

ASSESSMENT OF SOLID WASTE MANAGEMENT SYSTEM AND PUBLIC PERCEPTION ABOUT THE CONSTRUCTION OF A NEW LANDFILL TOWARDS THE SUSTAINABILITY IN KUALA PILAH, NEGERI SEMBILAN

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ABSTRACT

Solid waste management has become a major concern in Malaysia, especially in urban areas. The issue of solid waste management becomes more complex when existing landfills are no longer able to accommodate the solid waste generated. The limited land thus becomes a major problem in opening a new landfill. Many existing landfills in Malaysia are no longer suitable because most of these landfills have exceeded the allowable span. The present study covers the area in the district of Kuala Pilah, Negeri Sembilan. This study was conducted to determine the performance of solid waste management in Kuala Pilah and to evaluate the public perception about the construction of a new landfill in affecting the sustainability in Kuala Pilah. Kuala Pilah was chosen because there is no study related to solid waste management issues just yet whereby the existing landfills have already exceeded the expected life span, and a new landfill site should be identified. However, before proceeding to the opening of a new landfill site, many issues need to be addressed, especially the sustainability. The methods used in this study document review, questionnaire, and interview. The focus of this study will be divided into two fractions, being solid waste management and landfill management in Kuala Pilah. Though local authorities face a major problem due to lack of financial resources, they always try to give the best services to the community. Their effort was indicated by the increasing of complaints in municipal service. The findings could help stakeholders in the management of solid waste and landfill towards sustainability and assist stakeholders in achieving the objectives of the Local Agenda 21.

Keywords: Environment; landfill; solid waste management; sustainability.

INTRODUCTION

Good practicing in solid waste management system can preserve the ecosystem and helps extend the life spans of a landfill. The local authority is one of the agencies responsible for managing solid waste and public cleansing. The local authority is also known as Pihak Berkuasa Tempatan (PBT) is responsible for increasing the level of hygiene with the use of local energy exercise involving the local population, especially in residential areas in the implementation of Local Agenda 21 [1]. PBT is a government agency that is closest to the public. Chapter 28 of Local Agenda 21, emphasized the role of local authorities as an agency that plays an important role in educating and promoting sustainable development to the residents. In Kuala Pilah, Negeri Sembilan, the Local Authority (PBT) that responsibility for managing solid waste and public cleansing is Majlis Daerah Kuala Pilah. The existing landfill located in Kampung Ulu Maasop, Senaling Kuala Pilah. The landfill began operating in 1981 until present. There is no data collection was made to measure the amount of waste disposal per day because the landfill is not well equipped with any weighing bridge. The average of waste disposal is 65 tons per day depends on the trip of a garbage truck. Kuala Pilah required a new landfill because the life of existing landfills is estimated to be in operation for two years only. Some of the existing landfills was closed by Jabatan Pengurusan Sisa Pepejal Negara (JPSPN). However, leachate water from the site that still active flowed directly into the creek nearby without any treatment. The new landfill should be concerned with aspects of sustainability taking into account the impact on the environment, social and economic. The framework should be built after identifying all the issues and problems to assess the suitability of the site based on impact obtained after the study to assist stakeholders in decision-making to identify the impact of environmental, social and economic to the stakeholders in Kuala Pilah. Assessing risk perception and benefits to the stakeholders on the management of the landfill and the construction of a new landfill in Kuala Pilah and determine whether the need for the building of a new landfill in Kuala Pilah.

METHODS

According to Foo, solid waste management is the biggest challenge in the whole world, especially in rapidly developing urban areas [2]. Level solid waste management can be evaluated regarding the financial health of local governments; an agency tasked with providing solid waste collection and public cleansing to the local community. In this case, the financial position of local authorities will be studied to make sure solid waste collection service quality provided in Kuala Pilah are affected or not. The study conducted by Cointreau states that most cities in developing countries, Local Authority is responsible for providing facilities and funds for solid waste management. The study will be conducted using quantitative and qualitative methods (based on interviews and questionnaires) [3]. The questionnaires will be loaded with a more inclusive working process of departments and agencies involved so that starting from the collection of solid waste disposed of in landfills. This is to identify the issues and impact on the environment, economic and social.

RESULTS

Figure 1 shows the total population receiving solid waste collection services: 32, 054 from 63,874 people received the services, and the service area is 234.5 square kilometers from 1,090.42 square kilometers of Kuala Pilah are received the services. The estimated disposed wastes are 65 tons per day (based on SW Corp data.)

