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A study of sustainable management of solid waste in Perhentian island, Malaysia

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Abstract

This paper examines plans for the sustainable management of solid waste and the challenges faced by the local municipal and chalet owners in Perhentian Island, Malaysia. The study adopts a qualitative design involving in-depth interviews with five informants. The results outline a strategy to improve the current waste management plan such as focusing on composting and recycling as more economical and environmentally-friendly approaches to waste management. In conclusion, the local authority administering the island is now looking for a better way of managing this waste.

Keywords: Sustainable Management, Solid Waste, Island.

Un estudio sobre la gestión sostenible de residuos sólidos en la isla de Perhentian, Malasia

Resumen

Este documento examina los planes para la gestión sostenible de los residuos sólidos y los desafíos que enfrentan los propietarios municipales y de chalets en la isla de Perhentian, Malasia. El estudio adopta un diseño cualitativo que involucra entrevistas en profundidad con cinco informants. Los resultados describen una estrategia para

mejorar el plan actual de gestión de residuos, como centrarse en el compostaje y el reciclaje como enfoques más económicos y ecológicos para la gestión de residuos. En conclusión, la autoridad local que administra la isla ahora está buscando una mejor manera de manejar estos residuos.

Palabras clave: Gestión Sostenible, Residuos Sólidos, Isla.

1. INTRODUCTION

Malaysia is blessed with many idyllic tropical islands such as Perhentian Island which are favored as ecotourism destinations. Perhentian Island is located in the South China Sea, North Eastern corner of Peninsular Malaysia. It is a top tourist destination. Recently, the annual report of tourist arrivals is approximately 60,000, compared to a local population of 1,300 residing in the only village on the island. The disposal of solid waste on the island is a critical problem. Limited land means the option to dispose of solid waste at the landfill is not sustainable in the long-term. While other disposal methods such as the use of incinerators have proven to be less effective. Furthermore, the solid waste generated by visitors in the resort island is much more than the amount of waste produced by the locals.

Most studies conducted on resort islands are focused on specific treatment methods such as heat treatment or combustion, while limited research has been done on the management of solid waste. Among the factors emphasizing the importance of waste management is the limited land on the island, that food waste from restaurants in chalets and resorts operating on the island comprise the majority of the waste

and the low levels of awareness of sustainable waste management practices among tourists. Based on these factors, a study was conducted to identify environmentally-friendly solid waste management practices in Perhentian Island (Abdullah, 2001).

2. STUDY AREA

The tourism sector is a significant contributor to the state economy of Terengganu apart from the petroleum-based, agricultural and fishery-based industries. Hence, a range of tourism promotion efforts consisting of the development of new products, upgrading of tourism support facilities and aggressive marketing efforts need to be implemented. Perhentian Island is located in the South China Sea with a distance of 10 nautical miles (9km) from Kuala Besut Jetty, Terengganu (Figure 1). The islands can be visited by boat either from the Kuala Besut Jetty in Terengganu or Tok Bali in Kelantan which is less than 6km compared to the Kuala Besut Jetty. Boat trips to the islands take between 30-45 minutes depending on the sea conditions. The land area of the islands is about 1500 hectares.

Travel activity is the most important economic activity on the island. Its blue, clear water, colorful white sandy beaches and coral reefs make these islands a popular destination among locals as well as foreigners. Tourists visit the island for a variety of reasons such as its beautiful beaches, exciting snorkelling activities, challenging scuba diving and so on. The journey to Perhentian Island begins when the

South China Sea is calmer at the end of March to October. Recently, tourist arrivals to Perhentian Island recorded a total of 60,000 people. This number is very large compared to the population of the island, which is less than 1500 people who live in Kampung Pasir Hantu located on the island (Haliza & Rohasliney, 2010).

