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Attitude and Expectation: Food Waste Recycling as a Business Opportunity in Terengganu

Wan Nawawi Wan Nawawi[1]*, Sopiah Ambong @ Khalid[2], Noorazlin Ramli[1] and Norzaidi Mohd. Daud[3]

[1]Faculty of Hotel & Tourism Management, Universiti Teknologi MARA (Terengganu), 23000 Dungun, Terengganu, Malaysia
[2]Faculty of Chemical Engineering, Universiti Teknologi MARA (Terengganu), Bukit Besi Campus, 23200 Bukit Besi, Dungun, Terengganu, Malaysia
[3]Faculty of Business Management, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

ABSTRACT

The objectives of this study are first, to understand community attitude in food waste recycling as a business opportunity and second, to gauge their expectations of the local authority. In order to examine the above, a total of 171 respondents residing in Kuala Terengganu for at least two years were interviewed for this study. The results indicated that the community showed a moderate level of interest in engaging in food waste business opportunity and had high expectations of the local authority whereby they believed that the latter should aggressively promote recycling food waste products through the media, establish early education of food waste recycling in schools, enforce law to fight food waste problem and lastly, provide financial aid and courses for interested parties to get involved in the business of converting waste to money.

Keywords: Anaerobic digestion, attitude recycling, business opportunity, compost, expectation, food waste, Terengganu

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E-mail addresses:
wanna035@tganu.uitm.edu.my (Wan Nawawi Wan Nawawi)
sopia170@tganu.uitm.edu.my (Sopiah Ambong @ Khalid)
noora115@tganu.uitm.edu.my (Noorazlin Ramli)
norza544@salam.uitm.edu.my (Norzaidi Mohd. Daud)
* Corresponding author

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INTRODUCTION

Urban residents are estimated to produce 1.5 pounds of solid waste each day. In Malaysia, solid waste consists of 47% percent food waste, 15% paper, 14% plastic, metal 4%, 4% wood, textiles 3%, 3% glass, 1% rubber/leather and the rest other materials. According to the Ministry of Housing

and Local Government statistics, in 2012, 25,000 tonnes of solid waste were generated daily in Malaysia, in which Selangor was ahead of other states with a production of 2,955 tonnes of solid waste per day. This was followed by Federal Territory Kuala Lumpur (2,634 tonnes / day), Johor (2,002 tonnes / day), Silver (1,596 tonnes / day) and Kedah (1,383 tonnes /day). The increase of population around the world is deemed to be the main factor contributing to waste generation (Chandravathani, 2006; Manaf, Samah, & Zukki, 2009). According to statistics, the population of Malaysia had increased 40.5% within 15 years which has led to a corresponding increase in waste generated daily from 13,000 tonnes to 19,100 tonnes. Waste generation has an effect on the environment and thus it must be regulated in order to preserve a healthy environment. According to Agamuthu (2001), municipal solid waste in Kuala Terengganu increased from 8.7 metric tonnes per day in 1970 to 154 metric tonnes per day in 2005. Therefore, Kuala Terengganu needs to seriously address its waste management issues. According to Agamuthu and Fauziah (2009), 50% of waste generated in Malaysia is organic or food based, and it is increasingly annually. The Kuala Terengganu City Council (MBKT) also collected 300 tonnes of solid waste per day in clean-up operations in the city and which are taken to the landfill site at Sungai Ikan (Kuala Terengganu). Solid waste collection and disposal costs around RM7.75 million a year covering an area of 4,291.31 hectares; while in Redang Island it costs the council RM557, 280 year including transportation of solid waste from the chalets to the mainland. (Ministry of Housing and Local Government, 2012). Food waste from residential, commercial establishments such as restaurants, institutions, industries, school cafeterias, hospitals, and factories can actually be recycled. It is a growing issue and disposal is controversial, causing food prices to soar (El-Mashad & Zhang, 2010). However, food waste can also be turned into a commodity that can be reused.

By 2020, the target of 40% of solid waste can lead to a reduction of greenhouse gas emissions by 30%.

LITERATURE REVIEW

Worldwide, municipal solid waste is increasing at annual rate of 3.2% to 4.5% in developed countries and 2% to 3% in developing countries which include Malaysia (Agamuthu, 2001; Suocheng, Tong, & Yuping, 2001). Jalil (2010) contended that waste generation in urban areas is higher compared with rural areas as 65% of the Malaysian population reside in Kuala Lumpur. Waste generation is associated with three main factors, namely (1) the growth of economy, (2) the improvement of living standards and finally (3) the change in consumption pattern (Agamuthu, Khidzir, & Hamid, 2009).

Ineffective Food Waste Management in Malaysia

Several methods have been implemented in Malaysia in managing waste, such as waste recycling or reusing, incinerating,

open dumping or landfills and composting. Open dumping means waste is disposed of in an uncontrolled manner and such method can be detrimental to the environment. This method though primitive considered the cheapest way to dispose of waste (Rushbrook, 2001).