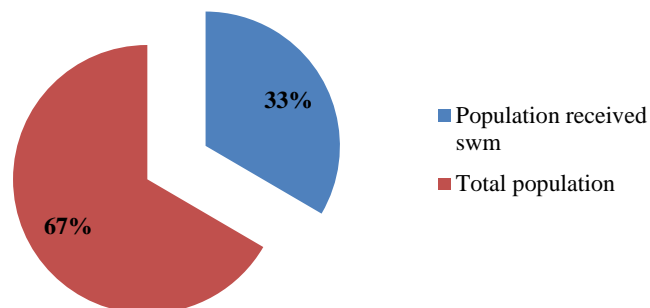


Figure 1. Total Population Received SWM Services

Table 1 shows the payment information of solid waste collection services that recorded and calculated from full privatization of solid waste management and public cleansing on 1st September 2011 until of October 2016 and in Table 2 is the tonnage of solid waste that had been collected from September 2011 until of October 2016.

Table 1. Payment Information of Solid Waste Collection

Description	Amount (RM)
Invoice (SW Corp)	10,974,449.42
PBT payment (monthly)	4,860,000.00
Contribution from JPSPN	2,688,721.37
PBT debt	3,145,728.05

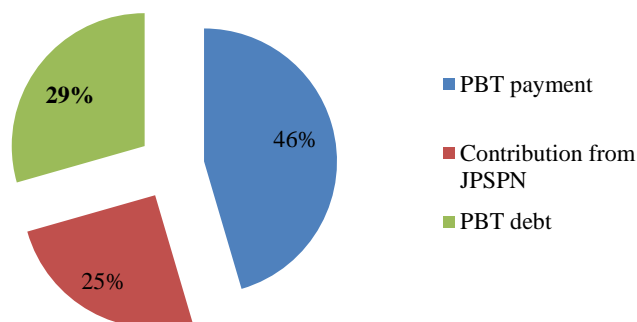


Figure 2. Percentage Information of Solid Waste Collection.

Table 2. Data For Solid Waste Collection from September 2011 until October 2016.

Year	Landfill	PBT	Month	Tonnage (kg)
2011	Ulu Maasop	Kuala Pilah	Sep-11	1428.00
			Oct-11	2138.00
			Nov-11	1834.00
			Dec-11	1528.00
				6928
2012	Ulu Maasop	Kuala Pilah	Jan-12	1809.00
			Feb-12	1646.00

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			Mar-12	1461.00
			Apr-12	1244.00
			May-12	1774.00
			Jun-12	864.00
			Jul-12	1377.00
			Aug-12	2020.00
			Sep-12	1437.00
			Oct-12	1564.00
			Nov-12	1460.00
			Dec-12	1753.00
				18409
2013	Ulu Maasop	Kuala Pilah	Jan-13	2046.00
			Feb-13	2496.00
			Mar-13	1230.00
			Apr-13	1460.00
			May-13	1120.00
			Jun-13	1110.00
			Jul-13	1377.00
			Aug-13	2152.00
			Sep-13	2158.00
			Oct-13	1992.00
			Nov-13	2158.00
			Dec-13	1140.00
				20439
2014	Ulu Maasop	Kuala Pilah	Jan-14	1820.00
			Feb-14	1888.00
			Mar-14	1980.00
			Apr-14	1901.00
			May-14	1813.00
			Jun-14	1918.00
			Jul-14	1254.50
			Aug-14	1227.60
			Sep-14	1381.40
			Oct-14	1397.50
			Nov-14	1355.90
			Dec-14	1428.40
				19365.30
2015	Ulu Maasop	Kuala Pilah	Jan-15	1533.15
			Feb-15	1348.77
			Mar-15	1450.23
			Apr-15	1485.26
			May-15	1537.12
			Jun-15	1466.88
			Jul-15	1536.00
			Aug-15	1558.52
			Sep-15	1517.30
			Oct-15	1508.72
			Nov-15	1517.99
			Dec-15	1531.49
				17991.43
2016	Ulu Maasop	Kuala Pilah	Jan-16	1490.40
			Feb-16	1376.20
			Mar-16	1517.00
			Apr-16	1567.70
			May-16	1423.50
			Jun-16	1398.40
			Jul-16	1438.60
			Aug-16	1478.80
			Sep-16	1470.78
			Oct-16	1431.50
				14592.88
TOTAL				97725.61

Table 3. Data for Municipal Services Complaint (2007 - 2016)

		2008	2009	2010	2011	2012	2013	2014	2015	TOTAL
Drain	20	22	47	55	22	21	19	6	3	215
Grass	14	8	31	23	13	11	9	6	2	117
Waste is not collected	13	7	24	17	44	5	10	7	2	129
Rubbish bin	8	16	23	27	13	5	2		3	97
Illegal dumping	4	4	11	2	8	2	5	1		35
Construction waste	1	3	2	2	1	2	1	1	1	14
TOTAL	60	60	138	126	101	46	46	21	11	607

DISCUSSION

According to the statement of payment history information, conclude that the financial position of local authorities is not very stable in making full payment to the SW Corp. This is because charges apply to the local community through the assessment are not accommodate for payment of solid waste management and public cleansing. Therefore, the question of how the performance of solid waste management can be improved while PBT is heavenly indebted and how the local authorities can manage the construction site for siting a new landfill while existing debt increasing every year. These problems become more critical when the whole residents in Kuala Pilah receive solid waste collection services. Are the local authorities are capable regarding financial resources, especially in managing landfill. Therefore, a strong financial position is also important to help local authorities in the management of solid waste until dumping to the landfills [4]. This is because to ensure that operations run smoothly in landfills, various machinery and technology and expertise is crucial to avoid pollution to the environment. All of this becomes a tool of control in ensuring that the discharge does not cause harm to the environment and local communities [5]. The issue of site management and solid waste not only gives problems directly and indirectly to the environment but also on the social and economic development of our country as a result of the increase in human population, land use restrictions and increase in economic activities [6, 7].

