

## Tourists' Perceptions on Environmental Impact Attributes of Mabul Island and Their Relationship with Education Factor

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**Abstract:** Researches on the environmental impact of tourism have extensively studied residents' attitudes and perspectives at different settings, especially on the natural environment. The study of perceptual environmental impact of the tourists, from the experience gained during their stay and activities, is equally important in examining the quality of the environment. Mabul Island, which is located at the southern edge of Semporna District, is a popular tourist spot, specifically the divers. Currently, the tourism development on the island has shown a rapid change in terms of the environmental attributes. Therefore, this paper attempts to examine the impact of tourism towards the environmental attributes of the island from the perspective of the tourists and to examine the level of education factor among the tourists. The findings were drawn from a questionnaire survey conducted among domestic and international tourists who visited Mabul Island during April 2014. The results revealed three main negative environmental attributes, namely damage to the coral reefs, lack of green spaces and rubbish in the water. These significant attributes show that the main categories of environmental impacts are the marine life, pollution and visual changes. Apart from that, the results have shown that tourists with a higher education level seem more responsible towards the environment.

**Key words:** Environmental Impacts • Tourist Perception • Environmental Attribute • Mabul Island

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### INTRODUCTION

Nature based destinations have shown a niche market for segmented tourists due to the value of the rich biodiversity. Variations of nature-based destinations such as islands, coastal areas, highlands, mountains, rivers and lakes are found in Malaysia as tourist spots. Small and isolated islands with their treasures gained popularity as touristic places especially in tropical countries. According to [1], the more attractive a site (usually due to its rich biological and/or cultural values), the more likely it is to be degraded due to heavy visitations, which in turn diminishes the quality of the experience. Butler's lifecycle model which describes the growth, stagnation and decline phases of a tourist destination can be understood as a hypothetical cycle. According to [2], Butler's model is not the existence of empirical evidence to support the shape of the curve, but rather the implicit warning to those responsible for tourism planning and development:

“Tourist attractions are not infinite and timeless but should be viewed and treated as finite and possibly non-renewable resources” [3]. Tourism

development is largely dependent on the natural environment. Moreover, tourism development is often a two-edged sword. It can be beneficial (e.g. job creation, image enhancement, promotion of economic growth), whilst also having negative impacts on the biophysical environment (e.g. soil pollution, water pollution, air pollution, ecosystem degradation) and the social/cultural environment (e.g. loss of traditional culture, increase in crime) [4]. Thus, the development of tourist destinations was normally accompanied by considerable environmental deterioration [2]. In the recent years, the environmental issues associated with rapid tourism have become critical concerns. The environmental impacts caused by tourism development have been highlighted in literature reviews [5-9]. Researches on the perception of environmental impact from tourism have extensively studied residents' attitudes and perspectives at different settings, especially on the natural environment. There have been a number of case studies of tourism impacts, marine ecotourism and island tourism from the perspective of the residents, for example, [10-14].

The perceptual studies on the environmental impacts amongst the tourists, from the experience gained during their stay and activities, are equally important in examining the quality of the environment. Moreover, most of the studies assumed uniformity, in particular in the tourism market segment. But in reality, these are highly segmented markets that reveal a different perception of environmental factors from the experience at tourist destinations. One of the main indicators of tourist values and behaviour is their level of education, but researchers seem to have neglected this issue in respect of the debate on sustainability. According to [15], a person's socio-economic status, cultural ties and past experiences influence how they perceive environmental quality. In the case of tourism in protected areas, the tourists may differ in many ways, including in their personal characteristics and perceptions about the recreational environment. Also, there is little research that demonstrates empirically (e.g. [15-17]) whether the level of education of the tourists makes a difference in their perception of the environmental impacts at the tourist destinations. Therefore, this paper attempts to examine the tourism impact on the environmental attributes of Mabul Island in Sabah from the perspective of the tourists and make a comparison of those perspectives at the various educational levels of the tourists.

