders, with the Besut District Department of Marine Parks (Terengganu) staff has the highest level of awareness, on eco-touristic activities that threaten coral reefs and the issue of coral reef bleaching. Although the three groups of stakeholders have shown high level of awareness on the importance of coral reefs conservation activities in Perhentian Island, majority of them were uncertain about their involvement in conservation efforts due to conflict of interest between economic empowerment and their aim towards sustainability of coral reefs.

Keywords Awareness, Coral reef conservation, Stakeholders, Malaysia

1. Introduction

Recent years have seen the continuous and rapid growth of the tourism industry that could be equally compared to the growth of globalisation. Most countries are actively trying to promote their natural resources to the world, and Malaysia as a centre of mega-biodiversity is no exception in the development of ecotourism industry to attract the attention of both local and foreign tourists.

Based on the year 2011 official statistics by the Ministry of Tourism Malaysia, 24.6 million foreign tourists whom had visited Malaysia had contributed RM56.4 billion to the national income (*Utusan Malaysia*, November 1, 2011). This amount had excluded the number of local tourists who had also visited the various tourist locations in Malaysia. Under the Malaysia Tourism Transformation Plan 2020, the Ministry of Tourism Malaysia is optimistic of the Malaysia's tourism industry by expecting it to grow threefold with the inflow of foreign tourists targeted at 36 million by the year 2020.

Despite the economic boom generated by the tourism industry, the differences between conventional tourism and ecotourism have been contested for decades. Conventional

tourism refers to the combination of activities carried out by individuals who move and stay in a destination outside their usual environment for more than a year (World Tourism Organization (WTO), 1993). In contrast, ecotourism can be defined in a much larger context whereby its tourism activities create cultural and historical understanding within the environment that presses on issues of ecosystem care and the generation of interest in an economic form to both local people and the government into encouraging natural conservation (Goeldner, et al. 2000). Ecotourism highlighted by Miller (1978) focused on sustainable tourism, with emphasis on the conservation and preservation of the environment among tourists. Body & Bhatt (2005) pointed out that the main goal of ecotourism is to provide travellers to experience the natural, environmental education and action towards sustainability.

The different definitions between ecotourism and conventional tourism not only created a great debate among scholars, but confusion had also arisen in classifying specific areas as a location for either ecotourism or conventional tourism. This can be seen in the case of Malaysia islands. The islands were labelled as ecotourism locations, implementation of environmental protection and conservation was still low. This statement can be supported with previous studies by Tan (2000) and Chang (2009) who both discovered negative impact towards the locations' natural resources and that these degradation have occurred in islands such as Perhentian Island, Redang Island and Tioman

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Island as a result of ecotourism activities.

2. Overview of the Coral Reef Bleaching Status in Perhentian Island, Malaysia

Continuous conduction of ecotourism activities could negatively impact the marine ecosystem, especially the living coral reefs (Nishihira, 1987; Wolanski, et al., 2009). Similarly, Mathieson & Wall (1982) also agreed although ecotourism promotes environmental conservation, ecotourism activities if continued unchecked or unnoticed could negatively impact the environment.

In Malaysia, despite the fact that 38 of its islands have been gazetted as protected areas under the “Marine Protected Areas” (MPA), activities including diving, snorkelling, underwater photography, swimming, sailing and kayaking are still very much allowed. Only several heavy activities such as driving powerboats and jet skis, surfing as well as fishing are prohibited (*Website Malaysian Marine Parks Department*, 2012). Although the permitted activities are classified as mild recreational activities, in the long run, these activities could harm the coral reef ecosystems. This is due to the fact that corals are very sensitive organisms whereby anthropogenic activities could place pressure on them (Keller, et al., 2009). As an example, through diving activities, the impact between the diver and the coral reefs could cause coral bleaching and long-term damages (Walters & Samways, 2001).