Starting in 2016 and 2017 no financial aid is provided by the federal government to cover the cost of solid waste management and public cleansing. The total solid waste collection does not show a significant increase because the services are only provided to the residents who are subject to assessment tax only, and there is no rapid development in Kuala Pilah. A resident who does not receive waste collection services contributes to the problem of illegal dumping that contributes to environmental issues. The solid waste collection still needs to properly manage even though local authorities in debt and total revenue unable to accommodate the payment of solid waste management and public cleansing. Local authorities often face problem beyond the ability of they to tackle [8] mainly due to lack of organization, financial resources, complexity, and system multi dimensionality [9]. In this study, solid waste collection data cannot be used as a major reference in this study. This is because the landfill is not equipped with weighing bridge. However, this data can still be used as a reference to conclude that local authorities are working hard to ensure that solid waste collection can be carried out even they are forced to bear the burden of increasing debt every year. As shown in Table 3, decreasing complaints report in municipal services show that local authorities are always trying to provide the best services to the community.

A good solid waste management can also be seen on the level of awareness that can be measured through their participation in the awareness campaign held. The importance of the involvement of local authorities described by Zia Devadas which states that the involvement of local authorities is a significant effort to improve the efficiency and effectiveness of solid waste management system [10]. PBT is one of the agencies responsible for providing advisory services and awareness campaigns to encourage people the importance of protecting the environment. Policy makers need to learn from past case studies that have been successful and to adopt these methods in their agency [11]. Between campaigns are often held by local authorities is also recycling and composting. Various measures have been undertaken by the government to reduce waste in landfills [12]. PBT, assisted by other agencies such as SW Corp, SWM Environment and Solid Waste Management Department (JPSPN) provides a variety of programs throughout the year to educate the public consciousness. However, the extent of the activities planned and carried out to change the attitude of society as a predetermined goal. Education in the early stages of a child is able to apply moral values to them.

As we are aware, enforcement is one of the criteria that can help educate and raise awareness. Accordingly, the laws adopted by local authorities to be seen whether it can have a positive impact on society. PBT should be more aggressive in its enforcement activities with the assistance of the SW Corp. SW Corp which is also responsible for the enforcement of Act 672 and Act 673. If the level of enforcement are very low and the enforcement of policies and laws that apply do not work, this could contribute to the weakness in solid waste management and can leave a negative impact on the environment, social and economics

Technical requirements and expertise is one of the important factors that contribute to the achievement of good solid waste management. Determination performance can also be measured through the work carried out by ensuring all necessary procedures are followed. Policy makers who lack the background and knowledge of technical terms will lead them unsure about what they should do [13]. Therefore, local authorities should have expertise and experienced to ensure that solid waste can be managed with good handling until it disposes to the landfill. Technically measured by the machinery and equipment used during collection activities until disposal. Indrayana and Silas explains in his research that in the scheme of collecting primary, local communities will be responsible for handling and storage of solid waste at the household level, the collection of solid waste from door to door, transportation and storage of solid waste from door to door, transport and storage of solid waste at the community level and the implementation of the program of recycling, reuse and composting [14]. Other

developing countries such as Bangladesh, Zambia and Vietnam have similar approach with Malaysia. The primary collection scheme carried out effectively because of inefficiency and local authorities in the country in providing solid waste management services, particularly collecting from door to door, especially in the area of housing and business [15]. This condition causes the urban population in these countries are faced with heap of solid waste on the roads and in various locations and create a variety of pollution problems [16].

Each of the agencies involved in solid waste management and public cleansing have their respective roles. Therefore, the efficiency of the organization to carry out their duties plays a very important role. Integrated solid waste management are cooperation with all the agencies that have been entrusted and also the local community. Integrated management of solid waste is a very comprehensive approach to recycling and solid waste management in the best way to protect humans and the environment [17].

CONCLUSION

The financial position of local authorities is an important aspect in ensuring services level of solid waste management and management of landfill are at satisfactory. The decreasing complaint of municipal services shows that local authorities have improved its service to the community. However further research needs to study to assist local authorities in improving collection performance of solid waste and towards developing a sustainable landfill. This study also can assist stakeholders in managing solid waste and landfill in achieving the objective of Local Agenda 21 as the result of the data analysis obtained during this study.

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