A Preliminary Study on Sustainable Management of Pineapple Waste: Perspective of Smallholders

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Abstract

Recently, pineapple wastes are produced in bulk quantities throughout the world, with rising issues on environmental impact. Pineapple leaf is one of the waste materials that are abundantly being dumped, decomposed and burnt. The objective of this study was to discover the perspective of smallholders toward sustainable management of pineapple waste. This study was conducted at Muar, Johor among 30 pineapple's smallholders. This study used simple random sampling to ensure that each of the pineapple's smallholders has an equal probability to be selected as respondent. Based on reliability analysis, the questionnaire used in this preliminary study is very reliable and confirms internal consistency of the measurements of variables (α = 0.938). The finding indicates that the smallholders have the knowledge on pineapple waste management. They also have positive perspective towards the practice. However, there are several barriers that limit them to manage the waste such as time constraints, high cost and availability of outdated technology. Therefore, all the relevant authorities should look into this matter to generate income to the industry.
Keywords: Sustainable Management, Pineapple Waste, Perspective, Smallholders, Knowledge

INTRODUCTION

Malaysia is one of the top pineapple producers in the world with a steady increase in acreage from less than 10,000 hectare in 2004 to about 10,319 hectare in 2014 with 84% of the yield is for domestic consumption, 10% for processing and another 6% for fresh market export. Demand for pineapple worldwide shows an increasing trend of 5% per year, while the variety that prevails in the market is MD2, which covers approximately 75% of the world market. In Malaysia, small pineapple farm sector is accounted for 47% of the planted area (an area of 1-5 hectare), while 54.5% is the involvement of a large-scale pineapple producers. This shows that pineapple smallholder producers play a vital role in the pineapple industry. According to the statistics from Ministry of Agriculture, the distribution of pineapple cultivation areas in Malaysia

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is Johor (56%), Sarawak (19%), Sabah (14%), Selangor (2%) and other states around 1% each. Since 2004, the Malaysian pineapple trade has shifted to the fresh consumption that has accumulated at around 70% as compared to only 30 percent for processing. Malaysia has abundant agro waste material that has not been fully utilized to optimize the production. All parts of pineapple from fruits to leaves can be consumed to give a health benefit for human life. Leaves of pineapple had been used as coarse textiles because of the fiber composition and structure inside the leaves (Banik et al., 2011). Efficient management of pineapple waste does not only make environmental sense, but also turns trash into cash, reduces environmental pollution, minimize the waste, conserve energy and natural resources. By practicing good management of pineapple waste, it can maximize the production of pineapple leaf fibers and develop green environment as well as boost the economy growth.

Sustainable Management

With a proper planning of waste management, the agriculture waste material can benefit the production industries as well as optimize the production. Recently, there is an important issue on crop waste management from agricultural sectors in Malaysia. There are approximately 1.2 million tons of agricultural wastes being disposed annually in Malaysia due to the rapid development of agricultural sectors (Yusri Yusof et al., 2015). Usually the waste is eliminated by burning or decomposing, which will raise another issue, which is environmental concern. Regarding to environmental and sustainability awareness, concerns on the long-term effect of burning crop waste have been expressed including pineapple leaves burning. There are several initiatives that have been done by Malaysian Pineapple Industry Board (MPIB) to emphasize on transformation of pineapple waste to wealth in order to create a sustainable agricultural industry. In pineapple cultivation, the pineapple leaves can be further processed to produce value-added product, which is extracting fiber from pineapple leaves and transforming into commercial products such as string, rope which is further processed into textiles and clothes. However, the process involved in pineapple leaves fiber productions is still lagging behind technology development in this decade (Yusri Yusof et al., 2015).

Pineapple Waste

Pineapple waste is known as a byproduct of the pineapple processing industry and typically consists of residual pulp, peels and skin. However there are many parts of pineapple that are unused such as leaves, stem, outer skin and others that we can reuse to produce new products. One of the waste materials are leaves; the major part of the plant that is currently unused. The leaves require global attention for commercial exploitation and can generate income to the industry. Recently, the waste of pineapple has increased and contributed to many environmental issues and energy waste. Therefore, it is encouraged that the effort in efficiency of sustainable management of pineapple waste will lead to significant way in decreasing the environmental impact and reducing generated waste. In this context, the utilization of pineapple waste as production of other resources has been highlighted.

METHODOLOGY

A preliminary study was carried out to ensure that the questionnaire was acceptable, reliable, easy to understand and answered by the respondents. This study was essentially intended to be a fairly exploratory research exercise to establish general viability of the survey questionnaire. The primary data for this research was collected through a survey using questionnaire. This study used Theory of Planned Behavior (TPB) to explain the perspective of smallholders towards sustainable management of pineapple waste. TPB postulates that intention is influenced by three independent variables; these variables are attitude of smallholders towards sustainable management, subjective norms and perceived behavioral control (Ajzen, 1991). A total of 30 pineapple smallholders in Muar, Johor were involved in this study. A Likert scale of 1 to 5 (1 representing Strongly Disagree and 5 representing Strongly Agree) was used to measure respondent's perspective on the statements related to the sustainable management of pineapple waste. To achieve the objective of the study, reliability and descriptive analysis were applied to analyze the gathered data.