Sanitary landfills are another waste disposal method. In 1959, the US used this as its primary method of disposing of waste. The waste would be spread into a thin layer and compacted into the smallest practical volume. The thin layer of compacted waste will be covered up with compacted soil at the end of each working day or in a more frequent interval depending on the volume of waste (Corbitt, 1989). By utilising this method, the large volumes of waste could be handled and disposed of in a manner which does not endanger public health and is also environmentally friendly (Schroeder, Aziz, Llyod, & Zappi, 1994; Yalcin & Demirer, 2002).

In Malaysia, ineffectiveness of waste management is often associated with these contributory factors, namely (1) lack of education, (2) attitude and behaviour gap and finally (3) self-perception and self-interest. Attitude and behaviour gap are related to the community's attitude towards the generation of waste who believe that waste is a burden that needs to be discarded as soon as possible, although the behaviour of the community indicates otherwise (Moore, 2012). Attitude and behaviour gap are often associated with convenience, social norms, lack of public participation, lack of education and lack of awareness of effective waste management (Milea, 2009; Mosler, Tamas, Tobias, Rodriguez, & Miranda, 2008). Limited knowledge of waste management definitely affects its effectiveness since prior knowledge of the existing waste management should be able to prepare citizens to accept and implement new technology in managing waste (Poswa, 2001). Aini, Razi, Lau and Hashim (2002) opined that greater awareness among the community on environmental awareness and concern, inculcation of sustainable consumption practices and education will mitigate problems related to waste management as the community becomes receptive of new information and implement new technologies of waste management. Self-interest and self-perception are related to perception and interest of an individual in taking care of common properties whereby most individuals tend to take care of their own properties better (Scarlett & Shaw, 1999). However, Periou (2012) believed that self-perception and self-interest are highly associated with an individual's socio-economic background whereby those from lower socioeconomic backgrounds tend to believe they do not have the power to promote a healthy environment.

Methods in Managing Food Waste: Business Opportunities

Alertness to opportunities refers to a person's capability to recognise business opportunities. According to the literature, this refers to "alertness to changed conditions or to overlook the possibility." This definition suggests that a business opportunity can be

noticed by the persons who are not actively seeking for them but they may be able to convert that into an opportunity when the alertness is high. This is known as "passive search" whereby a person is not actively engaged in a formal search for business opportunity, but they are receptive to the opportunity (Ardichvili, Cardoo, & Ray, 2003). For instance, Greenco is the first permitted commercial food waste facility in Georgia, US which converts food waste into compost. Tim Lesko, the president of Greenco was the president of Sebia Inc, a French-owned medical supply distribution company in Atlanta. He learnt a landscape company spent $150,000 each year to haul away yard trimmings. The individual landscapers at Georgia are having trouble in hauling their yard waste and Lesko identified this scenario as an opportunity for business. Soon, Lesko found there was no composting facility in Georgia. Then, he planned to collect and compost the landscaper's yard trimming and sell the compost back to the landscapers (Tucker, 2010).

The methods in managing food waste have been converted into business opportunities such as food waste composting, animal feed processing, anaerobic digestion and electricity generation. Food waste composting is the most cost-effective method of recycling food waste and expanding the market. Organic compost or organic fertiliser is considered a means to grow organic produce due to growing demand for healthy food. According to Hossein and Dahlan (2015), food waste can be dehydrated and processed as poultry feed without adverse effects on the livestock. Besides, animal feed based on food waste is more cost effective compared with conventional animal feed and much more economical for the farmer. Conventional animal food requires high contents of protein for better quality livestock, which in turns results in a high price for their meat. Currently, anaerobic digestion is a well-known method for recycling food waste due to its benefits in producing different kinds of green products. Most anaerobic digestions involve high cost compared with other methods of recycling food waste, but it appears to be more profitable in the long term. However, the Berkeley method which is hot composting, known as anaerobic treatment of food waste and the Bokashi method which is fermentation, known as anaerobic digestion, have been proven to be more cost effective. This fertiliser is nutrient-rich and has the ability to absorb more light than the inorganic fertiliser (Sopiah, Nazriah, Noorazlin, & Norzaidi, 2016). In addition, products from anaerobic digestion such as bio-methane or bio-gas can be used to substitute fossil fuel in generating electricity and heat (Luo, Ding, Xiao, & Lin, 2010; Tillman, 2000).

METHODS

A stratified sampling was used in this study. A total of 200 questionnaires were distributed to respondents who are currently or have been residing in Kuala Terengganu for at least two years. However, only 171 sets were completed by the respondents and used for data analysis. Cronbach's alpha

value for 13 items (questions) used in the pilot study is greater than 0.7 threshold value, estimated at 0.788. It is important to note the study utilised 5- point Likert scale to gauge respondents' views, in which 1 = Strongly disagree, 2 = Disagree, 3 = Slightly agree, 4 = Agree, and 5 = Strongly agree. The study used descriptive statistics, analysed respondents' profiles, and their attitudes towards food waste recycling as a business as well their expectations of the role of authorities. The analysis was conducted at both overall level and categorical level (i.e. household, commercial and institution).

