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KNOWLEDGE AND AWARENESS ON PLASTIC SOLID WASTE (PSW) MANAGEMENT IN ZAMBIA: WHERE ARE WE?

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A number of stakeholders are involved in managing Solid Waste (SW) and the role of each stakeholder in Waste Management (WM) is important. However, achievement of Education for Sustainable Developments (ESD) requires imparting knowledge on WM issues to the stakeholders. In developing economies of Southern Africa, a number of goals for sustainable development have been adopted in order to combat a number of SW related issues. Nevertheless, WM challenges are still evident in most of these economies. A study was conducted in Ndola City, Zambia on the current state of Plastic Solid Wastes (PSWs) management. The purpose of the study included assessing the level of awareness and knowledge on PSWs. A survey of 445 households in the urbans of Ndola City was conducted. The results of the survey indicate that, 36.1% of the respondents have obtained college education. Further, the results on knowledge on PSWs recycling indicate that, 70.6% of the respondents are knowledgeable. Despite 70.6% of respondents being knowledgeable and aware about PSWs recycling, only 19.7% of the respondents participate in community PSWs recycling programs. Further only 19.8% of the respondents learnt about PSWs recycling in primary schools. The results from this survey provide relevant information to waste managers, educators and practitioners on the current state of knowledge on ESD in developing economies. The novel contribution of the study is that, there is urgent need for society to be educated on the relevance of recycling for sustainable development. People from whole walks of life should understand the importance of recycling processes especially in industries that utilize non-renewable resources. Further, strategies other than the provision of knowledge and awareness should be investigated in the contextually to promote optimal participation of citizens in recycling programmes.

Keywords: awareness, education, knowledge, sustainable development, plastic solid waste, management

INTRODUCTION

In developing economies, Solid Waste Management (SWM) challenges continue to attract attention worldwide. In Zambia, illegal disposals, lack of enforced

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regulations and legislations, lack of knowledge and awareness on SWM, lack of enforced Extended Producer Responsibility (EPR), SWM related challenges faced by the waste managers and lack of stakeholder involvement are some of the problems preventing sustainable SWM (Mwanza et al. 2018).

One of the Sustainable Development goals is Quality Education. This goal is cardinal for achieving Sustainable Solid Waste Management (SSWM) in developed and developing economies. Therefore, in the Zambian context, a number of issues are preventing sustainable management of SW and this research focuses on assessing knowledge, awareness and education on PSWs in order to present the current status.

Education is considered an enabling factor in driving SSWM. Singhirunnusorn et al. (2012) alluded that, continuous provision of education and awareness on proper SWM and environmental issues is necessary for community participation. Isa et al. (2005) affirmed that, non-participation of the public in recycling programs can be attributed to lack of awareness. Numerous studies have assessed awareness and knowledge on SWM and recycling. The studies by Owens et al. (2000) presented a positive correlation between participation and recycling. Desa et al. (2011) assessed awareness, attitudes, knowledge and behaviour on SWM among students. Tonglet et al. (2004) highlighted that, knowledge on recycling influences recycling behaviour. Nixon and Saphores (2009) indicated that public education and recycling correlate positively. Afroz et al. (2018) alluded that, people knowledgeable about recycling have positive attitudes towards recycling. These studies have looked at knowledge, awareness and education on participation in recycling and SWM related programs. None of these studies have focused on knowledge, awareness and ESD in the Zambian context.

This research is cardinal to the Zambian context as it provides the current status of knowledge and awareness on SWM in particular PSWs. Further, the research is relevant to waste managers, policy makers, educators and practitioners as it provides strategies for implementation that can lead to successful stories on SWM in the Zambian context. Tilikidou (2002) indicates that, research outcomes provide valuable insights that are useful for public offices in designing creative recycling strategies. To this regard, the research focuses on assessing the level of knowledge and awareness on PSWs and how it has impacted sustainable development in terms of participation in recycling programmes. The research focuses on addressing the following research questions.

1. Do you know about PSWs recycling?
2. Where did you learn about PSWs recycling?
3. Do you participate in PSWs recycling?

