

PLASTICS MANAGEMENT FOR JOB CREATION, A FEASIBLE AND PRACTICAL SOLUTION TO THE WASTE POLLUTION AND UNEMPLOYMENT

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ABSTRACT

Plastic waste is a growing pollution concern in Ghana even though several attempts have been made to reduce the negative effects on the environment and quality of life. However, the role of the waste generator in adaptation process received minimal attention. Hence an exploratory and quantitative survey was employed in Greater Accra Metropolitan Area. The investigations bordered on the experiences of young plastic waste generators with the management of plastic wastes, the economic benefits in the management process, and the gender influence on perceived value of plastics and the recovery measures. Generated data and analysis show that young people acquire experiences through observations and practices. They found the plastic management process economically beneficial and will separate plastics from other wastes. The experiences narrowed the gap for education and induced a positive attitudinal change to plastics management amongst the young people. Young females were found to be dependable stakeholders in sustainability measures to mitigate effects of plastic mismanagement.

Key words: Plastics, waste, recover, youth, experiences, source separation.

Introduction

The amount of plastic waste in the world is on the rise and could triple by 2060 (OECD, 2022a). This is due to the widespread use of plastic products in various sectors such as food packaging, transportation, construction, and medicine. Despite being cheap and easy to process, plastic is made from non-renewable resources and has caused a reduction in the use of natural materials like stone, sand, clay, and metals. Additionally, plastic has helped slow down deforestation (FAO, 2022). Even though plastic was invented by Leo Hendrik Baekeland, a Belgian chemist, a century ago (Chalmin, 2019), sustainable use and management of plastic is still a challenge.

Many countries around the world have taken action to address the issue of plastic waste (Diggle & Walker, 2022). Over 60 countries have implemented bans and fees on single-use plastic products and other animals who feed on them due to the residual food particles (Priyanka & Dey, 2018) in the developing economies. The plastics enter the digestive system of the ruminants, remain undigested, and cause malnutrition and diseases like ruminal impaction with subsequent death (Priyanka & Dey, 2018). Similarly, micro- and macro-plastics leak into rivers and the sea and form part of the food chain for fish (Gündoğdu et al., 2021) and threaten the production and safety of fishery products (Alberghini et al.,

2022). Hence, it is imperative that long-term measures are taken to eliminate the effects of plastic waste on the environment and life.

On the other hand, Global trade in plastic wastes is found to favour the economies of low income countries, who lie at the receiving end, (Bai & Givens, 2021). The positive economic impact of plastic waste cannot be underestimated due to its recycling and reuse options. However a portion of the waste ends up in rivers and the sea as pollutant.

It is envisaged that a new measure to stop the mismanagement of plastic waste with a focus on the waste generator will induce a paradigm shift that spares on the concept of reducing, reusing, and recycling (McNicholas & Cotton, 2019). An example is found in the plastic waste awareness creation and the reuse in teaching and learning materials at a public school's early childhood class which focuses on the waste generator in Larabanga, Ghana's Northern region (Parejo et al., 2021) The resulting impact was a commitment of the children to recover plastic wastes from the environment and use them for artworks and toys, which will consequentially control the pollution (Parejo et al., 2021).

Targeting young and youthful waste generators is the next step of the waste generator-inclusive approach towards sustainable management of plastic waste. Knowing the perspectives of the waste generators on the plastic, and their role in the management process will provide the building block on which long-lasting interventions will be developed and implemented.

Experimentation

Research questions

The following questions directed the study:

What are the experiences of teenagers with plastics and the management of the waste?

What is the perceived economic benefit of managing plastic waste?

Does Gender influence the perceptions on value and the recovery of plastic waste? The study area included selected Schools (SCH) which are youth populated in the Greater Accra Metropolitan Area (GAMA). Being, Kinbu, St. Mary's, St. Thomas Aquinas, Labone and West Africa Senior High Schools. The students' diverse social backgrounds were taken into consideration during the selection process. The collected data represents the teenagers in the schools and their various social backgrounds.