**Literature Review: The Impact of Tourism on the Environment:** There is a close relationship between tourism and environment. One of the many myths of tourism is that tourism is dependent on a healthy or pristine environment [18]. This has led to the argument that tourism should ally itself strongly and naturally with sustainable development and ecotourism principles, which lead to the protection and maintenance of the environment [19-21]. In the context of tourism and in many aspects of human development, attitudes towards the environment have changed greatly over time [22]. The processes by which tourism can affect the natural environment are the same ways in which other human processes effect the environment and these have been known for a considerable time [23-27]. According to [22], the basic impacting processes, namely fire, pollution, consumption and trampling, along with habitat modification through development such as water modification, vegetation removal and landform modification are common forms of human activity in the natural environment. Other than that, there are six typologies of the built environmental impacts of tourism developed by [19], i.e. urban forms, infrastructure, visual

impacts, restoration, erosion and pollution. In addition, many private operators are unaware of the environmental impacts resulting from tourism activities and take a short-term view that prioritizes profit maximization [22]. As stated by [28], unplanned development of tourist areas contributes to degradation in the environmental quality, such as the deterioration of water, air and noise quality and the damage to natural sources. Thus, due to the increase in population and in the number of tourists, as well the rapid development activities, environmental sustainability has been impacted.

**Small Island Tourism and Environment Impacts:** Sustainability is a major issue in island tourism. According to [29], improvements in the quality of life of the host community, the provision of a higher quality of visitor experience and maintaining the quality of the environment on island destinations pose a major challenge to island tourism, especially for the smaller islands with their inherent limitations. Islands, despite their disadvantages environmental and geographical limitations and distance from the mainland, have the ideal settings to not only follow a planned and controlled approach to tourism development but also to introduce remedial measure effectively. Furthermore, small islands not only serve as contributors to the development of the tourism industry and economic income to the local community, but the excessive admittance of tourists to an island with unmonitored activities could also bring possible damage to the natural environment. Soil erosion, imbalance to the habitats of flora and fauna and the piling up of rubbish are some of the effects that occur [30]. In addition, tourist activities and services such as scuba diving, which are offered on the islands, are harmful to their coral reefs [31-37]. Thus, rapid tourism development activities on small islands may cause sea water pollution, coastal erosion and deposition, which would eventually incur a lot of expenses for the collection and disposal of solid waste.

**Education Level and Environmental Concerns:** [38] stated that people with more years of formal schooling have a higher incidence of pro-environmental behaviour than do the less educated and lower income respondents. [15] revealed that education is statistically significant with regards to the awareness of marine protected areas and that means that awareness is largely dependent on education, with people who are aware showing a significantly higher education background. Thus, in a way, awareness is largely explained by the education

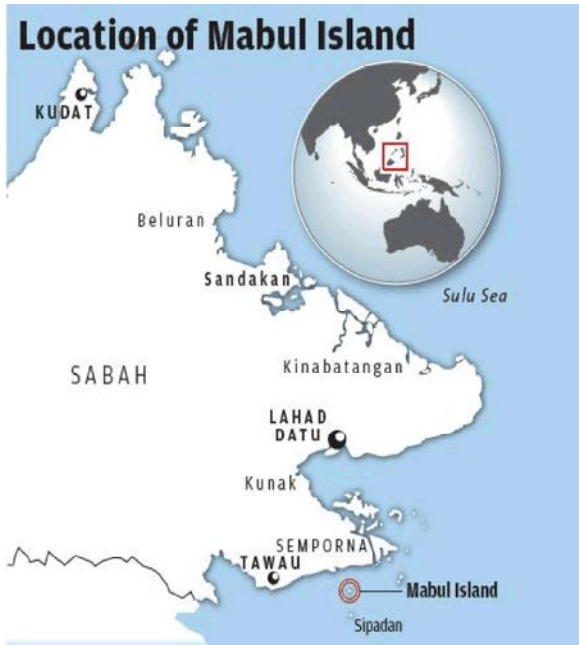


Fig. 1: The location of Mabul Island, Sabah  
Source: <http://www.thestar.com.my/>

level. Moreover, according to [16], the level of knowledge will influence the awareness or attitude of an individual and will lead to responsible actions. In the context of environmental education, increased knowledge of the environment and its issues in an individual will lead to increased awareness and positive behaviour towards the environment.

