Journal of Science and Mathematics Letters, Vol 7, 2019 (11-25)
ISSN 2462-2052, eISSN 2600-8718

RESEARCH PAPER

Community's Existing Practices and Knowledge on Recycling at Kundasang, Sabah

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DOI: https://doi.org/10.37134/jsml.vol7.2.2019

Received: 5 March 2019; Accepted: 29 April 2019; Published: 31 May 2019

Abstract

Recycling is known as the best approach to reduce disposal costs and prolongs the lifespan of landfill sites. However, the ignorance and negligence on the importance of recycling have lead to various solid waste management problems. This paper investigates the community willingness to participate in recycling practices through community waste bank in Kundasang, Sabah. Prior to the implementation of waste bank in Kundasang, a questionnaire survey was conducted to 300 households in four main villages. About 66.7% of respondents has agreed on the implementation of community waste bank as the community recyclables collection. The existing recycling activities were low as only 34.2% of the respondents practice solid waste separation at source. Other findings revealed that community's recycling practices was influenced by their socio-economic background. Respondents' education level was shown to influence their knowledge on solid waste separation and recycling practices. Although the majority of the respondent had completed their education in secondary school, about 61% of respondents were willing to participate in the waste bank. Moreover, 63% of respondents were interested in the waste bank program if incentives were given to the respondents as a reward. Additionally, the findings revealed younger generation in range 19 years old and below were likely to involve with the recycling activities compare to age range 20 years old to 49 years old. Hence, these findings suggested a positive community's acceptance on waste bank implementation in Kundasang. The community waste bank was expected to create positive attitude towards recycling practices and therefore contribute to the local environmental conservation.

Keywords: Recycling; Community; Willingness to participate; Waste bank; Positive attitude

Abstrak

Kitar semula telah dikenali sebagai pendekatan yang terbaik dalam mengurangkan kos pelupusan dan memanjangkan jangka hayat tapak pelupusan sampah. Walau bagaimanapun, ketidaktahuan dan kecuaian mengenai pentingnya kitar semula membawa kepada masalah pengurusan sisa pepejal yang memberi kesan kepada masyarakat. Oleh itu, kajian ini meninjau tahap kesediaan komuniti untuk mengambil bahagian di dalam aktiviti kitar semula melalui bank sampah komuniti di Kundasang, Sabah. Sebelum sebuah bank sampah dilaksanakan di Kundasang, tinjauan soal selidik telah dijalankan ke atas 300 isi rumah di empat buah kampung. Kira-kira 66.7% responden telah bersetuju dengan pelaksanaan bank sampah komuniti sebagai pusat pengumpulan barangan kitar semula. Aktiviti kitar semula yang sedia ada adalah rendah kerana hanya 34.2% responden mengamalkan pengasingan sisa pepejal di sumber. Penemuan lain mendedahkan bahawa amalan kitar semula dipengaruhi oleh latar belakang sosioekonomi mereka. Tahap pendidikan responden mempengaruhi tahap pengetahuan mereka terhadap aktiviti pengasingan sisa pepejal dan kitar semula. Walaupun majoriti responden hanya menamatkan pendidikan mereka di sekolah menengah, kira-kira 61% responden sanggup mengambil bahagian dalam aktiviti bank sampah. Selain itu, 63% responden berminat di dalam program bank sampah jika insentif diberikan kepada responden sebagai ganjaran. Di samping itu, penemuan mendedahkan

generasi muda yang berumur 19 tahun ke bawah lebih berminat melibatkan diri dalam aktiviti kitar semula berbanding generasi umur 20 tahun hingga 49 tahun. Oleh itu, ia menunjukkan bahawa penerimaan pelaksanaan bank sampah di Kundasang diterima secara positif di kalangan masyarakat Kundasang yang berupaya mewujudkan sikap positif terhadap amalan kitar semula di peringkat komuniti dan sekaligus menyumbang ke arah pemuliharaan alam sekitar khususnya.