Study design

The research followed an exploratory design, utilizing quantitative data collection methods. Graphs were generated from tallied questionnaires for interpretation.

Sampling and sample size

The random sampling of respondents was carried out. The sample size was calculated from the Yamane formula (Yamane, 1967). The formula combines the population size and the margin of error to arrive at the minimum number of samples that could be selected. The sample size was estimated per school as described in equation 1.

$$n = \frac{N}{1+N(E)^2} = \frac{239140}{1+239140(0.10)^2} = 95.98 \quad (1)$$

Where: n = the minimum sample size; N = total population = 107; ϵ = margin of error (10%)
Hence, the minimum sample size covered in the study was 96 respondents per school. A total of 480 youth was sampled from five SCHs.

Data collection and analysis

A random sampling of 480 questionnaires were carried out over 15 working days. The questionnaire recovery rate was 99%, with 475 completed forms. Data was analyzed descriptively and the forms were unmarked for confidentiality. Teenagers completed the questionnaires voluntarily during lunch breaks. Institutional Ethical Review Committee provided the ethical clearance for the study.

The instrument

The Instrument covered demographic information and ten (10) statements. The statements were organized to answer the three main research questions on the experience of teenagers in plastic waste and management, the perceived economic benefit of managing plastic waste, and Gender influence on the perception of plastic waste value. The experiences of teenagers were explored to understand their use of plastics and knowledge of the management options that evolved in the value chain. An experience will inform the respondent on the profitability or not of the interventions that captured the waste from the environment for alternative use. The role of both male and female gender was explored in the perceptions of plastic waste value.

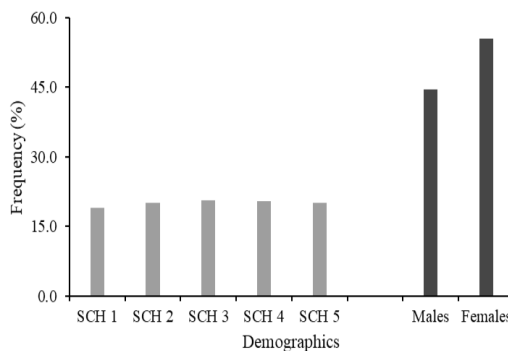
Data analyses

The data was manually compiled using Microsoft Excel and then exported to the Statistical Package for Social Sciences (SPSS)

version 18. Frequencies and percentages were recorded in tables and grouped by the three main research questions

Results and discussion

Demographics



The study involved a sample of 475 high school students, with ages ranging from 10 to 38 years. Notably, the average age of the respondents fell within the age bracket typically considered for Ghanaian youth, which spans from 15 to 35 years (Dansua, 2010). This information provides valuable insights into the study participants' age distribution and highlights the findings' relevance for Ghana's youth population. Respondents were categorized as youth-in-school under Ghana's National Youth Policy (Dansua, 2010).

The survey results, Figure 1, revealed a slight disparity in the gender distribution of participants, with 45% identifying as male and 55% as female. It is interesting to consider that the higher percentage of female respondents may suggest their enthusiasm for actively participating and offering valuable insights and perspectives.

An equal number of questionnaires were distributed to each of the five schools

under study, Figure 1. However, there was a variation in the number of retrieved questionnaires from each school. The reason for this variation was that some respondents were unable to complete the questionnaire during the short break time provided. These respondents were then unable to submit their completed questionnaires at a later date, which ultimately affected the total number of retrieved questionnaires from each school.

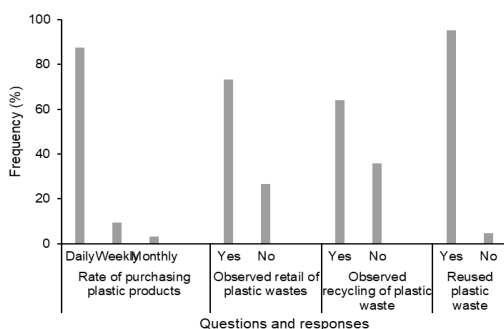


Fig. 1: Gender and school composite

Hence, the research was conducted with a primary focus on Ghanaian youth, with the majority of participants being females. The research team ensured that equal opportunities were provided to all youth in their respective locations, regardless of their socioeconomic status or background. The perspectives and experiences of the youth in the study area serve as a significant representation of the general perceptions and provide valuable insights.