**Mabulisland, Sabah:** Semporna is a town and district in the southeast corner of the Malaysian State of Sabah and is home to Malaysia’s largest dive tourism industry. One of the famous diving spot in Semporna is Sipadan

Island, which is the best known of all Malaysia’s dive sites and it is considered to be one of the top dive spots in the world [39]. Mabul Island started gaining popularity after the nomination Sipadan as a marine park, with restrictions to control the number of tourists for the protection of the ecosystem. The island is 26 hectares on a reef at the southern edge of Semporna District (Figure 1).

Mabul has 2,500 residents relying on fisheries and more than 15 resorts and dive lodges on this area of land [40]. The island consists of three distinct ethnic groups, namely the Bajau Laut, the Bajau Darat or Bajau Semporna and the Sulu. These communities also speak different languages and have different ceremonies and customs. In the 1980s, the island developed as a centre for eco-tourism but was later left unattended. However, today the island has transformed into a well-known tourist destination, offering diverse activities associated with the marine, coastal and local culture.

As an isolated small island destination, the ecosystem of the flora and fauna are easily threatened by the development of the area and also the intensity of the tourist arrival. According to [41], the tourism development on Mabul Island is uncontrolled and the number of tourist operators on the island has doubled since 2006. Their studies showed awareness of the environment among the key stakeholders, especially the tour operators; the concept of Limits of Acceptable Change for Mabul Island was introduced in the 2008 workshop. The series of activities since 1997 on Mabul Island (Table 1) on managing and monitoring the cleanliness and environment issues show the environmental degradation [41]. It shows that the efforts in monitoring and conserving the ecosystem have been taken into consideration since 1997 until recently.

Table 1: Key activities on Mabul Island, Semporna, relating to monitoring and conserving the environment

1997	The initiation of Mabul Marine Day (MMD) by Sipadan Water Village which focused on coral transplanting to recover the reef that had been bombed.
2004	Sipadan Island was closed to tourism. Tourism pressure shifted to Mabul Island. Increase of local population in Mabul Island due to job opportunities and more profit for small grocery shops on the island.
2006	The Limits of Acceptable Change study was conducted by [40]. The condition on Mabul Island was confirmed as over-populated.
2008	“Mabul Island: Acceptable Change (LAC) workshop” organized by WWF and partners to a range of stakeholders.
2009	The MMD extended to Mabul Marine Week (MMW), with the change in objective to “Cleanliness of Mabul, Our Responsibility”. The MMW committee officially became the sub-committee for the Semporna Tourism Action Council (STAC).
2010	The Study on Environmental Changes on Mabul Island by Universiti Malaysia Sabah continued.
April 2011	A series of collaborative environmental monitoring activities was conducted with the stakeholders.
Nov 2011	The results of the environmental monitoring were shared with the stakeholders.
Dec 2011	Agreement was obtained from tour operators to form a management body to prioritize working on a waste management system.

Source: [41]

Table 2: Perception of tourism impacts towards environmental attributes

Items	Mean	Standard Deviation	Rank
Damage to the coral reefs	3.83	1.029	1
The loss of green spaces	3.81	1.088	2
Rubbish/trash pollution	3.79	1.142	3
Water pollution	3.71	1.136	4
Beach erosion	3.64	1.139	5
Noise pollution	3.18	1.151	6

Note: Mean scores measured on a 5-point scale (1=strongly disagree, 5=strongly agree)

