The Social Sciences 8 (2): 166-171, 2013
ISSN: 1818-5800

The Perception of the Coastal Community on the Management of Solid Waste Disposal along the Johor South Coast

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Abstract: Waste is part of the environmental problems that is synonymous with development change and population increased. Studies on waste is not just confined to the urban ecosystem but its presence in various ecosystems either through man-made or naturally, could give an impact to the environment. Sequences to that a study of perceptions on waste management among coastal communities along the South Johor coast were conducted. Behavior and awareness of waste management are part of import aspect as indicators of community perception. The findings of the study show that the coastal community along South Johor coast on awareness and the impact generated from the coastal waste is high. However, in terms of their efforts to reduce waste and its management aspect, they are still practice of waste buried. Their exposure and involvement on waste management is still lagging. The findings also clearly indicated that involvement of department of environment, local authorities and other government agencies, private sectors and local residents are important in order to promote an integrated waste management for South Johor coast.

Key words: Coastal community, waste management, integrated solid waste management, Iskandar region, perception

INTRODUCTION

The problem of solid waste and its disposal is not only limited to urban ecosystem but also in various man-made or natural ecosystems. There have been various studies conducted on solid waste disposal issues. Several were focused at the management level, such as the local authorities (Lohani and Hartono, 1985; Kirca and Erkip, 1988; Bai and Sutanto, 2002; Kaseva and Mbuligwe, 2005; Zia and Devatas, 2008; Sha'Ato *et al*., 2007; Chung and Lo, 2008). Some focus on insular and highlands ecosystems. There were also studies on perspectives of students at public higher learning institutions and the households (Tonglet *et al*., 2004).

There have been many studies on the role of institutions, government bodies and private sectors in the management of waste conducted by foreign reseachers, such as MacDonald (1996), Daskalopoulos *et al.* (1998), Evison and Read (2001) and Robinson and Read (2005). The various studies on wastes were not only limited to aspects like its generation, storage, treatment and elimination (Tchobanoglous *et al*., 1993) but also focused on technological application in waste management as conducted by Sarptas *et al*. (2005), Samsudin *et al*. (2006), Ghose *et al*. (2006) and Gohlke and Martin (2007).

Nevertheless, studies on the perception of Malaysian coastal community on the issue has not been attempted. This study, therefore is an attempt to fill in the gap of information on management of solid waste in the ecosystem of this coastal community as part of the greater natural ecosystem. Given the waste pollution threat to the extensive coastal ecosystems, it is vital to understand one of the coastal communities viewpoints, behaviour, attitude and awareness of waste disposal management issues. The focus of this study, therefore was the community of the coastal areas of the Southern coast of Johor. The findings shall assist the authorities and various stakeholders to address the waste disposal management issues among the coastal community in particular and to contribute to the database to manage waste disposal issues in other coastal areas.

MATERIALS AND METHODS

This study analysed both primary and secondary data. The primary data were obtained through observation

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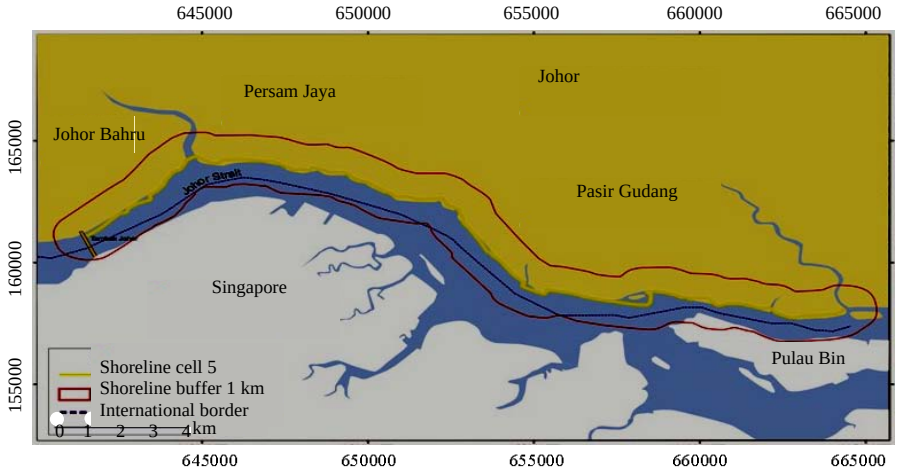

Fig. 1: Study area along the Johor South coast

and interviews as two major methods for this study. Observations were conducted at residential areas of the coastal community including the fishing villages and Orang Asli settlements. The observation technique is significant for through it, actual situations or cases of waste management issues can be properly identified and analysed. A total of 255 sets of questionnaires were randomly administered to get the comprehensive data on the perception of the coastal community on the waste management issues. Interviews were conducted to obtain their opinions on issues related to waste management including their perception on services of the local authority. To complement the primary data, secondary data was also obtained particularly from published sources such as books, journals, annual reports of the local authorities like the MPJB, central MPJB, MP Pasir Gudang and others in the form of written documents and online sources. The study area encompassed the coastal community along the Southern Johor coast stretching from Kukup Laut under Pontian Town Council to Pasir Putih within the Town council of Pasir Gudang. Figure 1 shows the villages or settlements involved in the study.