RESULTS

Demographic Profile

Descriptive analysis was used to analyze the results on the socio-economic profile of the respondents such as age, education level, farm size, income and experience. The data provides a general view of the situation on the samples conducted for this preliminary study. Table 1 represents the respondents' demographic profile of pineapple smallholders. The finding shows that the largest age group was in 31-40 years old category (40.0%) with the mean age (M = 40.33). Moreover, 20.0% of the respondents had gone through secondary education, with only a small amount of respondents with no formal education (3.30%), 13.3% had completed with primary education, 10.0% had graduated with diploma and 6.70% of respondents are degree holders. In this study, the percentage of respondents who have a farm size less than 10 acres are 80.0% and only 6.70% have between 31-40 acres of land. About 36.7% of the respondents have an income between RM1,001-RM3,000 and a smaller percentage of the respondents (6.70%) have an income above RM5,001. Furthermore, most of the respondents have experience in planting pineapple for less than 5 years and only 3.30% of the respondents have experience between 26-30 years.

Table 1: Demographic profile of the respondents (N=30)

Demographic Profile	Frequency	Percentage (%)	Mean
Age			40.33
<30 years	6	20.0	
31-40 years	12	40.0	
41-50 years	6	20.0	
51-60 years	3	10.0	
61-70 years	3	10.0	
Education level			
No formal education	1	3.30	
Primary	4	13.3	
Secondary	20	66.7	
Diploma	3	10.0	
Degree	2	6.70	
Farm size			9.6817
<10 acres	24	80.0	
11-20 acres	1	3.30	
21-30 acres	3	10.0	
31-40 acres	2	6.70	
Income			
<RM1,000	9	30.0	
RM1,001-RM3,000	11	36.7	
RM3,001-RM5,000	8	26.7	
>RM5,001	2	6.70	
Experience in planting pineapple			11.07
<5 years	9	30.0	
6-10 years	8	26.7	
11-15 years	4	13.3	
16-20 years	6	20.0	
21-25 years	2	6.70	
26-30 years	1	3.30	

Reliability Analysis

Reliability is an assessment of the degree to measure consistency between multiple measurements of variables. Cronbach's alpha with the value of more than 0.60 is used as a guideline to measure the reliability of the measurement in this preliminary study as recommended by Hair et al., (2006). A reliable scale will produce consistent result when repeated measurements are made (Hair et al., 2003). Table 2 indicates that Cronbach's alpha for this study is 0.938 which is very high and confirms internal consistency of the measurements

of variables. In conclusion, reliability statistics of this study shows that the measurement scales of the constructs were stable to measure the constructs.

Table 2: Reliability statistics

Cronbach's Alpha	N of items
0.938	22

Smallholder's Knowledge on Sustainable Management of Pineapple Waste

Based on the result from Table 3, majority of the respondents (55.3%) strongly agree with statement "I know pineapple waste such as the outer skin can be used as feed for ruminants" with the highest mean score (M = 4.42). Meanwhile, there are 13.3% of the respondents disagree with statement "To me, insufficient time to gain knowledge limits the processing of pineapple waste" with the lowest mean score (M = 3.72). Furthermore, about 46.0% of the respondents strongly agreed that money and energy lost can be reduced through the best practice of waste management. Moreover, the respondents strongly agree (45.3%) that the pineapple waste can be used in producing new products and 48.7% of the respondents agree that pineapple waste can be processed into organic fertilizer. In addition, there are 56.0% of the respondents who strongly agree that in order to implement waste practice, sufficient knowledge is necessarily.

Table 3: Smallholders' Knowledge on Sustainable Management of Pineapple Waste.

No.	Statements	Percentage					Mean
		1*	2*	3*	4*	5*	
1.	I know pineapple waste such as the outer skin can be used as feed for ruminants	1.3	2.7	4.0	36.7	55.3	4.42
2.	I believe that money and energy lost can be reduced through the best practice	0.7	3.3	10.7	39.3	46.0	4.27
3.	I know that the pineapple waste can be used in producing new products such as paper bag	0.7	5.3	6.7	42.0	45.3	4.26
4.	I know that pineapple waste can be processed into organic fertilizer	0.7	6.7	8.0	48.7	36.0	4.13
5.	To implement pineapple waste practice, sufficient knowledge about waste processing is necessarily	0.7	2.7	9.3	31.3	56.0	4.39
6.	To me, insufficient time to gain knowledge limits the processing of pineapple waste	3.3	13.3	17.3	40.0	26.0	3.72
						Total	**4.198**

*Indicator 1.Strongly Disagree 2. Disagree   3. Not Sure   4. Agree   5. Strongly Agree

DISCUSSION

Based on the findings, it indicates that pineapple smallholders have some basic knowledge on managing pineapple waste. They know that the waste can be reused and transformed into

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commercial products such as string, rope which is further processed into textiles and clothes. Meanwhile, most smallholders dispose the pineapple leaves by burning or decomposing. This scenario happens due to the limited technology available and ignorance from smallholders and local communities regarding the existence of commercial uses of pineapple leaves (Yusri Yusof et al., 2015).

Generally, pineapple smallholders in Muar, Johor have positive perspective towards waste management, which means that they are actively participating in any program or seminar organized by Malaysian Pineapple Industry Board (MPIB). Due to several restrictions, such as time constraints, high cost and outdated technology limits them to manage the waste.

CONCLUSION

The utilization of pineapple leaf fiber in composite material is a new source of materials which can be economic, ecofriendly and recyclable. Thus, good and efficient management of pineapple waste plays a vital role in the development of Malaysian economy. Moreover, it also can increase the income of smallholders, improve their lifestyle, reduce environmental impact and conserve natural resources. Hence, it is very important to disseminate the knowledge and importance of waste management to all levels of society.

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