Kata Kunci: Kitar semula; Komuniti; Kesediaan untuk mengambil bahagian; Bank sampah; Sikap positif

INTRODUCTION

Recycling is known as one the effective method and desirable approach in reducing the solid waste generation as it diverting solid waste from dumped to the landfill site, reduces disposal costs, waste transportation costs and prolong the lifespan of landfill site (Connett and Sheehan, 2001). However, the ignorance and negligence on the importance of recycling have lead to various solid waste management problems which affected the society. Moreover, the recycling rate in Malaysia is still low despite almost all Malaysian citizens are aware on the importance of recycling (Borneo Post, 2013). The number of Malaysian that committed to practice recycling was only 68.8% from 17,000 respondents according a survey by Solid Waste and Public Cleansing Corporation, Recycling and Public Awareness Division (SWCorp, 2013). The fact that solid waste generation has increasing rapidly due to urbanization, population, industrialization and economic growth could become a threat to the environment, society, and not excluded to the economic loses as well (Shekdar, 2009 ; Sekito et al, 2013 ; Dhokhikah et al, 2015)

The rapid development in Malaysia with total population approximately 32 million people accelerate the daily waste generation which is 38,000 tonnes as 12.8 million tonnes of solid waste generated per year and predicted to increase 15.6 million tonnes of solid waste in year 2020 (Harian Metro, 2018; MHLG, 2018). However, the recycling rate in Malaysia was recorded 24% in year 2018 while 76% of waste was disposed at the landfill site. Deputy Ministry of Housing and Local Government (MHLG) Senator Datuk Raja Kamarul Bahrin Shah Raja Ahmad stated that the recycling rate were lower compared to Singapore and Hong Kong which have reached more than 70% (Harian Metro, 2018; MHLG, 2018). Thus, the government has taken initiative to encourage recycling practices by providing drop-off centres or collection centres at convenient places, such as at shopping centres or supermarkets. There are 38 drop off point were introduced to the public with 2,567 recycling cages were provided for high rise residency and 1000 recycle bins were distributed respectively in Kuala Lumpur and in the other 13 states of Malaysia as part of the recycling campaign (DOS, 2014; Zen et al, 2015; NEHAP, 2016). In recent years, recycling seems to be noticed as practical solution to the increasing solid waste generation as more recycling facility was provided.

Despite the fact that the government has taken this matter seriously, it will be challenging without the involvement of community and individual interventions in decision making on components that particular in implemented a recycling scheme such as willingness in participation on recycling, convenience on recycling collection and location, economic instruments and local conditions on their environment (Timlett and Williams, 2008 ; Keramitsoglou, and Tsagarakis, 2013). Community involvement is the most crucial component for a successful solid waste management. The tremendous increasing trends on solid waste generation has creates a huge impact not just to the environment but also to the society as well. Thus, a community based waste management (CBWM) approach has integrated the cooperative concept of making changes in terms of source separation, recovery

of recyclables materials and collection storage (Visvanathan, 2006). The community based waste management aimed to involve the entire community by creating a sense of citizen role to solve the environmental problem in the community. Furthermore, the implementation of community based waste management engage and empowering the communities in recycling practices and promoting a sense of environmental awareness as well.

Recycling should be integrated into a project at community based level as the sustainable solid waste management strategy (Asim et al, 2012). While Hasfarm (2014), mentioned that Community based Waste Bank (CBWB) contributes in solving the waste management problem especially in the developing country. Due to the increasing volume of solid waste generation urge the government of Indonesia enacted the Waste Management Act in 2008 which modified the government's waste management focused on reduction, reuse and recycling as the key components in the establishment of the community based waste bank. The CBWB was establish in parallel with the private waste collectors and the recycling centre act to reduce waste by channelling the waste to be recycled (Hasfarm et al, 2014; Halimatussadiah et al, 2016; Nur Indrianti, 2016). Meanwhile in Thailand, recycling activities had been integrated into a community project by implementing solid waste recycling bank project which in return recycling had provide economic opportunities for poor families to generate income (Singhirunnusorn et al, 2012). Moreover, economic incentive mechanism allows in increasing the waste separation behavior at source as well (Boonroda et al, 2015). Besides that, Halimatussadiah et al (2016), studied found that the waste bank activity was incentivized in many form which is money and other benefits such as information exchange which increase the community's awareness and knowledge in recycling. Hence, the community based waste bank gives huge opportunity in benefits and potential of public participation in practicing recycling in daily life.

Thus, this paper investigates the community existing practices and knowledge towards recycling before a community based waste bank were implemented at Kundasang, Sabah. The community based waste bank was aimed to engage and empower the Kundasang community in recycling practices due to the inadequate facilities and lack of solid waste management in Kundasang.