The novelty of the research is to identify the gap between knowledge, awareness and education on; PSWs recycling and participation in recycling programmes. It is against this novelty, that ESD is considered with regards to focusing on providing knowledge, awareness and education on PSWs recycling. The focus of the research is not limited to schools but every media of information dissemination. Further, ESD forms the basis to achieving the fourth Sustainable Development Goal (SDG 4) which focus on inclusive and equitable education and promotion of lifelong learning opportunities for all.

LITERATURE REVIEW

ESD addresses the strengthening and Development of people's competencies, enhancing people abilities to contribute and participate in various types of sustainable development dimensions and processes (ESD Experts, 2017). The definition indicates that, the relevant skills and competencies that focus on reading, numeracy, and writing are included. For this reason, the study links ESD to knowledge and awareness on PSWs recycling since the competencies aforementioned are fundamental to achieving sustainability. According to ESD Experts (2017), ESD contributes to individuals' ability to take responsible and informed actions on environmental integrity and socioeconomic viability. A number of studies have been conducted to understand the factors that influence individuals or households to participate in waste recycling programmes. A study conducted by Omran et al. (2009) revealed that, participation in household waste recycling depends on the level of understanding and awareness on recycling. Further, the study indicated that, education and increased access to recycling facilities promotes a recycling attitude. To this regard, education, awareness and understanding of recycling is a key to achieving sustainability and ESD provides a platform for the economies to achieve SDG 4. Tikka et al. (1999) also concluded that, high participation rates in recycling programmes occurs in households with better education. However, the conclusion in the study conducted by Tikka et al. (1999) does not indicate the type of education and hence the need to link ESD and Knowledge and awareness to PSWs recycling. A study conducted by Babaei et al. (2015) affirmed that, improving individuals' awareness on solid waste recycling and segregation is necessary for promoting recycling. Alijaradin et al. (2011) analysed knowledge on recycling and participation. The study revealed that, 77.5% of respondents did not have knowledge on recycling and 64.2% did not learn of recycling from schools. Further in a study conducted by Sidique et al. (2010), the findings revealed that, recycling rates increased by cumulative expenditure increases on recycling education.

The studies reviewed from; Babaei et al. (2015), Alijaradin et al (2011) and Sidique et al. (2010) indicate that, education, knowledge and awareness on waste recycling influence recycling participation. Thus in the era of sustainability, it is relevant to understand the significant of knowledge and awareness on PSWs recycling as well as the level of education on PSWs recycling to the communities.

Several other studies have focused attention on understanding the impact of knowledge, awareness and education on participation in recycling programmes. De Feo and De Gisi (2010) alluded that public education and encouragement promote participation in recycling programmes. Chung and Lo (2004) indicated that, achievement of an integrated approach to managing municipal solid waste demands the understanding of knowledge on waste management.

According to Babaei et al. (2015), knowledge is an understanding of a community information in relation to the topic of interest which is acquired through education by learning. In this regard, knowledge and awareness on PSWs is acquired through ESD. The studies reviewed in the research support that, provision of knowledge and awareness on PSWs through ESD contribute to achieving sustainability. Afroz et al (2018) affirms that individuals knowledgeable on recycling respond positively to

recycling programmes and this is supported by Nixon and Saphores (2009). Based on the reviewed studies, the research focuses on assessing the questions indicated in the introduction.

METHODOLOGY

Study area

The research was conducted in Ndola city which is located in the Copperbelt province of Zambia. It is located at 21degrees, Wind SE at 23km/h. Using the Zambian Census report of 2010, the urban areas in Ndola city were selected and the study was conducted in the following urban areas; Kansenshi, Kanini, Twapia, Yengwe. Chipulukusu, Nkwazi, Dag Hammerskjoeld, and Kanini.

Research design

A non- experimental survey was conducted. In order to gather data, a questionnaire was designed and distributed to households in the urban areas of Ndola city. At most, two visits were made to the households. The first visit consisted of explaining the purpose of the visit and distributing the questionnaire. For the households that managed to complete the questionnaire at the first visit, the questionnaire was collected. However, for the households that needed more time to complete the questionnaire, the second visit was made.