This was evidenced by the closure of 12 islands in Malaysia in July 2010 due to the discovery of serious coral bleaching in three islands located within the state of Kedah, Pahang and Terengganu. The coral bleaching of coral reefs were at a critical and dangerous level in which its numbers ranged from 60 percent to the highest at 90 percent, and furthermore, they were exposed to the risk of death and extinction. Within all the listed locations, 90 percent of the coral reefs in Perhentian Island, Terengganu were faced with coral bleaching, making it the location with the highest percentage of coral bleaching. Despite it being at a critical, dangerous and alarming state, recreational activities at Perhentian Island such as snorkelling and diving continued.

The issue of coral reef bleaching in Perhentian Island is a very serious matter and is one which requires immediate conservation efforts. However, the contemporary situation has indicated that the efforts on coral reef conservation activities in Perhentian Island only focused on the action of Besut District Department of Marine Parks (Terengganu) in closing down the park during the northeast monsoon season every January, November and December. In addition, Reef Check Malaysia has also been implemented as a coral reef conservation initiative to provide education and raising awareness among residents and entrepreneurs in Perhentian Island of the importance of coral reefs.

As the status of coral reefs were at a critical stage with only ten percent free from bleaching, all stakeholders including the Besut District Department of Marine Parks

(Terengganu), the tourism industry operators and tourists who are visiting Perhentian Island should be aware of the seriousness of the matter and be involved in all coral reef conservation activities.

3. Methodology

The primary objective of this study was to assess the stakeholders' level of awareness on the impact of ecotourism activities as well as their level of awareness towards the coral reefs conservation in Perhentian Island. Stakeholders are defined as individuals or groups who have an interest in the actions of an organization (Savage et al., 1999). In the context of this study, the Besut District Department of Marine Parks (Terengganu) staff as the authority figure responsible in regulating all recreational activities in Perhentian Island, have them identified as stakeholders. Similarly, the entrepreneurs too were identified due to their interests towards the island's tourism industry which consist of operating chalets, hotels and resorts; shops and restaurants; as well as recreational activities centre such as diving and snorkelling. Finally, the tourists, without a doubt are stakeholders as they are the consumers to the various ecotourism product offerings such as snorkelling, diving and other exciting holiday attractions.

A survey was conducted by sending questionnaires to participants from all three stakeholder groups in the vicinity of Perhentian Island (small and large Island). The survey method was selected due to its suitability to involve a high number of respondents (Sekaran, 1992). Additionally, the use of questionnaire have proven to be an easier way in obtaining the needed cooperation from respondents as it guarantees confidentiality and raises the possibility for more honest responses as well as providing higher reliability standards (Yahaya, et al., 2007).

For this research, a total of 200 respondents were selected which comprised of 20 Besut District Department of Marine Parks (Terengganu) staff members, 80 local entrepreneurs and 100 tourists. As the research samples consisted of three specific categories, the determination of the number of respondents was then made based on purposive sampling.

4. Results

The first section discusses the respondents' profile as shown in Table 1. Based on the total of 200 respondents, majority of the respondents, that is 85 participants (42.5 percent), were at the age range between 25 to 32 years. In terms of origin, the east coast of Malaysia (Pahang, Kelantan and Terengganu) was recorded with the highest number of respondents with a total number of 106 participants (53 percent). As for education level, majority of the respondents were recorded possess secondary education level with a total of 73 participants (36.5 percent). Finally, majority of respondents working experience were found to be at the range between one to three years with a total of 57

participants (28.5 percent).