METHODOLOGY

Description of Study Area

Sabah is the second largest state in Malaysia with total area spans 73,904 km^2 topped with a coastline surrounded by the South China Sea. Sabah is the third most populous state with total 3,543,500 as reported in 2015 Malaysian census with estimated 42 groups ethnic and over 200 sub ethnic groups with different language and cultures. This study was conducted at Kundasang as it is the most visited place in Sabah due to the location of Mount Kinabalu. Kundasang is a small town situated within Ranau district with total population estimated as 9,892 people. Kundasang is only six km away from the UNESCO World Heritage Site of Kinabalu National Park with amazing panoramic view of the Kinabalu Mountain Range. Historically, Kundasang was a small village which later grown into a popular leisure town well known for visitors from all over the world with various of resorts and homestay in the vicinity. The tourism sector has become the main activity in Kundasang besides the fresh vegetables stalls along the Kundasang road (DOS, 2015 ; Sabah Tourism Board, 2016).

Research Design Framework

This study applied quantitative approaches by using survey instrument as the primary data. Survey instrument consists of series of questions for the purpose in gathering information from the respondents. It has been used as the common tools as it is inexpensive, quick, easy to analyze and the information gained can be minimal (Kaplan and Saccuzzo, 2009). The respondents were selected based on the stratified random sampling in the study area. There are twenty one villages that situated in the Kundasang area where four villages were selected based on its distance and location which less than 1 km from the location of proposed community waste bank as illustrated in **Figure 1**. There are Lembah Permai Village, Dumpiring Atas Village, Dumpiring Bawah Village and Sinisian Village. **Table 1** shows the location for each selected villages.

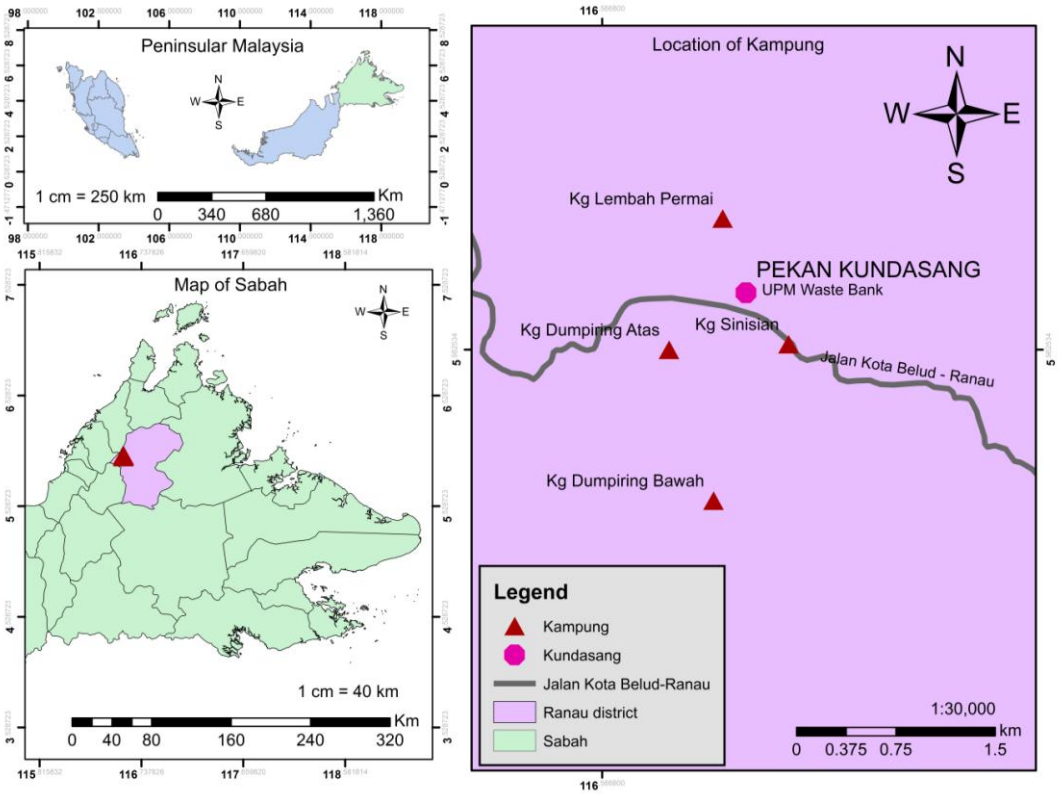

Figure 1: Location of Questionnaire Distribution at Selected Villages

Sample Size

This study used sampling calculation method based on the Kundasang population as shown in **Table 2**. For survey study, a total number of respondents were selected based on sample size formula (Yamane, 1967) as assumed in equation formula Eq. (1).

