

## COST-BENEFIT ANALYSIS ON MARINE PARKS IN TERENGGANU

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**Abstract:** Marine parks have existed in Malaysia for a long time, but some have neglected the economic roles these marine parks play. This research aims to find out the benefits and costs generated by the marine parks in Terengganu by using cost-benefit analysis (CBA). Through data collected from literature review, various websites and the Department of Marine Park's annual statement, it is found that the marine parks generate benefits to all constituents, but in protecting environment these marine parks faced some problems. In order to achieve these marine parks goals, based on our findings, we suggest that these marine parks increase its entry charge to keep the sustainability of these marine parks which will be benefited to all constituents.

Keywords: Cost-benefit analysis, sustainability, environmental protection, department of marine park, terengganu.

### Introduction

Environmental reporting, and its later development into sustainability reporting, has been the most important aspect of accounting and the environment, and it has been developed as a response to environmental issues, especially in the last two decades. (Gray *et al.*, 2014). This has encouraged accountancy to broaden its concept and practice into something new to fulfil the demand of accounting practices of the living environment. Nowadays, some people do not care about the environment, as according to Sharma *et al.* (2014), they neglected the function of the environment since it is a gift given by God that costs nothing, drawing comparison to the economic theory of goods and services, in which things that costs more are valued more by society.

One of the benefits the environment provides to the economy is tourism. In some countries, tourism has become their main source of income (Schubert, 2009) and many people depend on the tourism sector as their source of income. Tourism also have a positive effect on other sectors. Some of the sectors affected by tourism are the transportation sector, which include car rental services or public transportation; the resort sector, which involves hotels or rented houses; the culinary industry, in which restaurants and traditional food are a part of; and, the creative industry, which comprises the handcrafts business, the food and beverages services, and the convection and apparel industry. Tour guide services, international convention centres and luxury wedding services could also arise at tourism sites. Natural sites and ancient heritage sites can provide unique experiences to tourists.

These kinds of sites are gifts from God to society, which could not be bought. Natural tourism sites possess unique characteristics. Marine parks, for example, could attract tourists through animals living at the sites, such as the whale shark in West Irian Jaya in Indonesia. Millions of tourists are keen to see and feel nature's wonder, and all of this depends on the health of a destination's ecosystem. Therefore, we have to preserve a site's biodiversity so that its assets could be utilised as a tourist attraction.

Sometimes, tourists carry out activities that negatively impact biodiversity, particularly due to inadequate monitoring by the management. Tourism managements usually ignore the responsibility of preserving nature, which could cause damage to nature through habitat destruction, overexploitation of local resources, waste and pollution, the introduction of an invasive alien species, uncontrolled infrastructure development, and greenhouse gas emissions. Tourists expect a clean environment, and they would decline to visit polluted or degraded destinations, leading to economic losses (UNDB, 2011). Ruined biodiversity activities cannot be seen as a separate activity from tourism, but as one activity with a side effect that cannot be avoided. The harming activities have to be viewed as part of the operational activity of the tourism site, so that the costs incurred to maintain and restore the biodiversity have to be covered and deducted from the revenue generated by the tourism sites (Ismail, 2012). This calculation is important to determine the sustainability of the sites because if the degradation is greater than the maintenance and the recovery of the biodiversity, we can conclude that in the future, the sites will be ruined and could no longer function as a tourism destination.

Economy has its own unique way to assess value. In ecology, polluted areas are invaluable as it cannot support a high number of organisms. However,

in economy, polluted areas may still be valuable since there are people who would be willing to pay to use the polluted areas. Economy is all about human preferences. If something is desired by customers, its conditions are neglected as it has already acquired an economic value, even though it might not have value according to other disciplines (Lipton, 1995). Monetary term has been widely used in economy as its unit. As one of many decision-making tools, cost-benefit analyses are used to determine which option gives the highest profit or the best solution. In regulation and policy, under the scope of public sector accounting, cost-benefit analyses are also widely used. Examples of cost-benefit analyses are Aaron *et al.* in 2013; Florio *et al.* in 2008; Sunstein in 2004; 2013 and Lipton *et al.* in 1995. The cost-benefit analysis is one of the classic retrospectives of evaluation and decision-making tools that is simple yet comprehensive. In the condition of limited access to information, cost-benefit analyses could provide the best prediction compared with other decision-making analysis tools, such as cost-effectiveness, total economic valuation, Environment Impact Assessment, and multicriteria analysis (Sunstein, 2014). In comparison, among other cost-inclusive analysis, such as cost analysis, cost-effectiveness analysis, return on investment, time to return on investment, present value, sensitivity analysis, and comparison analysis, cost-benefit analysis is favoured to discover the benefits of a programme (Yates, 2009).