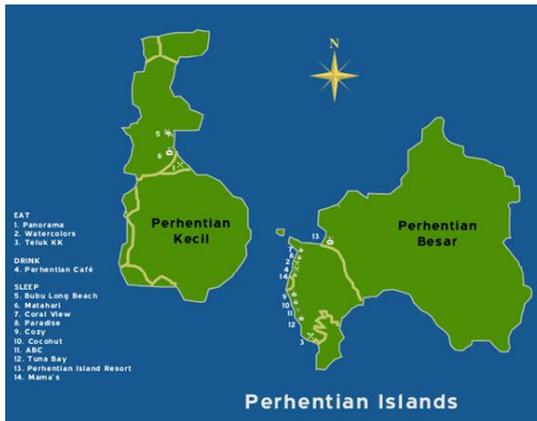


Figure 1: Perhentian Island
Source: <http://wikitravel.org>

3. METHODOLOGY

This qualitative study involved in-depth interviews with five informants consisting of resort management, solid waste cleaning contract staff and Besut District Council officials involved directly in the management of waste in Perhentian Island. In addition, observation is used to identify the solid waste management processes by contractors including collection, transportation and waste disposal facilities to landfills. Secondary data is obtained from the annual report

of Besut District Council, the official portal of Besut District Council, as well as journal articles related to solid waste management. The information and data obtained from interviews will be analyzed and coded according to the themes set forth in the study (Nazeri, 2002; Shafinaz, 2009).

4. RESULTS AND DISCUSSIONS

4.1 Results

The local authorities manage solid waste management with assistance from the Ministry of Housing and local government. All matters pertaining to solid waste management in Perhentian Island are under the responsibility of the Besut District Council (MDB). With the growth of the island's tourism industry, problems arise as to the management of the solid waste generated from the industry. The practice of planting residues on the solid waste site in the early stages of industry are no longer suitable due to soil problems. At present, solid waste from tourist centers on the island is still successfully regulated conventionally. This conventional practice requires a garbage manager to bring solid waste to the landfill site on the mainland using a 21km vessel. These practices are generally seen as not economical, and the land area for landfill is diminishing.

This process involves three parties, namely chalet and resort operators, garbage collector contractors appointed by MDB and local

authorities. The increase in residual waste production in Perhentian Island, estimated at 3500 tonnes per month, especially during peak periods, puts pressure on the landfill in Paya Rawa, Kuala Besut with an area of 13.30 hectares (Hamidi & Tuan, 2006). The interviews with Besut District Council officials found that the existing landfill has been in operation since 1981. However, the landfill has been upgraded and started operations in 2014. The study found that the landfill site is critical at this time as the existing site is almost full while solid waste must be collected and disposed of daily including solid waste from chalet operators and resorts on Perhentian Island. Local authorities need to plan for the preparation of a new landfill in the near future. The process of identifying a new landfill is a challenge to local authorities as it is difficult to secure a suitable and safe area for a new landfill (Kamus, 1997).

According to Mohmadisa et al. (2005), tourism activities have been a major contributor to economic activity in Malaysia. The role of government is also important in the development of this tourism sector. The government has made various efforts in attracting more tourists to Malaysia, especially to famous resort. However, the government's efforts to promote the tourism sector have indirectly had a negative impact on the environment in the tourism area. Litter and uncontrolled waste disposal have become a source of pollution in resort areas, especially in small island resort areas in Malaysia. According to Neto (2002), the major environmental impacts of tourism activities are not only stress on natural resources and damage to natural ecosystems but also the generation of solid waste.

This solid waste problem exists as a result of human action with little regard to the importance of preserving the environment. The ongoing solid waste generated from tourism activities is diminishing the beauty of nature-based tourism attractions. If this is not well managed, it will have a long-term impact on Malaysia's tourism sector. Malaysia's islands produce 400 tonnes of solid waste a day. Of these, 60% were collected and disposed of at landfills, 35% burned and 5% dumped into the sea (Agamuthu & Nagendran, 2011).