$$n = \mathrm{N} / 1 + \mathrm{Ne}^2 \qquad \text{(Eq. 1)}$$

Table 1: Distance Selected Villages from Proposed Waste Bank

Villages	Distance from Waste Bank (KM)
Lembah Permai Village (5°59′18.5″N ;116°34′35.2″E)	0.4 km
Dumpiring Atas Village (5°58′53.4″N ;116°34′21.1″E)	0.5 km
Dumpiring Bawah Village (5°58′53.4″N ;116°34′21.1″E)	0.5 km
Sinisian Village (5°59′04.6″N ;116°34′39.7″E)	0.3 km

Source: Ranau District Council, 2016

Where; N = total number of villagers (2,643), and e is the sample of error which considered at e = (0.06). Thus, the total number of sample size was 251. However, the researcher adds sample size considering for incomplete information, missing data and treatment of outliers from data. Strazzera et al (2000), have categorized three of sample size which affects bias and efficiency. (1) Small sample size of 100 or less (2) medium samples size ranges between 250 – 450 and (3) larger samples more than 1000. Similarly, sample size of more than 300 to 500 is considered suitable for most researchers in all type of research (Sekaran, 2013). Therefore, the researcher concludes that a total sample size was 300 for the selected villages as calculated in Eq. (2) and shown in **Table 2.**

$$n = N / \sum N \times 300 \qquad \text{(Eq. 2)}$$

Table 2: Respondents Sample Size

Villages	Population (N)	Sample Size (n)
Lembah Permai Village	700	79
Dumpiring Atas Village	492	56
Dumpiring Bawah Village	810	92
Sinisian Village	641	73
	2,643	300

Questionnaire Design

The questionnaire was adapted from the previous study of Omran et al (2009) and Keramitsoglou and Tsagarakis (2013). Omran et al (2009) focused on investigating the householder's attitude towards recycling participation, facilities provided and recycling activities campaign meanwhile Keramitsoglou and Tsagarakis (2013), focused on the public participation towards the acceptance of recycling facility. Additionally, the questionnaire was designed in Malay language as the preferable language among the respondents. The questionnaire was administered on 20th May till 20th July 2016. There were 15 items were asked to the respondents regarding their existing solid waste management practices,

knowledge on solid waste separation and recycling and willingness to participate in the community waste bank as depicted in **Table 3**.

Table 3: Constructs and Items in Research Questionnaire

Social Aspect	No	Question
Existing Solid Waste Management	Q1	How you manage your waste?
	Q2	Is there any collection service of MSW in your area?
	Q3	How you evaluate solid waste issue in your area?
	Q4	Do you separate your waste?
	Q5	If yes, why?
		If not, why?
Knowledge on solid waste separation and recycling	Q6	Solid waste need to separate according to its category
	Q7	Solid waste can be recycle and can't be recycle
	Q8	Improper solid waste management cause dengue outbreak
	Q9	Organic waste can be used for compost
	Q10	Solid waste which can be recycle can be sold
Willingness to Participate	Q11	Do you agree if community waste bank were implemented at Kundasang town?
	Q12	Do you willing to separate your waste and send to the community waste bank?
	Q13	Do you willing to participate in recycling programme?
	Q14	Do you willing to participate in community waste bank if incentives were given?
	Q15	Do you willing to spread the information to your family/ friends?

After the questionnaire validation process, a pilot study were conducted to identify the main problems that occur in the study area and to facilitate the respondents to understand with the questionnaire given. Data from the pilot study provides a better result which avoiding biased answers from the respondent before the actual distribution. Pilot study was conducted on 15th April – 30th April 2016 within 30 respondents. Reliability and validity test were analyzed by comparing alpha value. The Cronbach's alpha used to test the reliability shows greater outcome where, the reliability test were within 0.6 to 0.7.

Data Analysis

Data collected in questionnaire survey were analyzed using IBM SPSS Statistic 22 (Statistical Package for Social Science). The analysis involves descriptive analysis by summarized in frequency to show the characteristic of variable data for each questionnaire. This statistical data condensed into table, and graph which useful to present the result. Demographic analysis was analyzed to determine the distribution of the population according to the gender, age, education level, occupation and monthly income. Meanwhile, statistical analysis used Pearson correlation to determine either there is any significant relationship between variables.