Marine parks in Peninsular Malaysia were formerly managed by the Department of Fisheries. However, in 2007, the Department of Marine Parks was established under the Ministry of Natural Resources and Environment, and it is fully in charge of the administration and management of marine parks in Peninsular Malaysia. The department is not only responsible for the protection and conservation of marine ecosystem, but for ensuring the

establishment of the parks brings benefits to user communities, including the local community and visitors.

Terengganu's Department of Marine Parks (DMPT) manage 13 islands, which are Pulau Perhentian Besar, Perhentian Kecil, Susu Dara, Lang Tengah, Redang, Lima, Pinang, Ekor Tebu, Kapas, Tenggol, Nyireh, Yu Kecil, and Yu Besar. With a coverage of 586.69 km<sup>2</sup> (Yearly Statement of Department of Marine Parks Malaysia, 2012), Terengganu has the second highest number of marine park visitors in Malaysia. The DMPT also manage 57 resorts at the state's marine parks, which made this department and its management of marine parks the focus of this study.

### **Problem Statement and Purpose of Study**

This research will seek the answers to the questions below:

1. Should marine parks increase the entry charge?
2. Does the existence of marine parks generate benefit to all constituents?

Throughout this analysis, we compare the cost incurred and benefits gained by the DMPT. If it is found that the cost is greater than the benefit, some improvements in the management and system are needed to keep the marine parks sustainable, since it would affect the marine biodiversity, local community, tourists, researchers and the ecosystem, as well as the fact that this country depends on these islands as a protected area for the animals, national parks, tourism sites and source of income.

The conservation fee is the current management practice for an entrance fee system imposed on visitors to marine parks, which is consistent with the Fee Act 1951 and Fee Order (Marine Park Malaysia) 2003. The conservation fee charged for an adult is RM5, and student,

retirees and children are all charged RM2. No price differential has been made between domestic and international visitors since 1999. This research aims to analyse the Department of Marine Parks Terengganu's condition using cost-benefit analysis (CBA). Included as costs in this research are employee salaries, the cost of maintaining and developing marine parks, and the cost of environmental loss, while the benefits are the entry charge and trust fund, enterprise sales around the marine parks, and the potential value of the marine parks as an asset (Aaron *et al.*, 2013). CBA is occasionally used throughout a project or the 'project cycle'. A project cycle refers to a standardised process project managers follow when evidence-based projects are designed and implemented. Munger (2000) stated that CBA is undoubtedly a vital tool in policy work for problem-solving. It is a tool used for decision-making, which is widely accepted and used in project appraisal for the public sector's investments in large-scale infrastructure (Nickel *et al.*, 2009). This is mainly due to its many benefits as a rationality model, creating, evaluating and comparing alternatives containing different scales of alternatives, monetizing the costs and benefits, and assisting decision-makers. The DMPT can be considered a project that has been run for years. Cost-benefit analysis, as an evaluation tool, is designed to investigate the achievements of a project, the factors influencing it, and lessons for future policies (Rogers *et al.*, 2009). So, this research will focus on giving recommendations to the DMPT for its future. If the benefit is greater than cost, we have to maintain it and provide as much benefit as possible to constituents and stakeholders, allowing the DMPT to fulfil its mandate, while providing the best to visitors and for the ecosystem. This study will be beneficial for:

1. The Department of Marine Parks Malaysia as an evaluation tool for its lower departments and as references for the Departments of Marine Parks in other states.
2. The Department of Marine Parks Terengganu as a solution to their problems and recommendations for improvements.