RESULTS AND DISCUSSION

The respondents profile: This study involved 21 villages along the coast with the majority of the respondents being the heads of the families at 78%. The rest were made up of their spouses which were 13.4% and their children which stood for only 8.6%. Their ethnicity were 85% Malays and 15% Orang Asli. As for the respondents' educational background, 42.6% them had primary school education while 18.5% never attended school. About 36.1% of the repondents had some secondary education experience; 22.4% attended lower secondary and 13, 7% with upper secondary education. Very few respondents

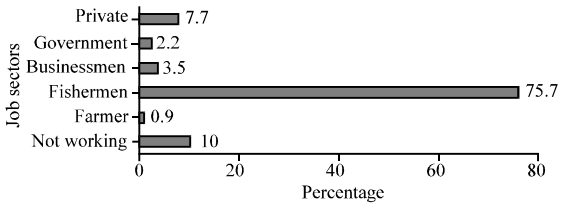

Fig. 2: Type of job sectors among the coastal community

Table 1: Level of education

Education level	Percentage
Never go to school	18.5
Primary schools	42.6
Lower secondary school	22.4
Upper secondary school	13.7
College/institute	1.2
University	1.6
Total	100.0

obtained higher education at either college or university levels. Only about 1.2% attended college and 1.6% had university education. Overall, the collective number of respondents with some level of education ranging from primary to university levels was quite high at 81.5% compared for those with no formal education at all at 18.55% (Table 1).

The job sector items clearly showed that fishermen dominated all other types of major occupation (75.7%) among the coastal community. The number of unemployed respondents was only at 10% while those in small business were at (3.5%). Government employees and private sector employees were at 2.2 and 7.7%, respectively. While farming respondents only stood at 0.9%, the lowest occupational sector of the community (Fig. 2).

The data also indicated that the basic amenities provided to the community. It shows that almost 100% of them have both piped water supply and electricity at

Table 2: Amenities among the coastal community along the Johor South coast

Amenities	Classification	Percentage
Water supply	Piped water supply	98.0
Electricity	Electricity	98.4
Toilets	Flush toilet	16.5
	Dug out latrines	14.1
	Bushes, sea or river as outdoor latrines	2.3
Telephone	Fixed line telephone	23.6
	Mobile phone	83.8

98 and 98.4%, respectively. The use of flush toilet was at 16.5%. There were some who still use dug out latrines (14.1%) and bushes, sea or river as outdoor latrines (2.3%). The use of mobile handphones was higher than the fixed line facility. Only 23.6% of the respondents had fixed line telephone at home. While 83.8% kept handphones (Table 2).

The community perception, their behaviours and awareness of waste disposal management: Burying their waste is the community's top method for waste disposal among 50% of the respondents. This is a traditional method, due to the availability of spots for such practice and relative ease of the task. The survey also found that only 25.3% of the respondents packed their wastes in plastic bags and dropped them at designated dump sites. Whilst 6.8% had their waste packed into plastic bags but dropped them into the sea. Interestingly, 4.4% of the respondents dropped their waste directly into the sea and 2.9% disposed theirs around their own compound. Table 3 shows the methods of diposals practised by the respondents.

Regarding the repondents awareness and knowledge on the impact of waste on their socio-economy; most of them were aware of the benefits of proper waste management, especially through recycling efforts. The data shows that 82% of the respondents gave positive reactions compared to those who were skeptics of the recycling and composting benefits which stood at 15.0 and 3.0%, respectively. Figure 3 shows the contribution of proper waste management to the economic sector.

Inefficient waste disposal management, particularly the collection of waste and lack of systematicity in its disposal or elimination, may cause major pollution of the environment. The waste generally affected the environment not only in changing the physical sorrounding but also affected the conduciveness of human living environment. Inefficient management of waste disposal may cause air, water, odour pollutions and damage esthetic values of the sorrounding areas. Collectively unmanaged waste may adversely affect human health and living conditions.