RESULTS AND DISCUSSIONS

Socio-economic Background

The total male respondents were 141 which constitute (47%) while 159 respondents (53%) were females (Table 4). In term of the respondent's age, 86 of the respondents (28.7%) were in the middle group range age between 30 - 39 years old. The second majority group which made up 73 (24.3%) was respondents with age range 40 – 49 years old , meanwhile 72 respondents (24%) in group range 20 – 29 years old. Young respondents from 19 years old and below were also included which comprises 47 respondents (15.7%). Older age group in 50 – 59 years old and 60 years old and above constitutes total of 22 respondents (7.3%). With regards to the education level in the study area, the total of 277 respondents (92.4%) had a formal education with 145 respondents (48.3%) completed their education in secondary school. While 116 respondents (38.7%) completed primary school and only 16 respondents (5.2%) obtained a higher education (Diploma /Certificate and Degree). However, there are 23 respondents were didn't have a formal education which constitutes respondents (7.7%) respectively.

The majority of respondents are self employed which comprises 146 respondents (48.7%) where most of them were work as hawker as Kundasang is the main vegetables supply to other district in Sabah. Meanwhile, 45 respondents (15%) are housewife, 41 respondents (13.7%) are farmer and 37 respondents work in private sector (12.3%). About 31 respondents involve in this study were student (10.3%). There was a different type of occupation in this study area as Kundasang is a small town in the district of Ranau with limited job opportunities. Meanwhile, the range income by the respondents was categorized into five which include RM 500 and below, RM 501 – RM 1000, RM 1001 – RM 2000, RM 2001 – RM 3000 and RM 3001 and above. The average income level among the respondents is in range net income RM 500 and below where 171 respondents (57%). While 103 respondents have RM 501 – RM 1000 (34.3%) net income and 26 respondents (8.7%) have higher income within RM1001-RM2000.

Table 4: Socio-economic Background

Demographic Background		Frequency	Percentage (%)
Gender	Male	141	47.0
	Female	159	53.0
Age	19 and below	47	15.7
	20-29	72	24.0
	30-39	86	28.7
	40-49	73	24.3
	50-59	7	2.3
	60 and above	15	5.0
Education Level	No formal education	23	7.7
	Primary school	116	38.7
	Secondary school	145	48.3
	Diploma/ certificate	14	4.7
	Degree	2	0.7
Occupation	Private sector	37	12.3
	Self employed	146	48.7
	Farmer	41	13.7
	Student	31	10.3
	Housewife	45	15.0
Income Level	RM500 and below	171	57.0
	RM501 - RM1000	103	34.3
	RM1001-RM2000	26	8.7

The Existing Solid Waste Management Practices

The existing solid waste management practices among the Kundasang community were still poor as only 25% of respondents dispose their waste at the town bin which provided by local authority. There are 23% of respondents dispose their waste into their own bin before directly send to the landfill site. Due to unavailable solid waste collection services in each villages in Kundasang, open burning waste has become the main disposal method which (41%) among the respondents, while only 6% of respondents practices composting and 5% dispose waste at their backyard. Negligence on the proper disposal method by the respondents will affect the human health and the environment as burning waste produce dioxin emissions and pollutants.

In term of solid waste collection services, only 38% of respondents claimed that the local authority provide waste collection services. However, about 47% of respondents claimed that there is no waste collection service by the local authority while 15.0% was not sure if there is a collection service provided by local authority. Ranau District Council were the responsible local authority who managed the collection services in the Kundasang town, however due to the management jurisdiction area, the local authority didn't provide the solid waste collection services in the villages area but they provided four of 240 litter bin at the Kundasang town for Kundasang community to dispose their waste.

Besides that, the respondents were also asked regarding the solid waste issues at Kundasang area. The majority of the respondents (61.3%) claimed that solid waste issues were serious in the Kundasang town area. Meanwhile, 24.7 % of respondents stated that, solid waste issues were not serious and 14.0% of respondents claimed the solid waste issue were normal. The survey results also revealed that majority of respondents (52.8%) didn't separate their waste according to the categories because of time constraint (22.7%), no available recyling facilities (21.7%), lack of knowledge on recycling (4.7%) and laziness (3.7%). In fact, only 34.2% of respondents separate their waste because of cleanliness (18.3%), self-awareness (15.6%) and to generate extra income (0.3%).