### Literature Review

According to Zimmerman (1977), the agency theory describes the relationship between two parties, in which one of them gives the other tasks to be done with some compensation, and thus, an agency relation has been built between the two parties. The first party is called the principal, i.e. they are the real party who has the authority and power to control an organization and its activities to achieve the desired goal. However, as the principal cannot carry out the tasks to achieve the desired goal, they appoint another party to represent them, to do their job and task them to achieve the goal, and this party is called the agent. An agent is a representative of the principal in carrying out the mission, as long as the principal is absent and the agent is only responsible to the principal. In this case, the Department of Marine Park is the agent, while the stakeholder (the principal) are the visitors, the government, and donators who allotted their money to carry out their mission, which are maintaining and giving the best tourism services to the public. Lopes (2012), in his study titled "Seeking for a Sustainable Development Scoreboard: Beyond the Agency Theory", clarifies that the environment is one of the important factors in determining the sustainable development scoreboard.

The stakeholder theory is an explanation of the relationship between crucial parties in an organization, as whenever the relationship is in serious harm, it will affect

organizational activities (Freeman, 1984). The stakeholder theory also discusses the two ways of contribution between an organization and the stakeholder. There are two parties in the stakeholder theory; the first are the influencers who have more power and importance to the organization, and the other are the claimants who have less power and victimised in the organizational activity (Tullberg, 2011). There are five core stakeholders, which are the shareholders, customers, employees, suppliers, and community. In some research, the term "core stakeholder" is different, another terms are used instead, such as "Primary" (Carrol & Buchholtz, 2003; Waddock, 2002; Moon & Bonny, 2001), "Narrow" (Evan & Freeman, 1993), "Definitive" (Mitchell *et al.*, 1997), and "Normative" (Phillips, 2003). Explicitly, the environment is also one of the stakeholders in this case as the environment provides what the organization need, where in this case, the organization is the whole human being. The organization has an obligation, not to the non-human natural environment itself, but to the community within which it operates, to be a good steward of at least local environmental resources. (Phillips, 2003).

The Earth gives us air to breathe, provides a place to live, as well as resources, like oil, coal, even food and water, which are our daily needs. In recent years, concern about environmental issues has increased, and people have started to take action in protecting the environment. The Department of Marine Parks Malaysia is an agent of the government to take care of the environment, while the government is the agent of the public. According to Lane (2012), the government is the principal for agents in the public service delivery. The public or society is the highest principal in this level and because not all in a society are available to do the work, and the agency is important in this case. In addition, based on the stakeholder theory, the environment also

has its right as a claimant, so the Department of Marine Park, as the agent of the public, holds the responsibility of carrying out the mission of maintaining the environment as one of the public stakeholders. This research's grand theory joins both the agency and stakeholder theories in terms of the Department of Marine Parks Malaysia carrying out their environmental mission. Those tasks are not easy and are complicated as the Department of Marine Parks Malaysia could also consider itself to a tourism destination.

According to Ackerman and Heinzerling (2002), the cost-benefit analysis is useful because of:

1. Better economic results, focusing on finding the most efficient option to solve the problem, how we achieve the goal with minimum resources. For economists, efficiency is the first priority in regulation, policy or anything else. Cost-benefit analysis could go further in the efficiency of activity execution because once the activity costs greater than benefit, the activity cannot proceed.
2. Objectivity, in which its results represent a decision in real facts as it is. The project is seen based on how much it costs to gain a certain benefit. Other factors, such as personal opinions or perspectives regarding the projects or activities, are ignored. The objectivity leads to the choosing of the best option as the points of view towards the options are not interfered by other factors, such as self-interest or group interest.
3. Transparent government decision-making processes, which is characterised by bureaucratic procedures and gradual administrative processes. Since decisions about the environment are complex, we have to consider many factors from many disciplines, such as biology, ecology, law, economy, engineering, etc.

In order to seek the best option from all disciplines, the best decision from the scientific perspective needs to be discussed. This discussion will promote the transparency of the decision-making process and increase public participation to ensure that the policy succeeds.