What are the experiences with plastics and the management of the waste?

The experiences reported by the respondents highlight the value of informal knowledge they have gained with regard to plastics and their management. This knowledge could prove to be incredibly useful for waste generators when it comes to making informed decisions about

selecting the most appropriate disposal option for the plastics (Kombiok & Jaaga, 2023). By leveraging this knowledge, waste generators can play a more active and responsible role in managing plastic waste in a safe and sustainable manner.

Figure 2 displays the frequency distribution of the responses collected from the instruments used in this study. This graphical representation provides a clear visual understanding of the data gathered on experiences of the plastic waste generator. According to a recent study conducted (Musah et al., 2021), it was discovered that the number of plastic products imported into Ghana is quite significant. This revelation may not be unexpected, given that a vast majority of young individuals (87.6%) who participated in the survey (Figure 2) reported purchasing readily available plastics on a regular basis. By delving deeper into the issue of plastic consumption and its effects on the environment, we can take critical steps toward mitigating the impact of plastic waste in our communities.

Furthermore, the survey aimed to gather information on the practices of plastic waste management, specifically focusing on the experiences of individuals in relation to the sale, reuse, and recycling of plastic materials. According to the data, Figure 2, a significant majority of 73.3% of the participants have observed the sale of reclaimed plastic waste in their localities. This finding highlights the fact that people are well informed about the financial gains associated with recycling plastic and are taking active steps towards contributing to a sustainable environment (Bening et al., 2022).

Furthermore, it was found that approximately 64.1% of the respondents had prior experience with recycling plastic waste, Figure 2. This finding suggests that the

participants have a heightened awareness of the significance of plastic recycling in today's society (Olatunji, 2022). It also implies that they possess first-hand knowledge of the numerous benefits associated with recycling plastic waste, including its positive impact on the environment, conservation of resources, and reduction in landfill waste. Overall, the data indicates that the respondents are well-informed and conscientious regarding their actions towards plastic waste management.

Additionally, a considerable proportion of the respondents (95.2%) showcased their familiarity with the notion of repurposing plastic waste, Figure 2. The source of such knowledge could vary from personal experiences to observations made in their immediate surroundings such as households or communities. This revelation highlights the fact that the younger generation is well-informed about the benefits associated with reusing plastics. Such advantages include prolonging the lifespan of the materials and minimizing the detrimental effects of waste on the environment (Awoyera & Adesina, 2020).

According to the feedback received, Figure 2, it is apparent that the youth in the community have gained a significant amount of knowledge and practical skills on how to manage plastic waste effectively. They have learned about the importance of reducing plastic usage, reusing plastic products, and recycling them appropriately. These insights have resulted from their daily experiences with plastic products, which has helped them gain a deeper understanding of the impact of plastic waste on the environment.

Moreover, their newfound knowledge and skills have led to a remarkable shift in their attitudes towards plastics, which demonstrates a good relationship between

awareness and attitudinal change. (Boca & Saraçlı, 2023). They now view plastic products not only as a convenience but also as a potential environmental hazard. As a result, they are becoming more conscious of their plastic usage and taking proactive measures to minimize plastic waste, such as using eco-friendly alternatives and properly disposing of plastic products.

What are the perceived economic benefits of managing plastic waste?

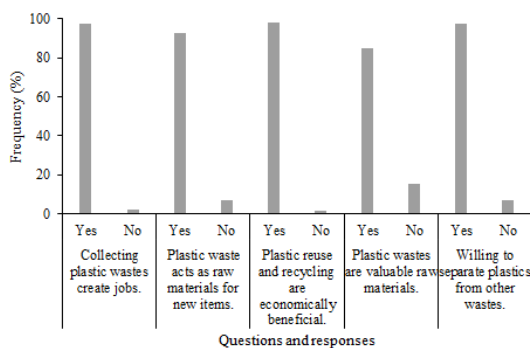


Fig. 2: Feedback on instruments addressing experiences.