Based on surveys on resort operators on Perhentian Island, most resort operators do not recycle waste generated from their resorts. Only 20% of resort operators say they managed to recycle aluminum cans only. The solid waste contractor appointed by the Besut District Council will then use a large boat to collect the garbage at each chalet and resort and then carry the collected garbage to the Kuala Besut Jetty on the mainland. Although appointed by the MDB, solid waste contractors are paid directly by resort operators. Fees vary according to the number of rooms in the resort. Its crude sum is about one hundred and six hundred ringgit a year. The contractor takes about an hour to sail from the island to Kuala Besut Jetty. From the jetty, the waste will then be loaded onto the MDB truck and taken to the MDB landfill 21 kilometres away. The garbage collection service operates only in the peak season, usually around mid-March until mid-September. This is because it cannot operate during the monsoon season or when the weather is bad due to the high tide.

The garbage produced during the off-season is relatively low due to the minimal tourist numbers. Although the waste produced is minimal, resort operators usually burn it. Difficulties occur when garbage collection services stop operating, but tourists or workers are still on the islands. In this case, some resorts will take their trash back to the mainland either to plant or burn behind their resort. In early 2008, most resort operators used these methods. Even during the peak season, when garbage is collected regularly, some of the resort's kitchen areas will burn waste materials and some homeowners will burn the garbage instead of disposing of it through the collection method (Jamaludin, 2003).

The waste is collected from the beach and above the pontoon to prevent insects and pests gathering rubbish. This can also avoid damaging the clean and safe atmosphere of the islands. Sometimes tourists mistake when they see small boats sailing along the dumps and returning to the deck carrying empty boats that the resort operator was throwing garbage in the middle of the sea. Locals have been able to identify the shortage of garbage collection services that they do not have a fixed schedule of services. Additionally, some garbage barges are in very bad condition and are in dire need of repair. There are also some parts of the garbage barge that began to break resulting in many plastic bags containing trash drifting away from the barge.

It is often the case, and it is more embarrassing when there is a receipt with the name of the resort in the plastic bags. Rubbish in the pontoon is also not often picked up resulting in high rubbish

stockpiling and overflowing. Average garbage collection users suggest that these services need improvement and they do not like to see garbage bags falling from garbage drifts drifting to the seafront and polluting the seas and coral reefs. Some even blamed the trash operator when asked about drifting trash, “They do not know how to store the trash properly; they are still dumping waste on high heaps” (Norashima, 2006: 22).

4.2 Discussion

Population growth and rapid urbanisation contribute significantly to the growing volume of solid waste generated in Malaysia. Based on studies carried out by the National Solid Waste Management Department (JPSPN) in 2012, 33,000 tonnes of solid waste was generated in Malaysia of which 15,000 tonnes was from food waste. Additionally, studies from the Ministry of Housing and Local Government found that about 70% of waste was recovered, but only 1-5% was recycled while the rest was taken to the landfill. In order to change this unsustainable solid waste management practice, the ministry has identified the need for more research on a strategic plan of solid waste management, solid waste composition and its characteristics, recycling, composting, fuel from waste and others.

National conservation strategies have established that sustainable tourism principles should take into consideration aspects of conservation and sustainability of natural, social and cultural resources

and waste reduction to avoid cost recovery. The Commonwealth Secretariat has identified that the characteristics of small islands such as isolated and distant lands, openness and exposure to natural disasters and environmental changes, poverty, limited capacity in public and private sectors are a challenge in developing an island. The population growth projection in Perhentian Island is expected to increase the production of municipal waste. High growth in the tourism industry is not the main reason for the increase in residual income here; the focus is on increasing existing capacity. However, the volatility of tourist arrivals affects the collection, transportation, treatment and residual capacity resulting from tourism activities. Good solid waste management is socially, politically, environmentally, economically and technologically efficient (Jamaluddin, 2007).

Managing solid waste requires basic information such as knowledge of the type of solid waste disposed of, the solid waste quantity, where solid waste generation occurs, and the party that generates solid waste and what will happen to the solid waste. In this regard, it is clear that the management of solid waste in Perhentian Island should involve all parties including local authorities, locals, and tourists. Without the involvement of all parties, the management of solid waste in Perhentian Island will be inefficient. Integrated solid waste management is critical and needs to be implemented promptly. This solid waste management has undergone a very serious change as solid waste produced by humans is growing and needs due diligence. Integrated solid waste management is not just about controlling the solid waste generated but more importantly how this system is able to

provide a level of clean environment and good health to locals and tourists.