Aaron *et al.* (2013), in their guidance book "Cost-Benefit Analysis (CBA) for Natural Resource Management in the Pacific: A Guide", states that in the past five to 10 years, the number of people using CBA in their researches have increased. The main objectives of CBA are to determine whether the upcoming or conducted investments outweigh its cost and can be used to determine the best option for investments. CBA also could inform which decision could proceed or not, which project should be implemented, among a great amount of options on hand. In another word, CBA helps in the decision-making process. TCBA can be used in at least three points in a project cycle, which are ex-ante, mid-term, and ex-post. An ex-ante CBA is conducted while a project is still being considered, or before the decision is made. Ex-ante CBAs are performed to evaluate the project's worth or feasibility, which available project gives the best outcome, and can be used to adjust an upcoming project. A mid-term CBA is carried out mid-way through a project to examine whether the project is on track and to update any design correction or adjustment for the rest of the project period. Finally, at the end of the project, ex-post CBA is established to assess the project's performance. This can support transparency and accountability in reporting on how well the public funds have been spent. In designing CBA, there are seven steps should be followed. The first step is determining the objective of the CBA. This process involves (1) confirming the underlying problems and links to the proposed project and (2) confirming what decision the CBA will inform as in how the results are used. The most common

questions in determining the CBA are (1) is the proposed project worthy as an investment? (2) which project option is more preferred? and (3) was the already settled project a worthy investment?

The second step of CBA is identifying the cost and benefit of each option on hand. This uses a with-without analysis and comes up to the with-without scenarios. The with-without analysis is an analysis that determines what changes will occur if the project is conducted or not conducted. Where, with and without scenarios offer a baseline wherein any alteration or impact of a project can be acknowledged and measured.

The third step is valuing the cost and benefit as far as possible. The cost and benefit from the available project must be written under monetary terms so that it could be compared to the others. By using the with-without analysis in the previous step, we can quantify the input and output of every available project. The assessing of monetary term is unnecessary when (1) physical or monetary value cannot be reliably measured or established, (2) the cost or benefit items are not significant to the analysis, and (3) the cost to measure the value overweighs its utility.

The fourth step is aggregating the cost and benefit, which is summing up all the different cost and benefit throughout the project's period and is presented as a value or a ratio. This step aims to facilitate the comparison of the options. Aggregating cost and benefit are done in two parts, which are (1) the present cost and benefit recognised in the future presented in the present value by  $\frac{1}{1+r}$  and (2) the present value of each cost and benefit is categorised into a single metric, called the net present value.

The fifth step is performing sensitivity analysis, which can present the result changes' sensitivity or robustness. This will affect our confidence level in the CBA and our confidence in establishing

suggestions for the projects based on the results. The sensitivity analysis can also deliver information on assumptions related to the results and conclusions. To employ the sensitivity analysis, three stages must be followed, i.e. (1) identify the key parameter that are uncertain, (2) determine alternative values for those uncertain parameters, and (3) calculate the impact of each parameter to the project's net present value.

The sixth step in CBA is considering the distributional impact of the proposed project. This process considers to whom the benefit of the project goes to. This becomes important because (1) this will show the feasibility of the benefit, which party gets the benefit more than the others, (2) in a case when the stakeholder wants to assess the benefit to a particular party, this analysis becomes compulsory as a consideration of conducting the project.

The final step in conducting a CBA is writing recommendations. The recommendations have to at least highlight (1) which project gives the highest net present value, (2) any major threat or assumption that may affect the project's success, (3) any major distributional issues, and (4) recommendations for the next steps, including potential changes.

## Methodology

This research will compare the benefit gained and cost suffered by the Department of Marine Parks Terengganu in running its activity. Since this kind of analysis is a mid-term analysis, which is analysis conducted in while a project is running, this analysis comes with recommendations regarding the marine parks. Recommendations to improve the marine parks from the perspective of CBA include the fact that the benefits gained are too small, and the Department of Marine Parks Terengganu has to increase the benefits, such increasing the entry fee charged on visitors.

