

The role of plastic waste in income generation for plastic waste collectors: A case study of Mbeya city, Tanzania

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Abstract: The Plastics are used in a growing range of applications which lead to huge amounts of plastic waste, which can have detrimental effects to humans and the environment. Recycling has helped to reduce plastic waste. This research intended to reveal the income gained by plastic waste collectors per day. The study used structured interviews and observations. A total number of 23 plastic waste collectors were interviewed. The results have shown that, most of the plastic waste collectors have primary education while majority has no any formal education. Further the results revealed the income varies due to season and the effort of the plastic waste collectors, during rain season, the large amount of money which can be gained by the plastic waste collectors per day is 3,000 Tsh (depicted by 43.5% of plastic waste collectors), and the small amount is 800 Tsh (depicted by 4.4% of plastic waste collectors) while for the season with no rain, the large amount of money which can be gained by the plastic waste collectors per day is 2,250 Tsh (depicted by 43.5% of plastic waste collectors), and the small amount is 600 Tsh (depicted by 4.4% of plastic waste collectors).

Keywords: Solid Waste, Plastic Waste, Income Generation, Plastic Waste Collectors, Recycling.

1. INTRODUCTION

By definition, waste is something that is no longer valued and has been discarded or discharged after use. Plastic is a general term for a wide range of synthetic or semi-synthetic materials used in many applications from packaging to buildings; from cars to medical devices, toys, clothes etc. In our environment, plastics exist in forms of basins, cups, bottles, plastic bags, cups, tanks, electronic devices etc. After serving the intended purpose, plastic products turn into waste. The amount of solid waste generated has been increasing due to population increase, developmental activities, changes in life style and socio – economic conditions. Over the last few decades, there has been a steady increase in plastic waste due to increase in the use of plastics products in most of the cities in sub Saharan Africa, plastics are used in both food and water packaging industries (Quartey et al., 2015). Plastic waste is third in position of the total constituents of solid waste, the first one is Organic waste, second one is Paper waste and the third one is plastic waste (UNEP, 2009). Due to urbanization and economic development in east Africa, plastic waste constitutes 10% of the total solid waste generated (Oberlin, 2011; Oyake – Ombis et al., 2015). In mbeya, Plastic waste constitutes about 9% of solid wastes generated at the household level per day, while in community secondary collection points the plastic wastes generated amounts to 11% of the total solid wastes generated (Mgimba & Sanga, 2016). According to Mbeya City Council (2008/9) annual report shows that the solid waste generated daily was about 167 tons.

Over the last few decades there has been a steady increase in the use of plastic products resulting in a proportionate rise in plastic waste in the municipal solid waste streams (Carrol, 1996; Yankson, 1998). Plastics products have become more attractive in food packaging, shopping bags, electronic devices etc than equivalent products made of other materials because they are durable; resist chemicals, water and impacts; are good insulator for electricity; inexpensive to produce and not heavy in weight (Sharma, 2008). The current annual worldwide demand of plastics has reached 245 million tonnes (PlasticsEurope, 2008a). Different types of plastic wastes are generated in towns and big cities in Tanzania. The

most common types of plastic wastes generated in Mbeya include water bottles and plastic bags. Most of plastic bags are those thin plastic bags which are usually given to the people free of charge when getting services from different areas such as shops, markets and food stores.

The huge amount of plastic wastes that results from the dramatic increase in the production and use of plastic products give rise to serious environmental concerns, as plastics do not degrade and can remain in the municipal refuse tips for decades (Tiwari *et al.*, 2009). If plastic waste is buried on the land it will create mountains of plastic waste which are hazardous. This is because plastics contain hazardous pollutants that are detrimental to both humans and the environment. Plastic products like bottles and plastic bags do not deteriorate easily. If they are used carefully, they can be used many times for a long time.

Due to growing concern on environmental issues and sustainable development, there has been a worldwide call to manage plastic wastes. Among the leading strategies include reducing, reusing, or recycling plastics so as to avoid their detrimental effects to both humans and the environment. Recycling is preferred to other methods of removing waste based on its advantages. For certain types of plastics, incineration is not good because burning of plastics releases hazardous substances and may contribute to emission of green house gases that lead to global warming (Aguado *et al.*, 2007). A number of people in Mbeya have entered in the activity of collecting and recycling plastic waste so as to generate income. Plastic wastes collected by individuals are delivered and sold to main collection centres where they are sorted before sending to recycling centres. The number of plastic bottles in the streets has decreased as a result of plastic waste collection. Waste recycling option minimizes waste in streets, plastic waste being among of them (Mbuligwe and Kassenga, 2004).