Respondent's Knowledge on Solid Waste Separation and Recycling

Figure 2 illustrated the respondents' knowledge on solid waste separation and recycling where almost 82% of the respondents knew that the solid waste needs to be separated based on categories such as paper, plastic, aluminium can, metal and glass. About 85% of the respondents were also aware that certain solid waste could be recycled and some waste cannot be recycled. Additionally, almost 80% of the respondents knew that organic waste could be used as compost fertilizer. In term of the public health, only 42% agreed that improper solid waste management could cause dengue outbreak, while 9.3% stated that waste didn't cause denque outbreak and 48.7% of the respondents was not sure about it. Moreover, the survey results showed that 82.7% of the respondents know that recyclables waste can be sold and create extra income for the community.

Based from the results, it shows that the respondents' knowledge on solid waste was high although the majority of them only completed their education level in secondary school. Based from the correlation results, a significant relationship ($p < 0.05$) exist between education background and the respondents' knowledge as depicted in **Table 5**. Similarities also found in Wright (2011) studied where there is a positive correlation between knowledge regarding the proper solid waste separation and recycling. This relationship also might due to the fact that recycling is a worldwide issues and generally supports with the informational and awareness campaigns organized by the local government.

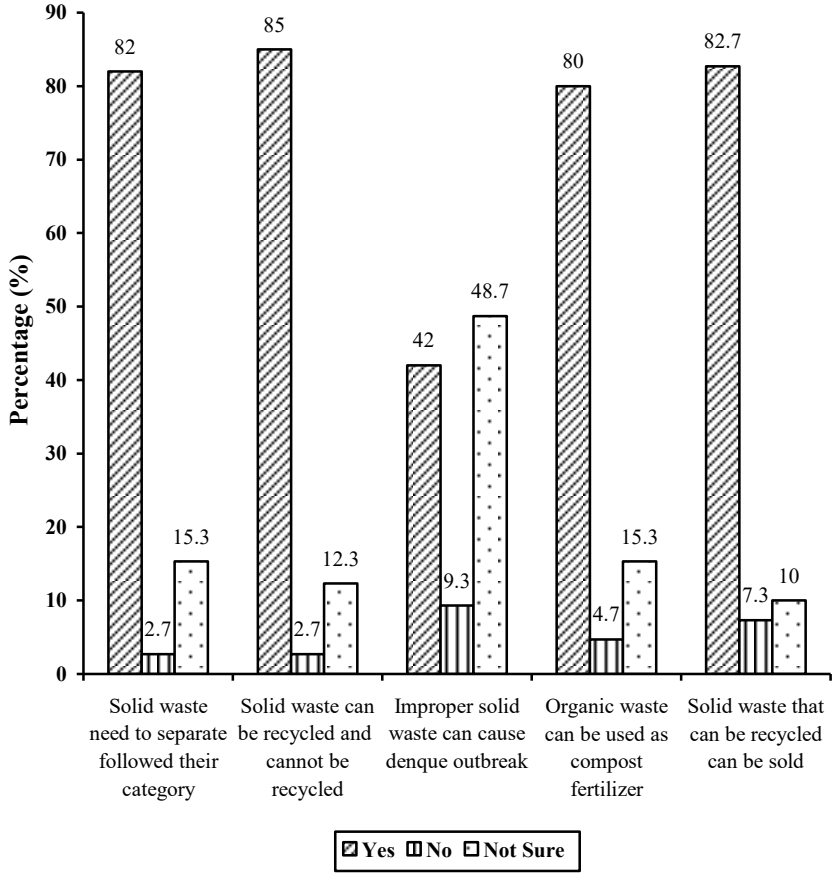

Figure 2: Knowledge on Solid Waste Separation and Recycling

Table 5: Relationship Education background with Environmental Knowledge

Pearson Correlations

		Q6	Q7	Q8	Q9	Q10
Education	Pearson Correlation	.081	.153**	.041	.180**	.168**
	Sig. (2-tailed)	.160	.008	.477	.002	.003
	N	300	300	300	300	300

**. Correlation is significant at the 0.01 level (2-tailed).

Respondent's Willingness to Participate in Community Waste Bank Programme

This study also investigates the respondents' willingness to participate in the community waste bank programme. As shown in **Figure 3**, 66.7% of the respondents agreed on the implementation of community waste bank as the recyclables collection at Kundasang town. Meanwhile, 24% of the respondents did not agree on the implementation of the waste bank and 9.3% of respondents was not sure. It is also revealed that 61% of the respondents were willing to participate in the waste bank while 28.3% of respondents was not willing to join the waste bank that will be set up at Kundasang town. This is might due to the unfamiliar with the recycling practices which it has not become a culture in our daily life. However, 84.7% of the respondents were willing to join a recycling programme that will be organized in Kundasang. The recycling awareness campaign were importance to spread awareness

especially among the Kundasang community as Kundasang is the most visited place for tourist attraction. The improper solid waste handling could affect the tourists' and the community health. Hence, tarnish the good image of Sabah state in general. Additionally, the survey also revealed that 63% of respondents were interested in the waste bank programme if incentives were given to the respondents as a reward of their participation. About 63% of the respondents willing to spread the information on waste bank operation to their friend and family. Thus, based on the results, the respondents' willingness to participate in the community waste bank was high and showed that they were aware on the impact of solid waste issues.