**Costs to the Department of Marine Parks**

1. Employee Monthly Salary (Annual Statement of DMPM, 2013)
2. Depreciation and Development Cost (Annual Statement of DMPM, 2013)
3. Environmental Loss

As the DMPM’s main task is to maintain the environment, environment loss is considered one of the costs of running the department’s activities, especially ones that occur due to tourist activities. Tourists visiting marine parks carry out activities that sometimes destroy the environment, which contradicts the DMPM’s goals (Annual Statement of DMPM, 2013). Environmental loss also occurs due to activities carried out by the local community, such as illegal fishing, deforestation and hunting of protected marine biodiversity (Chatterjee *et al.*, 2006). Environmental loss is considered as cost also because there is an outflow of money that is used to achieve the goal. Measuring environmental loss is not easy since we need deep measurements and complex methods to assess its value (Rutherford *et al.*,1998). This cost is critical for the DMPM, and therefore, this cost is included in this research. Environmental loss is a broad perspective, which is suitable in the context of the reduced value of coral reef and decrease of fish density.

**Benefits to the Department of Marine Parks**

Benefit, according to Yates (2009), is determined as value of resources produced or salvaged resulting from the implemented programme and it is measured with similar units as cost, which is monetary value. Benefit also includes outcomes generated from activities or projects. Benefit has a wider definition than profit, as profit is only limited in monetary term (Oxford Dictionaries.com). If something is to one’s benefit or is of benefit to someone, it helps someone or improves one’s life. Therefore, we consider these items as benefits:

1. Tourism Charge and Trust Fund

Tourists visiting the marine parks will be charged RM2 or RM5 depending on their age, where RM2 is charged on children and people with disabilities, and RM5 on adult (DMPM Websites).

2. Total Economic Value of Natural Resources

Natural conservation activities will lead to the increasing quantity and quality of marine biodiversity. Since the natural resources will not be traded off for some monetary incentives, the Total Economic Value for the Pulau Redang Marine Park, 2012, is used in this analysis, (Annual Statement of DMPM, 2013).

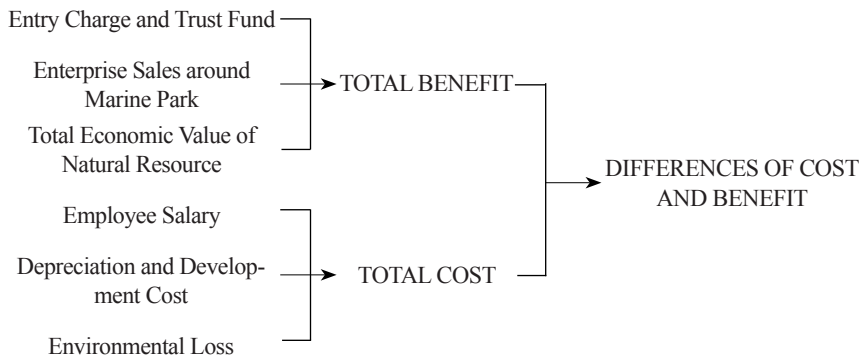
**Data Collection and Analysis Framework**

This research uses secondary data collected from the Department of Marine Parks Terengganu’s annual statement. As for the environmental data, we used the findings of Rusli, *et al.* (2009). This source of data will be used in the analysis framework present below:

Table 1: Source data for benefit and cost items analysis

Benefit Items	
Description	Sources of Data
Entry Charge and Trust Fund	Annual Statement of DMPT 2012
Enterprise Sales around Marine Park	Rusli, <i>et al.</i> , (2009)
Total Economic Value of Natural Resources	DMPT, 2012
Cost Items	
Description	Sources of Data
Employees Salary	DMPT, 2012 according to Malaysia Information Service 36/2013
Depreciation and Development Cost	Annual Statement of DMPT, 2012
Environmental Loss	<a href="http://redang.org/conservation.htm">http://redang.org/conservation.htm</a>