Data collection

Using the Zambian census population report of 2010, the population of the selected urban areas in Ndola city were identified. Based on the sampling guidelines of Kothari and Garg (2014), the sample size of the study was determined. A total of 445 households formed the sample size of the study. In order to obtain a validated presentation of the households, stratified sampling was used to determine the sample size in each urban area of Ndola. In order to collect the research data, a questionnaire was designed using the theories from the studies conducted by Afroz et al. (2018); Troschinetz and Mihelcic (2009), Vincent and Reis (2008) and Isa et al. (2008). The questionnaire consisted of three sections and the first section focused on assessing knowledgeability and awareness on PSWs recycling from the households. The second section focused on assessing "where the households learnt about PSWs recycling from." The third section addressed the participation of households in PSWs recycling programs. A total of 229 questionnaires were collected and analysed from a sample size of 445.

Data analysis

The research data collected from the questionnaires was analysed using the Software Package for Social Sciences (SPSS). Descriptive statistics focusing on the frequency and percentages were analysed. Pie-charts and bar graphs were used to present the data.

RESULTS AND DISCUSSIONS

Do you know about PSWs recycling?

The results depicted in Figure 4.1 indicate that, 70.6% of the household respondents know about PSWs recycling and only 27.4% do not know. The results provide a vital reflection on the current state of knowledge on PSWs

recycling. Provision of education for sustainable development is cardinal in WM issues. Therefore, the results provide a positive direction towards the achievement of ESD strategies for SSWM. Further, it is necessary to point out that, knowledge and education influence stakeholder participation in SWM programs. The studies of Singhirunnusorn et al (2011) concluded that, continuous provision of awareness and education on proper SWM and environmental issues is crucial for community participation. In addition, Nixon and Saphores (2009) found that, public education and recycling correlate positively.

In order to confirm where the households learnt about recycling, it is necessary to investigate the question. The follow up question is necessary as it will provide the information required to bridge the gap on recycling knowledge and ESD. In a study conducted by Alijaradin et al. (2011), 77.4% of the respondents knew about recycling and less than 40% learnt of it from schools. Therefore, it is cardinal to understand where households in Ndola learnt of recycling for the purpose of designing sustainable and contextual strategies in ESD for Zambia.

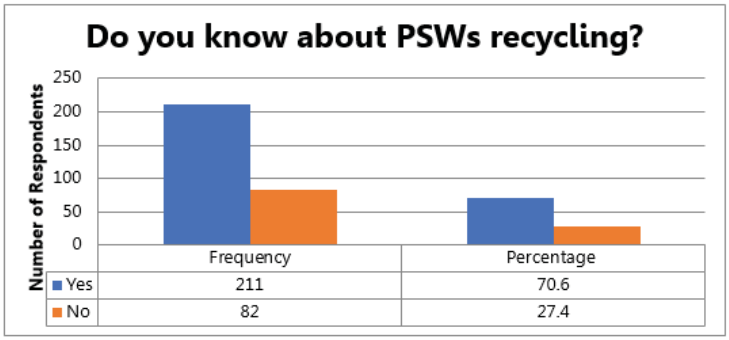

Figure 4.1: Do you know about PSWs recycling?

Where did you learn about PSWs recycling?

The results depicted in Figure 4.2 indicate that, the majority of the household respondents learnt about PSWs recycling from social media (32%). This result is supposed by Omran et al (2009). However, in order to achieve sustainability in the waste management arena, it is regrettable to note that, only 14% of the households' respondents learnt of PSWs in primary schools. Enhancing ESD on WM matters should begin at primary level education if the goals of SSWM are to be achieved. Alijaradin et al. (2011) findings support the results in this study and provide a basis on which to build ESD in schools.

From a developing economy perspective, the results on knowledge and awareness on WM have shown that, majority of the society learnt about SWM related issues from social media (Afroz et al. 2018; Babaeri et al. 2015; Nixon and Saphores, 2009; Vincent and Reis, 2008). Knowing about PSWs recycling from the social media is not a problem; however, few people in developing economies have access to social media. To this regard, the results from this study imply that, knowledge and education on PSWs should begin in primary schools. This is suggested because; one of the goals of sustainable development is provision of good health and well-being. The goal on good health and well-being can only be achieved with effective ESD programs in primary level education.