Waste recycling is only a partial solution to this problem since the recycling industry in Tanzania is still in early development and the processing capacity is still too low (Riedjik, 2010). According to Mwayafu (2010), recycling of plastics can create employment while at the same time cleaning the environment. Therefore, the paper intends to identify the income gained by plastic waste collectors.

2. METHODOLOGY

2.1 Area of Study

The area of study for this research was Mbeya City, the area was selected for the reason that the city has all representative characteristics expected in the research. Representative characteristics of the research were plastic waste collectors, availability of plastic waste collectors, plastic waste collection centres.

2.2 Sampling Procedure

There are two common sampling procedures, namely probability sampling and non-probability sampling. Non – probability sampling is that sampling procedure which does not afford any basis for estimating the probability that each item in the population has of being included in the sample. In this type of sampling items for the sample are selected deliberately (Kothari, 2004).

Non probability sampling was used in this study because the exact number of plastic waste collectors is not known.

2.3 Sample Size

The sample size used was 23, whereby there were 17 males and 6 females. The respondents were obtained randomly in streets of Mbeya City and at the collection centre.

2.4 Data Processing and Analysis

The data gathered, were analysed by using MS Excel program.

3. RESULTS AND DISCUSSION

3.1 Gender of plastic waste collectors

Plastic waste collector's general information includes gender, age and education level. 73.9% of the plastic waste collectors were male, while 26.1% of the plastic waste collectors were females, the reason behind for the gender not to balance is the hardship of the job.

3.2 Education level of plastic waste collectors

The results revealed 86.9% of the plastic waste collectors have got primary education level, while 13.1 have no any formal education. This shows the business of plastic waste is dominated by the people with primary education and few of them who don't have education at all. This might be caused by the reason that, people with primary education they usually struggle to get formal employment, that's why they have decided to enter in that business.

3.3 Ages of plastic waste collectors

The results also revealed that 47.8% of the plastic waste collectors are in the age of 18 – 25 years, 34.8% are in the age of 26 – 35 years, 13% are in the age of 36 – 45 years and 4.4% in the age of 46 – 55 years. This shows that, this job has taken a number of young energetic people, and this is due to the nature of the job, which is very tedious involving a lot of movements in seeking of plastic waste. The scope of the study based on the ages above 18 years old.

Table 1: Ages of plastic waste collectors

Age (Years)	Plastic waste collectors (in %)
18 – 25	47.8%
26 – 35	34.8%
36 - 45	13%
46 - 55	4.4%

Source: Field work 2016

3.2 Quantity of plastic waste collected by individual plastic waste collector per day

The results revealed that 43.5% of the plastic waste collectors collects 15 kg of plastic waste per day, 30.4% of the plastic waste collectors collects 12 kg of plastic waste per day, 8.7% of plastic waste collectors collects 8 kg of plastic waste per day, 13% of plastic waste collectors collects 5 kg of plastic waste per day and 4.4% of the plastic waste collectors collects 4 kg of plastic waste per day. The quantity collected depends on person's effort, if an individual has big effort, the number of kg of plastic waste collected will also be large.

Table 2: Quantity of plastic waste collected by individual plastic waste collector per day

Plastic waste collectors (in %)	Quantity of plastic waste collected (in kg)
43.5%	15 kg
30.4%	12 kg
8.7%	8 kg
13%	5kg
4.4%	4kg

Source: Field work 2016

3.3 Income gained by plastic waste collectors per day

The income gained by plastic waste collectors per day, depends on the season, the price of the plastic waste per kg during rain reason is 200 per kg, while the season with no rain the price is 150 kg, and this is due to the fact that, during rainy season, plastic waste is available in small quantities compared with the season with no rain fall, where by majority of people drinks bottle packed water. Therefore, the income gained will also depend on the quantity of the plastic waste collected by the plastic waste collectors. 43.5% of plastic waste collectors get 3000 Tsh, 2250 Tsh; 30.4% get 2400 Tsh, 1800 Tsh; 8.7% get 1600 Tsh, to 1200 Tsh; 13% get 1000 Tsh , 750 Tsh and 4.4% get 800 Tsh, 600 Tsh, for rain season and season with no rain respectively.

3.4 Number of Plastic Waste Collection Centres

The researcher observed only one plastic waste collection centre in Mbeya city, which means all plastic waste collectors delivers plastic waste collectors to that centre. Due to that, the price for selling plastic waste, is determined by the buyer, which is the plastic waste collection centre, the reason behind for buyer to set price is due to the fact that there is no competition in the business.