Table 1. Respondents' Profile

Variables	Number (person)	Percentage (%)
Ages		
17-24	70	35.0
25-32	85	42.5
33-40	28	14.0
41-48	10	5.0
49-55	4	2.0
56 and above	3	1.5
Origin		
Southern Region Malaysia	9	4.5
Central Region Malaysia	21	10.5
Northern Region Malaysia	14	7.0
Borneo Sabah & Sarawak	4	2.0
East Coast Region Malaysia	106	53.0
Europe	39	19.5
Philippines	1	0.5
United States	4	2.0
South Africa	1	0.5
Thailand	1	0.5
Education Level		
Primary School	11	5.5
Secondary School	73	36.5
Diploma	57	28.5
Bachelor Degree	39	19.5
Master / PhD	20	10.0
Working Experience		
<1 year	35	17.5
1-3 years	57	28.5
4-6 years	52	26.0
>7 years	56	28.0

4.2. The Stakeholders Awareness about Ecotourism Activities that can Threaten Coral Reefs in Perhentian Island, Malaysia

As shown in table 2, the majority of the Besut District Department of Marine Parks (Terengganu) staff, tourists and entrepreneurs were aware on the impact and threats towards the coral reefs through activities such as walking on coral reefs (mean = 4.37); the usage of boats (mean = 3.45); throwing garbage into the sea (mean = 4.55); the use of soap during shower in the beach (mean = 3.77) and reclamation

(mean = 4.02).

Table 2. Distribution of the Mean of the Stakeholders Awareness about Ecotourism Activities that Can Threaten Coral Reefs in Perhentian Island

Variables	Mean	Standard deviation
Walking on reefs	4.37	0.92
Boat usage	3.45	1.08
Diving into the seabed	3.00	1.07
Snorkelling	2.71	1.08
Disposal of garbage into sea	4.55	0.85
Soap usage during bathing in the beach	3.77	1.14
Land reclamation for the development of chalets and hotels	4.02	1.05
Total mean	4.22	1.03

Although the overall mean was seen to be higher with its value at 4.22, the scuba diving (mean = 3.00) and snorkelling (mean = 2.71) activities were less perceived or made aware of as threats towards the coral reefs to the stakeholders. Based on the two mentioned activities, the tourists were stated as the stakeholder with the lowest awareness in diving as a threat towards coral reefs, while the majority of the Besut District Department of Marine Parks (Terengganu) staff have shown little belief in the harm of snorkelling activity towards the coral reefs.

4.3. The Stakeholders Awareness about the Importance of Coral Reef Conservation in Perhentian Island, Malaysia

Based on table 3, the overall mean for the stakeholders' awareness on the importance of coral reefs conservation in Perhentian Island was high with its value at 4.06. This justified that all three stakeholders were aware of the importance of coral reef conservation. Two statements were recorded whereby the stakeholders were unsure with the first being the involvement of high cost to conserve coral reefs with a mean value of 3.35. The second statement, which was to reduce diving and snorkelling activities to conserve the coral reefs, was met with the lowest of mean at the value of 2.97.

Table 3. Distribution of the Mean of the Stakeholders Awareness about the Importance of Coral Reef Conservation in Perhentian Island, Malaysia

Variables	Mean	Standard deviation
Coral reef conservation activities must be conducted on Perhentian Island.	4.43	0.73
Education on coral reef conservation should be given.	4.35	0.69
NGOs should carry out awareness campaigns on coral reef conservation.	4.29	0.68
Without conservation, coral reef will die and extinct.	4.21	0.80
Media should disseminate information on coral reef conservation.	4.27	0.71
All stakeholders should be responsible in conserving coral reef.	4.29	0.59
Coral reef conservation activities should be improved.	4.28	0.67
The existence of "Marine Protected Areas" (MPA) is very important in protecting coral reefs.	4.32	0.81
Coral reef conservation activities can be fun.	4.05	0.71
Coral reef conservation involves high costs.	3.35	0.97
Diving and snorkelling need to be reduced for coral reef conservation	2.97	1.08
All stakeholders should be aware of the importance of coral reef conservation.	4.26	0.72
Stakeholders' involvements in coral reef conservation activities are still low.	3.67	0.83
The government should involve the stakeholders in coral reef conservation activities	4.20	0.79
Total mean	4.06	0.83

Table 4. One-way ANOVA test results to evaluate the differences awareness level among stakeholders