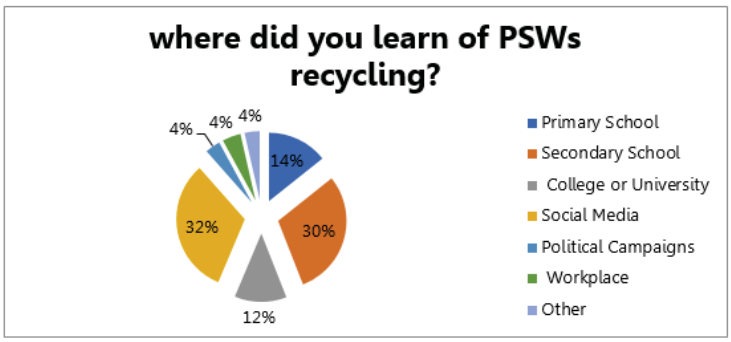

Figure 4.2: Where did you learn of PSWs recycling?

Do you participate in PSWs recycling?

The results in Figure 4.3 depict that, only 19.7% of the household respondents participate in PSWs recycling programs. The majority of the respondents do not participate. The reality of the results is that, knowledge on PSWs by the household respondents has not resulted in participation in PSWs recycling programmes. Isa et al (2005) affirmed that, non-participation in recycling programs by the public can be attributed to lack of awareness. This is in contradiction with the results in this study. The majority of the household respondents know of PSWs (70.6%) yet only 19.7% participate. Nevertheless, Tilikidou (2002) indicates that, research outcomes provide valuable insights that are useful to public offices in designing creative recycling strategies. Therefore, these results provide useful information that can be used in planning for ESD in developing economies on issues of SWM. Further, the findings on this question are relevant since a gap has been identified from the Zambian perspective.

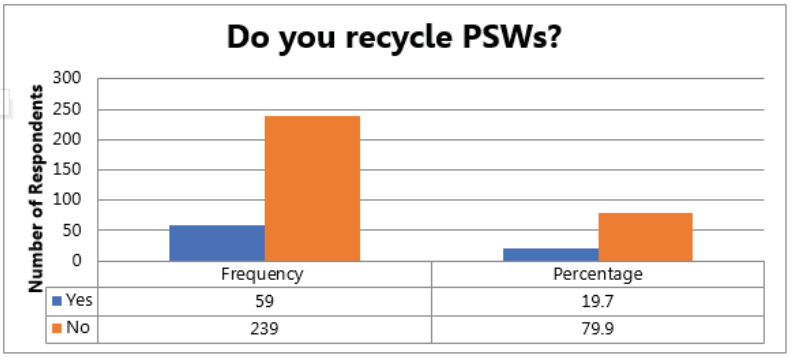

Figure 4.3: Do you recycle PSWs?

CONCLUSION

ESD is a cardinal strategy for achieving the sustainable development goals. In developing economies, a number of challenges in managing PSWs are faced; and knowledge and awareness on the benefits of proper SWM is one of them. This study has shown the gap existing between knowing about PSWs recycling and participation in recycling programs from a developing economy perspective. The study has shown that, only 32% of the households assessed learnt of PSWs from social media while only 14% learnt about it during primary education.

The results in this study are cardinal to education practitioners and educators, policy makers and waste managers. The relevance of the study is in the presentation of the current status on knowledge, awareness and education on

PSWs recycling. The current status has indicated that, 70.6% of the household respondents in the urban areas of Ndola know about PWSs and only 19.6% participate in the PSWs recycling programmes. The gap is relevant as it provides a platform for assessing the factors that can drive the households to participate in recycling programmes.

The study has identified limitations on the none comparative analysis of the demographic factors such as age, education level, occupation and size of the household on the questions assessed in the study. In the context of Ndola or another city, the identified limitation can be researched on.

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