Table 2: Analysis framework for the study



**Research Findings**

*Benefits Outweigh Costs for Marine Parks*

Based on the sources of data that we have collected (Table 3), we found that the total benefits outweigh the total costs by RM399,980,502. This is by adding up all the benefits, which include the entry charge of RM528,101 plus the trust fund received from the government amounting to RM220,000, plus the enterprise sales in marine parks of RM47,877,431, as well as the total economic value of Pulau Redang of RM354,000,000, resulting in total benefits of RM402,625,532. As for the total costs of RM2,645,030, we added up all the costs that we collected from the sources, which include the cost of equipment maintenance and marine parks development of RM481,232, employee salary of RM991,128, and the cost environmental loss of RM1,172,670. From Table 3, we can see that this activity is generating benefit. As for the enterprise around the marine park sales, there are 51 resorts in the marine parks and many more restaurants around the marine park. Therefore, the stated sales could be larger than the listed ones.

*Entry Charge of Marine Parks*

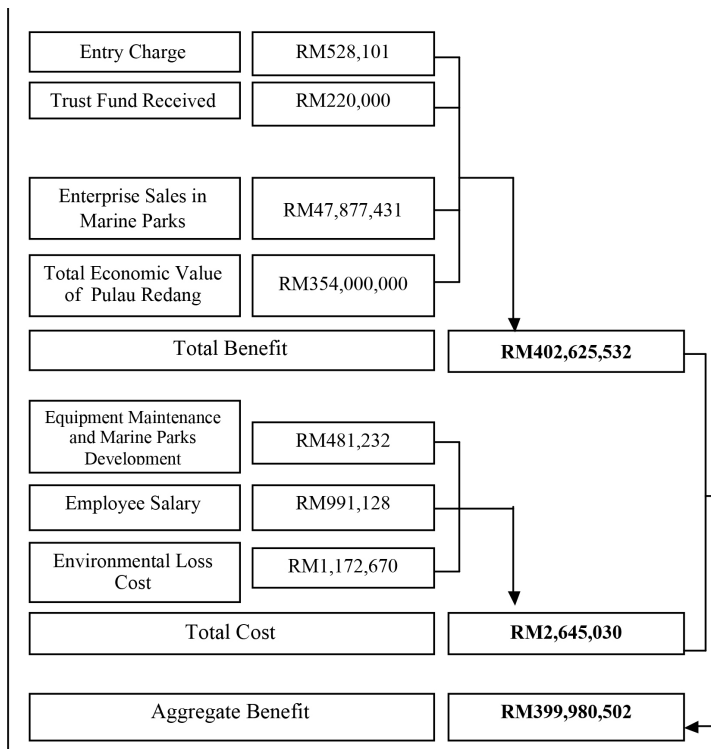
The tourist and economic activities around marine parks could be covered by the direct benefit of entry fees as they could be used directly to achieve the marine parks’ goal, which is to protect the environment. The entry charge should be increased as it will help the marine parks pursue its mission of protecting the environment and biodiversity.

*Do the Marine Parks Have to Increase the Entry Fee?*

Looking at Table 4, based on our findings, the entry fee can cover the cost of marine parks equipment maintenance and development of RM481,232, as well as the employees’ salary of RM991,128, which altogether is RM1,472,360. The benefits side, which consists of the entry charge of RM528,101 and the trust fund of RM220,00, which totals up to only RM748,101, are unable to cover the cost of maintenance and development of the marine parks and employees’ salary by RM724,259. Therefore, we would like to suggest increasing the marine parks’ entrance fee to cover the basic costs of their operations.



Table 3: Cost and benefits analysis of Pulau Redang



We hope that the entry charge and trust fund would help marine parks achieve their mission, which is to provide tourism services to visitors through well-maintained and well-built infrastructure as the depreciation and development costs to the marine parks and employees’ salary can be covered by the entry charge. Based on the calculation below, we suggest that the entry charge and trust fund cover all of the equipment maintenance, marine parks development, and the employee salary.