The respondents' perception on the environmental impact due to inefficient waste disposal management were

Table 3: Method for waste disposal

Method of waste disposal	Percentage
Packed in plastic bags and dropped at designated dump sites	25.3
Packed in plastic bags and dropped into the sea	6.8
Dropped directly into the sea	4.4
Disposed around their own compound	2.9
Burying their waste in backyard	60.7
Total	100.0

Table 4: Environmental impact due to inefficient waste disposal management

	Percentage		
Environmental impacts	Yes	No	Not sure
Water pollution	64.2	34.3	1.5
Odour problems	55.1	40.6	4.3
Esthetic/scenery	65.7	31.5	2.8
Health problem	50.8	44.9	4.3
Clogged drains	50.4	48.0	1.6
Damaged nets	52.8	41.7	5.5

Table 5: Perception of respondent on the link of diseases with disposed wastes

Link of diseases with disposed wastes	Percentage
Skin diseases	44.0
Headache	43.0
Cancer	11.0
Bone problems	2.0

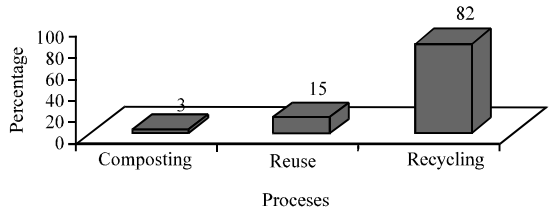

Fig. 3: Impact of waste on coastal community socio-economy

based on their observation of water pollution, odour problem, unsightly scenes, aesthetical damages, clogged drain, damaged fishing nets, due to floating waste in sea and river of their coastal area. The survey data in Table 4 shows that all indicators for environmental changes caused by waste were marked by >50% of the respondents who attested to these occurences. Findings on their perception of water pollution and unsightly scenes stood at 64 and 65.7%, respectively. Their perception on clogged drains and damaged nets due to poorly disposed waste stood at 50.4 and 52.8%, respectively.

In the mean time, the respondents perception on disposed wastes as source of health problems also showed their high level of awareness at 50.8%. This is evidently clear when 65.2% of respondents agreed that disposed waste may cause diseases. While 20.1% pleaded ignorance, 14.7% of them were unsure whether disposed wastes caused illnesss. Table 5 indicates the perception of link between diseases and disposed wastes.

The respondents' perception on the link of diseases with disposed wastes were evident in occurence of cancer, skin infectins, headache, dizziness or rheumatism in the community. Skin diseases and headache were two major health issues indicated by the respondents as linked to the disposed wastes at 44 and 43%, respectively. Waste as a cause of cancer was indicated at only 11%. Table 5 shows the diseases linked to disposed wastes.

Waste disposal management of the coastal community: Effective management of local waste disposal is an important component in the management of waste in larger environment ecosystem. Systematic and efficient management may ensure the resilience, sustainability and equlibrium of human enviromental sorroundings. The respondents' perception on the waste management issues provided a feedback on the community's various level of awareness and knowledge at individual, communal or authority levels. Their perceptions on disposal of solid waste also underscored the need for an integrated waste management effort by all the stakeholders.

The data in Table 6 shows that almost half or 47.8% of the number of respondents managed the disposal of waste on their own. The town council also played a key role in the disposal with 41.9% of the respondents stated that their waste disposal was undertaken by the local council. About <10% of the respondents indicated that it is done by other parties. About 2.7% of the respondents indicated department of environment and 3.8% mentioned private collectors and villagers.

The perception of the community on waste management assistance from private sectors such as hotels, resorts, seaside restaurants and recreational companies was indicated as negative. Only 5.6% of the respondents stated that these sectors did assist in managing the solid waste disposal along their coast. While 94.4% of the respondents opined that there was no assistance of any form from these particular commercial tourism sector.

Analysis on the generation of waste disposal is an important component in any study on waste disposal, particularly that which link to waste-specific data and modelling. Not many studies in Malaysia was conducted on specificity of waste types and their analytical breakdown. For this specificity purpose, types of disposed waste generated at the level of the households should be identified. In this study, the types of disposed waste generated by the coastal community were consisted of three components, i.e., plastics, papers and food leftovers. Based on their perception, it was found that plastics and food waste were the most generated by the coastal community households. Plastic waste were top at 48.4%, followed by food waste at 44.9%. Table 7 shows the types of waste generated by the coastal community.

The perception of the respondents on the volume of daily waste generation indicated as a rank of 1 and 1.5 kg day^{-1} for about 28% of the community. This is followed by a generation of 1 kg day^{-1} (23.3%), while 0.5 kg day^{-1} and 2 kg day^{-1} were, respectively at 18.2 and 15% (Fig. 4). Only 5.1% of the respondents were unsure to give their approximation of their household waste generation. This trend of waste generation is not much different with waste generation by urban households in urban ecosystem. According to Ministry of Housing and Local Government, the generation of waste in a quantity 1-1.5 kg day^{-1} in Malaysia is typical.