Plastic waste management is a crucial aspect of environmental sustainability (Oguge et al., 2021) as it plays a significant role in protecting the planet's resources, including the land and sea, from the detrimental effects of pollution. The sustainable management of plastic waste has numerous economic benefits (Zaske, 2021) that are often overlooked. These benefits include job creation, increased income generation, and the production of new items from recycled plastic (Hernandez et al., 2022). In light of this, we sought to understand the perception of young people towards the economic benefits of plastic waste management, which is the collection, sorting, reuse, recycling, disposal and product redesign, (Lange, 2021) and how

this perception influences their decision to participate in community efforts to keep the environment free from mismanaged plastics. The study involved gathering the opinions of young people through a survey. The findings of the study could help inform policy and initiatives aimed at encouraging young people to participate in efforts to reduce plastic waste and promote sustainable management practices.

After conducting a comprehensive analysis of the data presented in Figure 3, it has been discovered that a significant majority of the respondents, accounting for 97.5%, have expressed their unwavering support for the concept of creating employment opportunities through the collection of plastic waste. This finding is significant in demonstrating that the idea of waste management for job creation has gained popularity among respondents. This approach has the potential to address two critical issues faced by many countries - unemployment and plastic waste pollution (Lebreton & Andrady, 2019; Suomi et al., 2020).

For instance, the success of an initiative in Yaounde, Cameroon, serves as a clear example of how this approach can work. An organization paid young people to collect plastic waste, which was then recycled. This initiative aimed to reduce the negative impact of plastic waste on the environment while providing employment opportunities for the youth (Ngalame, 2016). The success of this initiative highlights the benefits of waste management for job creation.

The discovery of the job creation potential in waste management is undoubtedly a significant step toward addressing the problem of unemployment. It can serve as a beacon of hope for the youth, enabling them to fully comprehend the value of plastic

waste and the benefits of its recovery for the industry. This discovery is a crucial step towards creating a cleaner environment while also providing employment opportunities for the youth.

As a result, it can be deduced that the majority of the youth have demonstrated an admirable level of knowledge and awareness regarding the impact of plastic waste and its role in their communities. This includes recognizing its potential for job creation, as well as its positive impact on the environment. The data suggests that such knowledge among the youth could lead to a positive shift in attitudes towards plastic waste, leading to an increase in its collection and recovery for the industry.

Hence, the findings suggest that waste management for job creation is a feasible and practical solution to the problem of plastic waste pollution and unemployment. The success of the initiative in Yaounde, Cameroon, adds to the growing body of evidence that waste management for job creation offers a way forward for many countries. This approach has the potential to create a cleaner environment while providing employment opportunities for the youth, thereby contributing to sustainable development.

Furthermore, the study findings, Figure 3, suggest that a vast majority of young people (92.8%) acknowledge the potential of plastic waste as a valuable resource for manufacturing new items. The respondents' awareness of this fact is an indication of their understanding of the importance of the circular economy, where waste is considered a resource. These young people demonstrated a high degree of environmental consciousness in their recognition of the principle of reuse (95.2%) and recycling (64.1%), as discussed earlier.

The research reveals that the respondents' positive attitude towards plastic waste and their understanding of the value chain's circularity are significant contributors to their willingness to participate in waste management initiatives. With such a positive outlook, young people are likely to engage in activities aimed at recovering and selling plastic waste materials to industry, thereby contributing to the creation of a more sustainable future.

Additionally, the results indicate that young people's involvement in waste management initiatives will not only help mitigate the environmental impact of plastic waste but also create economic opportunities that promote sustainable development. Hence, it is encouraging to see that young people are aware of the value of plastic waste and are willing to contribute to its management, thereby supporting the transition to a circular economy (Johansen et al., 2022).