Concerning the concept of sustainable development, as noted in the Brundtland report (1987 World Commission on Environment and Development reports), development should be carried out in a way that will not affect the future generation's ability to meet their needs. This encompasses the concept that we should not abandon the problems that future generations must face (for example, contaminated or unrecoverable land, air and water), and limited resources need to be maintained and preserved. This approach is appropriate in the waste management process. Therefore, the authority's approach to managing waste in Perhentian Island is to ensure that waste handling, treatment and disposal should be managed eco-friendly to mitigate the long-term effects of waste. To this end, the Terengganu State Structure Plan 2015 suggested the establishment of a moving station for solid waste management. Transfer stations are proposed in major island areas such as Perhentian, Redang and Kapas Islands.

The addition of transfer stations in other resort islands such as Lang Tengah and Tenggol Islands will be subject to the study of the maximum carrying capacity of the islands. These moving stations will collect and compress the waste before being sent to major disposal points. However, detailed studies have to be carried out to ensure the suitability of the proposed method to address the problem of solid waste disposal in the islands.

This study proposes five waste management plans for Perhentian Island. First, this study suggests that the plan should seek new waste management facilities in line with the principles of sustainable development and the following waste management hierarchies (i) Reduction, (ii) Reuse and recycle, (iii) Composting, (iv) recovery (including energy from waste) and, (v) Disposal. Second, composting is practical and effective to be implemented in resorts. Nature-friendly compost bins should be provided at every resort and chalet to manage the disposal of food waste from the restaurants. Third, distribute appropriate information and provide appropriate education on waste issues among the community. To ensure that this is successful and effective, it needs to be managed by a respected party involved in managing sustainable waste in Malaysia.

Fourth, local authorities should support public, private and voluntary public sector initiatives to increase reuse of goods, recovery of used goods, and use of recyclable goods. The average public awareness of waste management in Perhentian Island is low. Programs to raise public awareness and community awareness should be established to support the establishment of recovery and recycling schemes in the future. This should highlight the seriousness of the problem and show the benefits of reducing, isolating, and recycling waste. All parties such as civil society, governments and individuals must work together in the pursuit of this program. Lastly, the best way to overcome the problem of soluble waste in Perhentian Island is through recycling.

Resort operators are strongly encouraged to recycle as the sea is used as a place to dispose of waste. The recycling campaign was launched in 1993 and again in 2000. However, the percentage of recycling rates among the population is still low, and the government is trying to target 22% of recycling by 2020. The percentage of recycling in Malaysia is still lower than in developed countries which have exceeded 50%. Hence, recycling programs need to be enhanced, and all parties should take continuous efforts in realizing an effective recycling program in Perhentian Island to achieve sustainable solid waste management.

5. CONCLUSION

Most small islands in Malaysia face challenges in ensuring sustainable use of natural resources and eco-friendly waste management. The unique social, economic, and environmental features of Perhentian Island such as the lack of extensive areas and the scarcity of human resources and financial resources are waste management barriers. The problem is worsening with the advent of holidaymakers during the holiday season which increases the cost of waste disposal. This makes it difficult for authorities to manage waste with limited waste management facilities. Hence, A particular organization or individual should be given full responsibility for implementing the plan as well as reporting on current developments and evaluating whether it achieves the objective or not.

Procedures for coordinating the activities of different agencies need to be regulated. The budgets for various actions need to be established, and it should get the approval of the authorities. The authorities need to formulate strategies to ensure sustainable waste management efforts. The role of the public and private sectors is necessary for this effort. To address the problem of solid waste disposal in Perhentian Island requires the involvement of all parties whether local authorities, state governments, central government, private parties as well as locals. Without the unanimous support of all parties, what is planned to be implemented in addressing the problem of solid waste disposal will not achieve its goal.

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