Awareness level		Sum of squares	df	Mean square	F- Ratio	P- value
1. Different awareness level about the effects of ecotourism activities that could threaten coral reef	Between group	628.765	2	314.382	23.087	0.000
	In group	2682.590	197	13.617		
	Total	3311.355	199			
Awareness level		Sum of squares	df	Mean square	F- Ratio	P- value
2. Differences of the awareness level about the importance of coral reef conservation among stakeholders	Between group	177.780	2	88.890	2.492	0.085
	In group	7026.600	197	35.668		
	Total	7204.380	199			

* At the significance level of 0.05

4.4. The Differences Awareness Level among Stakeholders

One-way ANOVA, F was conducted to assess the difference of the ecotourism activities awareness level that could threaten coral reefs and the importance of coral reef conservation between all three stakeholders, as shown in table 4 below. One-way ANOVA test results showed that there were differences in the level of awareness among the three stakeholders of ecotourism activities that could threaten coral reefs with $p = 0.000$ ($F = 23.087$). In contrast, there were no differences in the level of awareness among stakeholders about the importance of coral reef conservation with $p = 0.085$ ($F = 2.492$).

5. Discussion

The overall results of this study have shown that there were variations in the awareness level of stakeholders. In general, the stakeholders' awareness towards ecotourism activities as a possible threat to coral reefs was at a good level. The majority of the stakeholders were aware of the five ecotourism activities which could threaten coral reefs including walking on coral reefs, boat driving, garbage disposal into the sea, the use of soap during shower in the beach and land reclamation. These findings were in line with past studies that had shown tourism activities as one of the main factors in the declination of coral populations in Peninsular Malaysia (Mohamed, et al., 2004). Similarly, Glynn (1996) had also pointed out interference of coral reefs by either nature or human action would cause the zooxanthellae which serve as the colour pigment and the nutrient provider to the corals to die, and subsequently, the experience of bleaching by the coral reefs. Authors Barker and Roberts (2004) too further confirmed this by pointing out the coral reefs damage can be caused simply by human contact in the first ten minutes and the unintentional kicking of soil sediment into the corals.

However, the study also discovered a low awareness level within the stakeholders on the impact of diving and snorkelling activities towards coral reefs, due to the stakeholders, particularly the Besut District Department of

Marine Parks (Terengganu) staff and local entrepreneurs, being in denial of the effect. Additionally, tourists were discovered to be uncertain of the impact the activities would have towards the coral reefs. Despite the existence of denial and uncertainty within all three stakeholders, a study by Zakai and Furman (2001) in Eliat at the north of Red Sea in Israel had shown otherwise, whereby they found continuous diving activities had caused damage to external skeletal and internal tissue of the coral reefs until they turned to white and eventually die. The occurrence was due to the entering of soil sediments from the sea bed into the coral reefs caused by the contact the divers' diving equipment had with the coral reefs when the divers dove to the depth ranging from four until eight feet. Liew et al. (2001) in their research of the ecotourism site in Redang Island too had discovered that 62 percent of the divers had kicked and touched the coral reefs with their diving fins. Similarly, Talge (1991) had found snorkelling activities too had caused damage and death to the coral reefs as snorkelers with their equipments tend to touch, trample, grasp, and knocked into them.

Moreover, in the face of the very serious situation of coral bleaching at a 90 percent rate, the practice of coral reef conservation became even more important to ensure the continuous survival of the organisms. As stated by Bengen (2002), coral reef conservation undoubtedly could protect and preserve the marine life from extinction. As there are as many of 110 countries around the world with coral reefs resources (Smith, 1987), coral reef conservation activities were neither foreign nor strange.

The study had also discovered that all three stakeholders, comprising of Besut District Department of Marine Parks (Terengganu) staff, entrepreneurs and tourists, have displayed high awareness level towards the importance of coral reefs conservation in Perhentian Island. The majority of stakeholders agreed that coral reef conservation activities must be improved by way of providing education about conservation, awareness campaign from non-governmental organization (NGO), "Marine Protected Area" (MPA) protection, and the dissemination of information through media.