RESULTS

Descriptive Statistics Analysis

Results showed that majority of participants were females (62%). Majority were young, below the age of 55 calculating for 93% of total respondents. Majority also had low monthly income, in which about half of the respondents earn less than RM 1000 per month (52%) and 25.7% earn between RM 1001 to RM 3000. Furthermore, 43.9% of respondents are from the household category, followed by 33.3% from institution and the rest from commercial. Each group has at least 30 samples which are required for parametric statistical test. In addition, the majority of institution respondents represent schools (51.7%) and universities (24.1%), while the majority of commercial respondents are from the food industry while the rest were from the hotel/resort industry.

ANOVA test

This section sheds light on the respondents' attitudes towards food waste recycling as a business in Terengganu. In Table 1, the mean value was generated together with p-value of ANOVA to assess the differences in level of agreement among different category groups of respondents, namely household, commercial and institution. From the results, the three groups showed similar levels of agreement (p value > 0.05) for questions 1, 2, 3, and 5. Respondents from the commercial group showed significantly higher level of agreement for question 4 (p value < 0.05) with a mean value of 3.79 compared with the household group (3.33) and institution group (3.32).

Table 1
Mean for respondents' attitude towards food waste recycle as business

No.	Items/Questions	Category				p-value
		H	C	I	Total	
1	Food waste recycle product generate income	4.05	3.97	4.11	4.05	0.743
2	Will recycle food waste into compost for own use	3.45	3.36	3.46	3.43	0.860
3	Interested if low cost	3.32	3.64	3.26	3.37	0.188
4	Interested if easy control and maintenance	3.33	3.79	3.32	3.43	0.028
5	Interested if training is provided by authority	3.43	3.74	3.26	3.44	0.059

H: Household; C: Commercial; I: Institution

The agreement level (expectation) of respondents on the role of authority was analysed and shown in Table 2 using mean and ANOVA. Results showed that there is no significant difference in the mean level of expectation between household, commercial and institutional groups in which all the p values were greater than 0.05. In general, respondents have high expectations on all the eight roles being measured as the mean values were greater than 4.

Table 2
Mean for respondents' expectation of roles of authority

No.	Items/Questions	Category				p-value
		H	C	I	Total	
1	Attention to food waste problem	4.12	3.95	4.25	4.12	0.159
2	Law enforcement to food waste problem	4.24	4.05	4.12	4.16	0.426
3	Provide financial aids to interested party	4.15	3.85	4.11	4.06	0.109
4	Provide courses to interested party	4.15	3.97	4.04	4.07	0.448
5	Funding research for more food waste product	3.97	3.97	3.98	3.98	0.997
6	Help promote food waste product through media	4.69	3.82	3.98	4.26	0.270
7	Early education of food waste recycle in school	4.2	4.31	4.23	4.24	0.744
8	Promote the advantage of food waste recycle compost	4.16	4.28	4.32	4.24	0.404

H: Household; C: Commercial; I: Institution

DISCUSSION

Attitude towards Food Waste Recycles as Business

The result of the study indicates the commercial group is interested to initiate the food waste recycle business if the operation (control and maintenance) of such business is easy. In general, respondents believe recycled products from food waste can generate income (mean = 4.05). Besides, respondents agree they should recycle food waste into compost for their own use (mean = 3.43). In sum respondents showed moderate level of interest to start up if the cost is low (mean = 3.37), the operation is easy (mean = 3.43) and training is provided by authority (mean = 3.44). Respondents of the study have relatively higher expectations of authority to help promote recycling of food waste products through media (mean = 4.26), establish early education of food waste recycle in school (mean = 4.24), and promote the advantage of food waste compost (mean = 4.24).

Expectation towards Roles of Authority

Respondents also believed that the authority should pay more attention to food waste problem (mean = 4.12), enforce law to fight food waste problem (mean = 4.16), provide

financial aids to those interested (mean = 4.06), provide courses to interested party (mean = 4.07), and lastly fund researches for more food waste product (mean = 3.98). From the results of the study, respondents placed high expectations on the local government to initiate a recycling business despite their moderate interest. Thus, the community believe they do not possess any capability or knowledge on recycling and believe the local government could help them to start a recycling business. This is supported by Periou (2012).

CONCLUSION

There are several ways of managing municipal solid waste, namely landfill, composting, recycling, incineration, anaerobic digestion, cofiring food waste and coal in generating electricity. However, the current practice of managing waste in Terengganu seems to be limited to open dumping and landfills. Food waste is the major municipal solid waste generated in Malaysia (including Terengganu) and if food waste could be managed properly, the waste problem could be solved eventually. Besides, food waste can be converted into business opportunities through composting, animal feed and anaerobic digestion. Composting is able to convert food waste into organic fertilisers to promote the concept of healthy food as opposed to chemical fertiliser. Food waste which are processed into animal feed, especially poultry feed and aqua feed, is as effective as conventional feed, yet more economical compared with conventional feed. Anaerobic digestion is costly but it is profitable in the longer term. Food waste can be used and converted into products which generate income to the community. The results of this study indicate moderate positive attitude towards food waste recycling as business opportunity and such attitudes are associated with the operation and cost of recycling food waste. The local community in Kuala Terengganu also have high expectations of the local authority. Funds from the local authorities as well as training courses organised by them would help the community to start a recycling business.

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