4. CONCLUSION

The study about the role of plastic waste in income generation for plastic waste collectors in Mbeya city indicated that, 43.5% of the plastic waste collectors get 3,000 Tsh per day, this is the highest amount earned by those collectors and the lowest amount is 800 Tsh this was depicted by 4.4% of the plastic waste collectors, though the amount is not very big, the amount earned has supported those plastic waste collectors in running their life. Generally, this job of plastic waste collection depends on the physical effort of the plastic waste collector and has taken the group of people who has either primary or no education who usually get difficult to be employed in the formal employment. Further, the availability of individuals who bought plastic waste from plastic waste collectors has contributed to minimize the amount of plastic waste in streets. Therefore, there is the probability of this income to vary depending on whether the plastic waste collector will increase effort or will decrease effort.

REFERENCES

- [1] Aguado, J. and Serrano, D. (1999), Feedstock Recycling of Plastic Wastes. RSC Clean Technology Monographs. Royal Society of Chemistry, Cambridge.
- [2] Aguado, J., Serrano, D.P. and San Miguel, G. (2007), European Trends in the Feedstock Recycling of Plastic Wastes. *Global Nest*, Volume 9, pp 12-19.
- [3] Carrol, A. (1996), Urban Environmental Sanitation Project, *Staff Appraisal Report* Republic of Ghana, Report No. 15089.
- [4] Kothari, C.R. (2004), *Research Methodology: Methods & Techniques*, 2nd edition. New Delh: Wishwas Prakashan.
- [5] Mbuligwe, S. E., and Kassenga, G. R. (2004), “Feasibility and Strategies for Anaerobic Digestion of Solid Waste for Energy Production in Dar es Salaam City, Tanzania”, *Resources, Conservation and Recycling*, 42, pp. 183 – 203.
- [6] Mгимба, C and Sanga, A. (2016), “ Municipal Solid Waste Composition Characterisation for Sustainable Management Systems in Mbeya City, Tanzania”, *International Journal of Science, Environment and Technology*, Volume 5, No. 1, 47 – 58.
- [7] Mwayafu, D. (2010), “Waste Plastic Disposal: A grave Problem”, UCSD, [www.easuswatch.org/phocadownload /Articles/waste plastic disposal](http://www.easuswatch.org/phocadownload/Articles/waste%20plastic%20disposal), retrieved on Friday 11th November, 2011.
- [8] Oberlin, S. A. (2011), “The Role of Households in Solid Waste Management in East Africa Capital Cities”, PhD thesis, Wageningen, Wageningen Academic Publishers.
- [9] Oyake – Ombis, L; Van Vliet, B. J. M; and Mol, P. J. A. (2015), “Managing Plastic Waste in East Africa: Niche innovations in Plastic Production and Solid Waste”, *Habitat International*, Vol. 48, 2015, pp. 188 – 197.
- [10] PlasticsEurope (2008a), Analysis of Plastics Production, Demand and Recovery for 2006 in Europe, *The Compelling Facts About Plastics*, Brussels, Belgium: PlasticsEurope.
- [11] Quartey, E. T; Tosefa, H; Danquah, K. A. B; and Obrsalova, I. (2015), “Theoretical Framework for Plastic Waste Management in Ghana through extended Producer Responsibility: Case of Sachet Water Waste”, *International Journal of Environmental Research and Public Health*, Vol. 12, pp. 9907 – 9919.
- [12] Riedjik, A. (2010), Waste Recycling Opportunities in the Serengeti Ecosystem, *Policy Paper*, Arusha, Tanzania, [www.roundtableafrica.net/getattachment/projects/waste management in-serengeti-ecosystem](http://www.roundtableafrica.net/getattachment/projects/waste%20management%20in-serengeti-ecosystem), retrieved on 3rd January, 2012.
- [13] Sharma, P.D. (2008), Plastic Wastes – Reduce, Reuse and Recycle of Plastics are Essential to Make Environment Greener and Safer, www.saferenvironment.wordpress.com/2008/10/06, retrieved on Thursday 7th November, 2013.
- [14] Tiwari, D.C., Ahmad, E. and Kumar, S. (2009), “Catalytic Degradation of Waste Plastic into Fuel Range Hydrocarbon”, *International Journal of Chemical Research*, Volume 1, No 1, pp 1.
- [15] Yankson, P.K. (1998), The Urban Informal Economy Accommodation, Growth, Linkages, Health and Environmental Impact. *The case of Greater Accra Metropolitan Area*, Ghana University press, Accra.