Despite this, the majority of the stakeholders were still uncertain towards the cost of coral reef conservation. In

reality, most conservation activities involved high cost especially the replanting of artificial reefs, organizing awareness campaigns and organizing a clean-up for both sea and beach. Following the high cost of conservation, as stated by Yacob et al. (2009) in their study in Redang Island, the conversation fee that has been charged at the rate of RM 5 per visitor should be increased. Financial support for the conservation activities were also an important agenda among environmentalists (Bjork, 2000). The contemporary situation in Perhentian Island had the authorities to collect fees from the visitors under the Fees Act 1951, in which adults were charged at a rate of RM5 per entry and RM2 for children under the age of 12 (Marine Parks Malaysia, 2003), hence there existed the need to have the fees to be managed with care and responsibility in ensuring smooth coral reef conservation.

In addition, the majority of the stakeholders had shown little awareness of the importance of the reduction of scuba diving and snorkelling activities for coral reef conservation due to two identified factors. The first factor was because the stakeholders had found the action to reduce both activities to be in the conflict of their interest. The entrepreneurs, for instance, were sandwiched between economic empowerment and their objectives and goals towards the sustainability of coral reefs. As it is, according to Hocker and Wilmot (1985), conflict would present three behavioural categories which were avoidance, competitiveness and tactical collaboration. The entrepreneurs denied the impact of scuba diving and snorkelling was due to their concern on the declination of their economic resources as a result to the reduction of both activities. Similarly, the tourists who visited Perhentian Island for scuba diving and snorkelling activities too had denied the negative impact brought by both activities.

The second factor closely relates to the educational background of the stakeholders. The study revealed that entrepreneurs were the group with the highest percentage of secondary school education. Similarly, majority of the Besut District Department of Marine Parks (Terengganu) staff were found to have only received secondary level education attainment. The medium level education was among the reasons why both stakeholders had believed that diving and snorkelling activities would not threaten the state of the coral reefs. This was very much in line to a previous study by Zarrintaj et al. (2011) whereby they had discovered the level of education affected individual awareness level towards environmental issues. Therefore, it is to be believed, that a higher education level could lead to a higher awareness towards the environment.

6. Limitations and Future Research

This study focused on only three groups of stakeholders, namely being the Besut District Department of Marine Parks (Terengganu) staff; entrepreneurs and the tourists. Therefore, future study could involve other stakeholders such as fishermen and researchers. Research on fishermen and

researchers will allow comparisons of findings as well as the expansion to the scope of existing studies. Future study can also be expanded to other islands in Malaysia especially to those that are suffering from serious coral bleaching such as Payar Island and Redang Island. In addition, future research can also look into a comparative study between the effects towards the coral reef ecosystems caused by both natural and human activities. Through these, they will be expected to provide a clearer picture to the dominant factor of coral reef bleaching and provide effective solutions towards the issue.

7. Conclusions

This study has demonstrated that stakeholders' literacy towards coral reef conservation issues exist in the study area. All three stakeholders have shown an understanding in the importance of coral reef conservation despite it being a scientific issue that was often dominated by scientists. However, it is important to take note that the findings of the awareness level varied between the three stakeholders. The study shows that educational background and interests towards the tourism industry were important factors influencing the awareness level of stakeholders. Thus, improvements in the awareness level of stakeholders are very important because the three stakeholders are the main stumps to the ecotourism industry in Perhentian Island. If this situation persists, the elimination and reduction of coral bleaching will be more difficult, and will eventually threaten the coral reefs with death and extinction. Therefore, the study suggests that all stakeholders should carry out their respective functions and responsibilities to overcome threats to coral reefs such as the coral reef bleaching problem. As its intended original definition, ecotourism industry in the island should be done in a sustainable manner.

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