**Methodology:** This study adopted a quantitative approach and survey questionnaires were self-administered by the respondents. Data were drawn from the tourists who stayed at the resorts and lodges in Mabul Island in April 2014. The questionnaires were left at the resorts and tourists filled up the survey forms when they were at the resort. A sample size of 200 tourists and a simple random sampling method was adopted for the survey. The questionnaires were prepared in two languages, Bahasa Malaysia and English. The questionnaire was divided into five sections. The first part of the questionnaire was the respondent's profile. The second to fifth sections were statements about the physical environmental impacts by tourism development on the island. From 200 questionnaires distributed, only 175 questionnaires were usable. This article presents a descriptive statistics, one way ANOVA and crosstabs analysis in interpreting the respondents' demographic and personal information, as well as to identify tourists' perception of the environmental attributes that are affected by tourism and the difference in perceptions of the environmental attributes on Mabul Island, Sabah, according to the different levels of education. In measuring the findings of this study, the interpretation of mean score for the environmental attributes that are affected by tourism in Mabul Island is adapted from [42].

**Findings:** The findings of this article can be divided into three sections: profile background of the tourists, visitor perception towards physical environmental impacts by tourism and the difference the level of education has towards the items of environmental attributes impacted by tourism.

**Profile of Respondents:** The respondents' demographic profile showed that the majority of the respondents (62.3%) were international tourists, compared to Malaysians (37.7%). Tourists from China marked the highest number of respondents. Female respondents (58.3%) outnumbered male; the sample presented a peak

proportion of respondents in the age group of 26 – 35 years. The majority of respondents were Chinese (45.1%) followed by Malays (30.3%). The majority of the respondents (57.9%) had a higher level of education and worked in the private sector (42.9%). Students had also participated in this survey (12.9%). The common purpose of visit was vacation. The majority of respondents (82.8%) were first-timers.

**Visitors' Perception towards Physical Environmental Impacts by Tourism:** Table 2 shows the findings from tourists' perception towards the environmental effects of tourism activities on Mabul Island, Sabah. Data obtained indicate that tourism activities have negative impacts on the environmental attributes of the island. The mean score of the overall environmental attributes is more than 3.18 and it indicates that the tourism activities have an impact on the environmental sustainability on the island. Damage to the coral reefs is the highest with a mean score of 3.83 and standard deviation of 1.029. It reveals that most of the respondents agree with the statement that uncontrolled snorkelling activities could damage the coral reefs. The results have also shown that the loss of green spaces is the second highest; followed by pollution caused by littering, water pollution, beach erosion and noise pollution. The significant attributes show the main categories of environmental impacts from tourism on the small island are infrastructure and visual. The results also support the main categories from [19], whereby the potential consequences, namely water pollution and noise pollution, contribute to the pollution impact. Furthermore, the loss of green space contributes to the visual impact of the built environment.

**Effects of the Level of Education on the Environmental Attributes Impacted by Tourism:** The level of education of the respondents comprise of non-formal education (1.2%), primary education (9.4%), secondary education (15.2%), tertiary education (57.9%) and others (16.4%). In the context of environmental education, the increased knowledge of an individual regarding the environment will lead to increased awareness and positive behaviour towards the environment. Thus, the analysis of one way ANOVA has been used to make a comparative perspective among the different levels of education of the respondents towards the items on the environmental attributes impacted by tourism. The results (Table 3) show a comparison of the tourists' education levels and their perceptions of the environment on the eleven items that they have been questioned on. The results indicate that

Table 3: Comparison of perspective among each level of education towards the items on the environmental attributes impacted by tourism