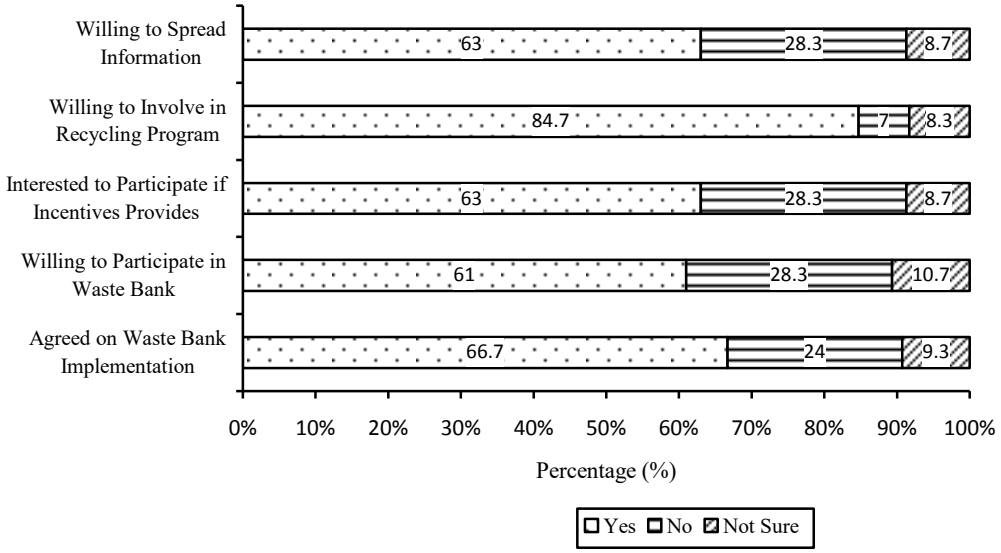

Figure 3: Respondents Willingness to Participate in Community Waste Bank

The results of this study show that recycling activities among the Kundasang community were still low as only 34.2% of the respondents practice solid waste separation at source. Due to the inadequate of recycling facility, time constraint and lack of knowledge on recycling were concerned to be the factor of low recycling activities among the respondents. Similarly, a previous study had also stated that the lack of time could become a barriers of recycling practices (Grodzini Ska-Jurczak, 2003). The availability of recycle facilities was also important as it is one of the factor why people separate their waste. Findings from other studies also revealed that households are more likely to participate in recycling activities if there is a convenience recycling facilities (Bowman et al, 1998; Meneses and Palacio, 2005 ; Saphores and Nixon, 2006; Singhirunnusorn et al, 2012). Everett and Peirce (1992) mentioned that the effectiveness of recycling activities depends on the active participation of the public through the collection activity. The results were similar in Dhokhikah et al (2015) studies as the existence of waste bank Surabaya, Indonesia has encouraged the community activities on solid waste separation at source and recycling.

Recycling activities brought positive impacts on the environment as it reduces the amount of solid waste to be sent to the landfill sites (Lange et al, 2014). Moreover, recycling should be practiced by the communities as it brings many benefits including uplifting living standards by facilitating employment and providing income opportunities (Menikpura et al, 2011). Nevertheless, there should enough supporting factors to motivate the communities to

participate in the recycle facilities as 63% of respondents were willing to participate in the community waste bank if there is incentives were given. Incentives schemes have been previously suggested to have influence household's recycling practices in Thailand Waste Bank (Boonroda et al, 2015; Martin et al, 2006).

Figure 4 illustrates that younger people (19 years old and below) and older people (50 years old and above) were likely to particpate in recycling activities. This result correlates with previous findings which claimed that older household are more likely to recycle (Singhirunnusorn et al, 2012; Bowman et al, 1998) and younger peoples are more likely to participate as they become more environmental conscious and active. Results from Lee and Paik (2011) study also found similar results as older people were reported to participate more in recycling practices while Halimatussadiah et al (2016) found that the participation of older people was related to their greater willingness to join in the waste bank operation. The older age group has portrayed a positive sign towards recycling compared to age group between 20 – 49 years old. This is due to their commitment on jobs and education as being studied by Muller and Schienberg (1997).