Also, the study conducted revealed that most young people, approximately 98.2% of the respondents, Figure 3 consider recycling and reusing plastics to be economically beneficial. The majority of the participants, precisely 84.7%, Figure 3, also support the idea that plastic waste is a valuable raw material. The results of the study demonstrate a significant shift in the perception of plastic waste from being entirely worthless to being a valuable resource that can be harnessed for economic gain.

The study also found that almost all participants, about 97.8%, Figure 3, were willing to separate plastic waste from other types of waste during disposal. This willingness is essential as it helps prevent contamination of plastic waste, making the recycling and reuse process less expensive. Separating plastic waste from other forms of waste also ensures that the plastic waste is kept clean, making it easier to recycle with novel technologies (Alias et al., 2022).

The data from the study shows that young people are well-informed about plastic waste management and understand the importance of proper disposal. They know the steps required to eliminate the effects of plastic mismanagement. This knowledge and understanding demonstrated by the youth acts as a precursor to their commitment to saving plastic waste from general waste. They set aside plastic waste for industry, ensuring that it is available for buyback and recycling companies.

Hence, the study indicates that young people today are well-informed about plastic waste management, and they understand the value of plastic waste as a raw material. The commitment demonstrated by the youth to save plastic waste from general waste is commendable and can have a significant impact on the environment (Evide et al., 2021).

Does Gender influence the perceptions of value and recovery of plastic waste?

TABLE 1
Chi-square test on the role of gender

	(chi-square test)	Yes	No	Q12
MALES	0.002<0.5	80.7%	19.3%	Are plastic wastes valuable raw materials?
FEMALES		88.0%	12.0%	
	(chi-square test)	Yes	No	Q13
MALES	0.002<0.5	90.7%	9.3%	Would you want to set your plastic wastes aside for recycling and reuse?
FEMALES		94.6%	5.4%	

The test aimed to investigate whether there is a difference in how males and females value plastic waste and their willingness to recover it for industry. The null hypotheses were "Female's value plastic waste more than males" and "Females are more willing to recover plastic waste for industry than males". The study analyzed the responses of males and females to assess their attitudes toward plastic waste. The results of the chi-square test showed that both null hypotheses were true, indicating that females value plastic waste more and are more willing to recover it for the industry than males. The difference in responses between males and females was statistically significant, with a p-value of 0.002 for both tests, as outlined in Table 1.

Furthermore, the study found that young females were more informed about and had more experience in managing plastic waste than males. They had a better understanding of the value of plastics and their role in the management process, which made them more inclined to recover plastic waste for the industry. This is consistent with similar observation among people in Europe (Barbir et al., 2021). On the other hand, males needed more sensitization to increase their interest and participation in plastic waste management and recovery.

Hence, females are more committed to ensuring the sustainability of plastic waste recovery and management structures than males. Therefore, it is necessary to increase the awareness of males to match the interest of females in plastic waste management. The findings of this study may help policymakers and industry stakeholders develop strategies to enhance plastic waste recovery and management practices and promote gender equity in waste management.

Conclusion

Plastic waste has become a major environmental issue, prompting several interventions aimed at reducing its negative impact on the environment and human life. The success of these interventions requires sensitization and awareness creation to change people's attitudes towards plastics and make them appreciate their value in the circular economy.

We have shown that young people have acquired knowledge about plastic management through their daily experiences, even without formal sensitization. The study area data revealed that most young people purchase readily available plastics daily and have seen primary plastics being reused and recycled. They have also recognized

the economic benefits of managing waste, including the potential for job creation through recovery, reuse, and recycling. This knowledge has given them a positive outlook towards plastic waste management.

Notably, young people value used plastics as raw materials for the manufacture of new items and are willing to separate them from other waste. This is a crucial step towards a more sustainable circular economy. The study also revealed that young females have a greater interest than males in advancing the plastic circular economy and are more likely to participate in plastic waste management activities. This makes them invaluable stakeholders in the mitigation process.

With the cooperation of young people, especially young females, it is possible to achieve effective plastic waste management and reduce the negative impact of plastic waste on the environment and human life. By promoting the reuse, recycling, and recovery of primary plastics, we can create a sustainable circular economy that benefits us all.

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