Item	Mean					F Value	Sig.(p)
	Non-Formal Education	Primary Education	Secondary Education	Tertiary Education	Others		
1. Tourism activities in this island has caused noise pollution	2.00	3.13	3.13	3.24	3.36	0.780	0.540
2. Water pollution can be clearly seen in the sea	2.00	3.40	3.60	3.70	3.83	1.752	0.141
3. Water pollution is caused by solid waste	2.00	3.60	3.67	4.07	4.10	3.993	0.004
4. Water pollution is caused by the dumping of waste oil from boats and ferries	2.50	3.64	3.73	3.82	3.85	1.062	0.377
5. Water pollution is caused by the sewage from lodgings	2.00	3.46	3.52	3.60	3.96	2.197	0.072
6. Tourism activities reduces visibility of sea water	1.50	3.36	3.37	3.67	3.81	2.605	0.038
7. The beach area is filled with rubbish	2.00	3.32	3.53	3.54	4.11	2.706	0.032
8. There are overcrowding of tourists on the island	3.00	3.20	3.60	3.96	3.98	3.777	0.006
9. Uncontrolled snorkelling activities may damage coral reefs	2.50	3.58	3.87	3.90	3.93	1.333	0.260
10. Tourism development contributes to the loss of green spaces/natural landscape	2.50	3.60	3.68	3.82	4.07	1.350	0.254
11. Beach erosion is caused by uncontrolled development	2.50	3.47	3.60	3.76	3.93	1.106	0.356

Note: Sig: level of significance,  $p < 0.05$

fourout of eleven items have statistically significant differences at the  $p < 0.05$  level in the perception scores for each type of educational level. The four items that have shown significant differences are item 3, water pollution is caused by the solid waste [ $F(4,159) = 3.993, p = 0.004$ ], item 6, tourism activities reduce the visibility of the sea water [ $F(4,161) = 2.605, p = 0.038$ ], item 7, the beach area is filled with rubbish [ $F(4,160) = 3.993, p = 0.0004$ ] and item 8, there is overcrowding of tourists on the island [ $F(4,161) = 3.777, p = 0.006$ ]. The results for the post-hoc comparison revealed that item 3 has a statistical difference of perception regarding water pollution caused by the solid waste between the non-formal educated and tertiary educated respondents. From a crosstabs analysis, the results showed that respondents with higher education more agree (61%) and strongly agree (64.7%) compared to the secondary educated with their agreement of only 16% towards the statement. Moreover, for the post-hoc comparison also revealed that item 8 ‘there are overcrowding of tourists on the island’, has a statistical difference of perception between the secondary educated and the tertiary educated. Respondents with higher education more agree (67.6%) and strongly agree (60%) with the statement compared to the secondary educated, with their agreement of only 10%.

### CONCLUSIONS

This article acknowledges that the analysis of tourists’ perceptions can produce information that is as useful as residents’ perception as the baseline data for monitoring the environmental quality, even though previous studies on perception of environmental impacts have often concluded that tourists are not very perceptive of the natural areas visited, or that what they

notice are primarily the direct impact of other tourists [1]. The significant physical environmental impacts in small islands like MabulIsland are mainly associated to marine life (damage to the coral reefs and water pollution), visual changes (beach erosion, littering and loss of green spaces) and noise pollution. This is supported by the majority of studies on the impact to the marine life, especially coral reefs [32-37]. Moreover, this study takes forward the typology of the built environmental impacts of tourism as developed by [19] that the potential impacts are of relative importance to the different aspects of the built environment. The user perception of environmental problems can be a better basis for planning and management, so that collaboration amongst the stakeholders can be implemented. This is supported by [43-45], who stated that dialogue sessions between managers and stakeholders, supporting and sharing decisions, are encouraged. If the management is to include public input as guidance in managing the impact of tourism, they have to consider the users’ perspective regarding the resources and their use. Apart from that, the study departed from the conclusions of many previous studies on the perceptions of the impact of tourism by the different stakeholders. However, by considering the varying levels of education with regards to the perception towards environmental impacts among the tourists to this area, a better understanding is provided of the difference the level of education has towards environmental issues at tourist destinations. The results have shown that tourists with a higher education level seem responsible towards the environment. The finding is supported by [38], who stated that people with more years of formal schooling have a higher incidence of pro-environmental behaviour than do the less educated and lower income respondents.

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