The implementation of waste bank at the community level provides opportunities for the community to utilize their waste in efficient and effective manners. As described in the previous section, up to 61% of the respondents were willing to participate in the community waste bank programme. This shows that the respondents were aware of the importance of a proper solid waste management. However, due to lack of waste collection services by the local authority, the proper options for the community to dispose their waste are rather limited. Hence, the proposed community waste bank facility is expected to improve the solid waste management in Kundasang, This is due to the fact that the community engagement and participation are the key factor for the success of any solid waste management plans. As in the previous study, the scarcity of local facilities has become a barrier of recycling which it influence the communities to send their recyclables waste to the recycling facilities (Menikpura et al, 2011 ; Alexander et al, 2009). The introduction of recycling concept in community is important as it could change peoples' attitude, behaviour and mind setting through education and recycling practices.

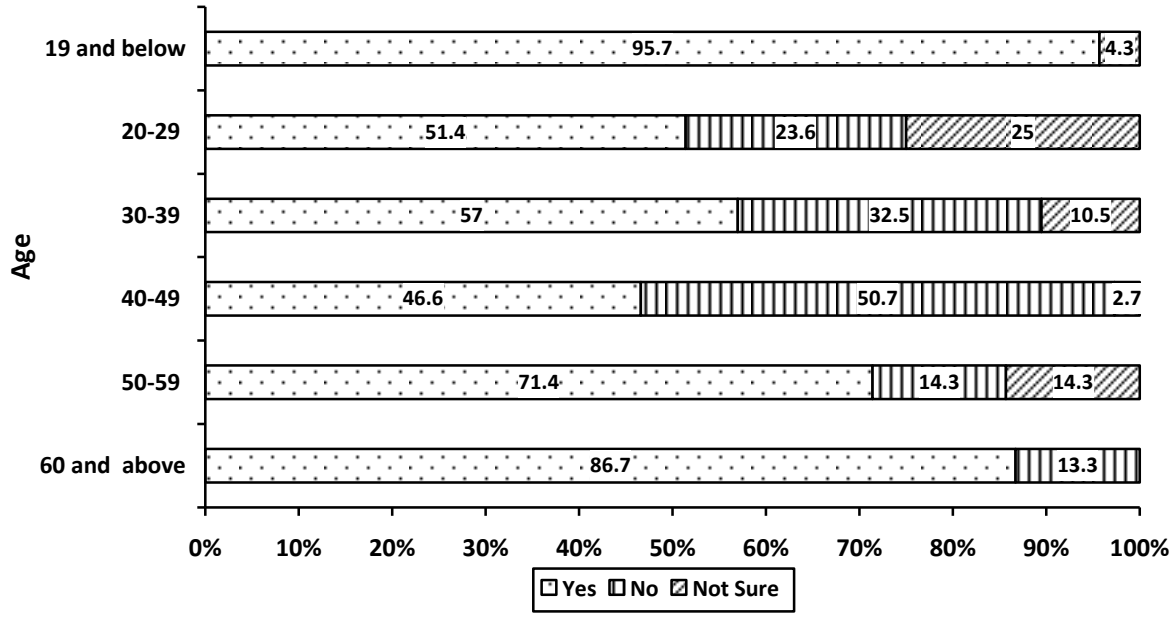

Figure 4: Respondent Willingness to Participate in Community Waste Bank by Age

CONCLUSIONS

As the conclusion, the existing practices and knowledge regarding the recycling practices were still lacking as the majority of the respondents were still dispose their waste in improperly due to the inadequate of solid waste management and collection services at Kundasang. The community waste bank was expected to create a sense of environmental awareness regarding recycling practices in their daily life. Despite the fact that householder was the main generator of waste, their willingness to involve in the waste bank programme were vital as they were contributed significantly in reducing their solid waste generation at source. Thus, giving incentives and rewards were clearly attracting the respondents in attempts the enthusiasm of the community to commit in recycling practices. To summarize, the proposed waste bank could enhance the community's awareness and practices on a proper solid waste management thus contribute to the government's effort on increasing recycling rate to 30% in year 2020.

ACKNOWLEDGEMENT

The author would like to thank to the Head of Kundasang community, Ranau District Council and Kundasang communities for their time in involving in the questionnaire survey.

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