The perception of the respondents on the best method to dispose their wastes indicated that half of them chose open burning (46.7%). While, those opting for landfill was (23.6%) and those for sanitary landfill was only 11.2%. The percentage of preference for open sanitary landfills was almost the same as for thermal or incinerator methods which was at 11.6%. The practice of reducing waste at the source of origin and recycling or reuse were the least preferred method of disposal at only 2.9 and 4.0%, respectively (Table 8). Based on this perception, the community's proper awareness level of waste management was still low. With the practice of open burning still dominating their mode of waste disposal, evidently more need to be done to raise their

Table 6: The number of repondents managed the disposal of waste

Type of respondents	Percentage
Local authority	41.9
Department of environment	2.7
Private collectors	3.8
Villagers	3.8
Managed of waste on thier own	47.8
Total	100.0

Table 7: The types of disposed waste generated by the coastal community

Types of disposed waste generated	Percentage
Plastics	48.4
Food waste	44.9
Papers	6.7
Total	100.0

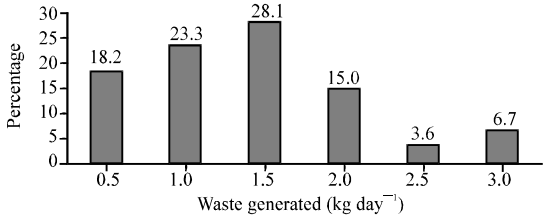

Fig. 4: Perception of the respondents on the volume of daily waste generation

Table 8: The best method to disposed wastes

Method to disposed wastes	Percentage
Open burning	46.7
Open landfill	23.6
Sanitary landfill	11.2
Thermal or incinerator	11.6
Waste reduction	2.9
Recycling and reuse	4.0
Total	100.0

awareness level for proper waste management among the Southern Johor Coast coastal community. Overall, the community behaviours, awareness and understanding of the waste disposal management is reasonably appropriate albeit the need for more action from other stakeholders of the waste management.

The survey analysis did indicate that the community, although had certain level of awareness and concern about proper waste management, yet 60.7% of the respondents chose to bury it in their backyard. This situation arised due to the fact that the local authority had not play its disposal role effectively. An evident was that individuals scored higher precentage of 47.8% (Table 3) for managing their own waste, compared to that of the local authority at 41.9% (Table 6).

The respondents awareness on the impact of waste generation and disposal on the environment was evident when half of their total responses were on indicators linking polluted environment to waste disposal (Table 5). Their linking of diseases to solid waste disposal was also high among respondents (65.2%). Their awareness on the importance of recycling for economic benefits was also high with 82% of respondents giving positive reactions. Responses on recycling, reuse activities and composting is shown in Fig. 3.

Even though, the coastal community has an awareness on the process of waste management such as collection, transportation, elimination and its impact on the environment and the respective roles of the authorities, their own involvement, nevertheless was at a very low level indeed. The findings indicated that almost 46.7% of the respondents opted for open burning as their top method of waste disposal (Table 8). This calls for for their increased engagement at their household and neighborhood levels together with local authority, Department of Environment (DOE), environmental NGOs and the media to raise the level of waste management in this coastal community.

CONCLUSION

Generally, there is a need for an integrated management of waste disposal for the resilience and sustainability of the environment. The findings of this study did indicate the respondents high awareness and understanding of the environmental impact of the wastes. They were also aware of the need for proper management and roles of the parties responsible for waste disposal. Nevertheless, despite these awareness, the community still opt to bury their wastes in their backyard as a primary mode of waste disposal.

The community seemed to opt for open burning compared to other means of waste disposal such as usage reduction at the source level, recycling, reuse, composition and incineration. The findings clearly indicated that the community still lack of exposure to proper waste management and the related issues.

The findings also indicated the vital need for integrated waste disposal management through coordinated involvement of various government and private agencies such as Department Of the Environment (DOE), local authority and individuals to raise the community awareness and committment for proper management of wastes disposals. Campaign and dissemination of information on the issues should be sustained to ensure the community is engaged with proper management of waste disposal hence the sustainability of the physical aspects of the environment and human welfare. This scenario shall ultimately become an asset to draw tourists which may benefit the community and reduce their eco-system sustainability.

ACKNOWLEDGEMENTS

This stduy is part of research findings from the UKM-GUP-JKKBG-08-05-019 research grant. The researcher would like to thank the UKM, CRIM and NIC of National identity, Nation State, Cultural diversity and Globalisation (JKKBG) (OUP-2012-017) which provided the grant to fund this research.

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