Table 4: Total costs and benefits to cover for increase in entrance fees

Description	Value	Total
Equipment Maintenance and Marine Parks Development	RM481,232	

Employee Salary	RM991,128	
<b>Total Cost</b>		<b>RM1,472,360</b>
Entry Charge	RM528,101	
Trust Fund	RM220,000	
<b>Total Benefit</b>		<b>RM748,101</b>
<b>Increase in Entrance Fee Suggested</b>		<b>RM724,259</b>

The increase needed is as much as RM724,259 to cover the cost of equipment maintenance and development, as well as employees’ salary. The increase of RM724,259 divided by 200,000 visitors per year means that the entry charge needs to be increased by RM3.62. Therefore, based on these CBA calculations, we propose that the new entry charge to the Marine Park Terengganu in Pulau Redang should be RM8.62 (current entry fee of RM5 plus the

suggested increase RM3.62). According to Mamat *et al.* (2013), in Pulau Redang's case, the willingness-to-pay of visitors is between RM10.86 and RM28.69, so the increase can be done by the DMPT.

### *Do Marine Parks Generate Cost or Benefit in Overall?*

Total Benefit: RM402,625,532

Total Cost: RM2,645,030 → Generated Benefit:  
RM399,980,502

Marine parks, in overall, generate benefits, as we can see from this study it generates RM399,980,502. The generated benefits include those from the marine parks themselves (trust fund and entry charge), contribution from society (ecotourism, sales of enterprises around marine parks), and the ecosystem (total economic value). Since the marine parks generate benefits, they should be maintained and moreover maximised in the future for the sake of all stakeholders and parties. The DMPT also need to maximise the utilization of marine parks and optimise the operation of marine parks, such as the maximization of trust fund and entry charge for increasing the service for tourism and protecting the environment. Based on the findings above, it is quite good and must be defended and increased in the future. With well-developed marine parks, the benefits to ecotourism will increase and it will bring a positive impact to the state's revenue as an increase of ecotourism will bring benefits in terms of increased taxes and a better tourism sector (Tangvitoontham, 2012).

### **Conclusions and Recommendations**

From the above findings, we can conclude that the major concern for marine parks is about their limited budget for their management, operation, maintenance, research, as well as conservation. According to Yacob *et al.* (2012), the situation becomes a major concern for Marine Park in Malaysia, where the revenue from the

conservation fee is very limited compared with the annual budget requirement for management and conservation purposes. If the marine parks wish to increase its revenue to ensure continued operation, there are several reasons why consideration should be given to the increase in the conservation fee, such as considering it the real cost users pay to enjoy the island, the fact that maintenance of the coral reef and marine environment is only possible through the conservation fee, not through extra tax or fee are charged on divers. Thus, increasing the conservation fee by a certain amount is much better than introducing a new tax or fee collection system (Yacob *et al.*, 2012). As the RM5 conservation fee was implemented in 1999, which is almost 20 years ago, we suggest that the marine parks increase the entry charge to RM9.00, instead RM8.62, to cover the costs of maintenance and development, as well as employees' salary. This increase is necessary to achieve the dual goal of the DMPT. Furthermore, according to Mamat *et al.*, 2013, visitors' willingness to pay for Pulau Redang is between RM7.11 and RM10.63, making the increase in fee viable (Mamat *et al.*, 2013). Without sufficient funding, ecotourism involving the marine ecosystem may be harmed in the future. Also, according Yacob *et al.* (2012), domestic visitors are willing to pay 50% more than the current conservation fee and international visitors are willing to pay more than double.

Another recommendation is that the marine park authorities may wish to consider "multi-tiered" conservation fees. Lindberg (1991) justified this by stating that international visitors receive substantial enjoyment from the experience in ecotourism sites yet pay low entrance fees (RM5 is approximately USD1.25) and they do not pay taxes to support the park. Thus, in this case, multi-tiered structure may be more suitable.

Besides that, our findings reveal that the marine parks are generating benefits to all parties and stakeholders, in which, currently, the benefit is RM399,980,502. It should be maintained in the future, where the outcome is that it brings benefits to all parties, including the State of Terengganu, through the ecotourism. The findings of this study can \ be used in economic analysis to determine the viability of conserving the marine ecosystem in the long run. The estimated benefits obtained from this study can also be used for other similar marine parks for the purpose of policy or management decisions that affect the target resources. For future research, the framework can be used, along with more comprehensive data and variables to get a complete and deeper analysis of the marine parks.

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