BEHAVIOUR OF HOUSEHOLDS IN ACCRA-GHANA TO SOURCE SEPARATION & RECYCLING IN ACHIEVING SUSTAINABLE SOLID WASTE MANAGEMENT

Doris Baah1, M. Kharlamova2

1 Postgraduate Student of the Department of Monitoring and Forecasting of the Ecological Faculty,
2 PhD in Chemistry, Head of the Department of Monitoring and Forecasting Peoples’ Friendship University of Russia (Moscow), Russia

Abstract.
This article is focused on the sustainability scenario of solid waste management in Accra, the capital city of Ghana. Source separation and recycling of household waste has a direct effect on solving the open dumpsite co-nundrum in Ghana. This paper highlights the households’ behavior and their concerns towards separation of waste at source and recycling options. The article assess the willingness of households in low and middle income communities in Accra to separate household waste at source and discuss the efficiency at which the households can separate the waste into the desired categories. The findings show a highly efficient source separation program significantly enhances the recycling potential of recyclables in the waste stream whiles the high organic separation efficiencies could help recover majority of the organic waste in the waste stream for composting purposes.

Keywords: solid wastes, sustainability, willingness, source separation, recycling, household, Accra, Household solid waste (HSW).

Introduction
Research over the last decade or two has continued to highlight the fact that waste business has become increasingly expensive for city authorities alone to handle. Therefore every stake holder must get involved especially the household if we are to achieve the sustainable development goals. Beneficial uses of solid waste depend on efficient collection and separation of waste into fractions of economic importance [1]. Most urban cities in Africa including Accra produce a variety of waste predominantly domestic solid waste, industrial waste and construction waste which mostly end up in landfills with quite a significant amount also disposed in drains, streams and open places creating pressing sanitation problem [2].

Accra generates nearly 900,000 metric tons of solid waste per year, 1 approximately 67% of which is organic matter, the rate of waste generation is approximately 0.5 kilograms per person per day.1 The city estimates that 88% of waste generated in areas where it provides collection services is collected, however, waste collection services are only provided in a limited area; only 40% of households in the city have waste collection bins. Accra is working to increase its waste collection coverage, especially in low-income areas of the city [4]. Currently, nearly all waste recycling in Ghana is carried out by the informal recycling sector but the challenge facing most Metropolitan, Municipal and District Assemblies (MMDAS) in Ghana today is how to provide adequate disposal facilities effectively to handle the large volumes of waste generated. All of Accra’s waste disposal sites are currently closed; the city has no waste disposal site of its own. Collected waste is currently transported from Accra to a landfill in Tema, approximately 37 kilometers outside Accra [4].

Sustainable development of solid waste management distinguishes a large range of possible relationships between the public and private sector, including public-private partnerships, community-public partnerships, and private-private arrangements and activities within the relationships in the SWM system notably, separation of waste, and the productive use of waste [3]. Source separated solid waste is easily handled as the sorted waste streams can be channeled to their respective treatment facilities like composting, recycling or waste to energy. A lot of effort is however required to make source separation successful since it is not naturally part of present day urban lifestyles [7].

Therefore, the main purpose of the article is to identify the nature of recycling behavior practiced by households and their willingness to adopt source separation in Accra and suggest best practices of waste resource recovery in the metropolis by highlighting the system of waste collection and its challenges in order to ensure effective handling and management alternatives for solid waste.

Research design and methodology
This article is basically a descriptive research which presents facts concerning the nature and status of the situation at hand. It also includes a mix of survey, literature and reports review, as well as information from stakeholders in the waste management sector. Three types of residents were studied: those living in slums, in residential areas, and in a commercial area mixed with houses. To capture the diverse nature of the living arrangements in the metropolis, the data collection needed to be stratified to get adequate representation of the citizenry for the household survey. To attain uniformity, towns in metropolis were classified into high income, middle income and low income areas to form the strata.

Analysis of results
The growth in population in Accra over the years means the importance of housing cannot be underestimated. Parts of inner-city Accra comprise a mixture of very low-density development with under-used service
infrastructure on the one hand, high-density development and overstretched infrastructure services on the other. The Bank of Ghana (2007), in their research classified housing in Ghana as follows: Compound Houses, Detached, Semi Detached, Flat/Apartments, Tents/Kiosks, Huts and Other.

**Figure 1: Housing Distribution in Ghana**

Housing in Accra can be grouped into three broad categories: the low-income, middle-income and high-income areas. The low-income housing areas comprise Osu, Jamestown, Adedenkpo, Chorkor, La, Teshie, Nungua, Sukura, Kwashieman, Odorkor, Bubiahsie, Abeka, Nima, Maamobi and Chorkor. Altogether, these areas accommodate about 58% of Accra’s total population. Most of the city’s informal businesses are located in low-income areas. The middle-income areas of Accra are predominantly populated by Ghanaian citizens and business, administrative and professional families. Much of the housing in these areas has been provided by state, parastatal and private sector organizations and individuals. The middle-income areas include Dansoman Estates, North Kaneshie Estates, Asylum Down, Kanda Estates, Abelempke, Achimota, Adenta and Tesano. Usually, these areas, unlike the low-income areas, are planned developments. The high-income areas provide housing for the remaining 10% of the population. They include areas like North Ridge and West Ridge, Ringway Estates, north Labone Estates, Airport Residential Area, Roman Ridge, East Legon.[9,10]

**Figure 2: Willingness of Households to separate waste at source**

The first level for separation at source in the waste recovery system in Accra is the household. The main reasons that respondents source separate HSW at home are almost the same among different community groups and different age groups. The willingness to separate waste at source seem to be based on financial benefit from the sale of their materials rather than on environmental awareness because majority of the population are poor. Surprising, from the 60 respondents interviewed, 20 from each of the categories, low income households expressed more willingness to separate the waste they generate. This implies that most of the respondents have a high awareness of the environmental problems caused by HSW and are willing to work to resolve these problems.

Some of reasons that respondents do not source separate HSW at home, according to importance, are as follows: HSW source separation is too troublesome, the waste I classified will be mixed later, do not have a place to put the classification trash bins at home and the community does not carry out a household solid waste source separation program.
From the figure above, it is quite clear that basic knowledge on the recycling possibilities of household waste is high but there is low rate of recycling because there are no organized and effective recycling programs in operation and informal sector recycling largely remains the active source of recycling in Ghana. This is confirmed by the fact that only 2% of the solid waste generated in Accra, the capital of Ghana is recycled in a recycling facility (Global Project, - Accra as cited by Thompson, 2010).

### Incentives for Source Separation

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Low Income</th>
<th>Middle income</th>
<th>High income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of Bins</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td>Financial Incentive</td>
<td>No incentive</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>85</td>
<td>10</td>
</tr>
</tbody>
</table>

Respondents in both income groups admitted that incentives ranging from financial to mass education could facilitate their participation in any source separation program. Majority of respondents confirmed that multiple bins preferably colored bins are necessary in order to help them sort separate waste recognizing the need to sort the waste into different categories to avoid contamination. About 95% of low income respondents suggested that financial incentives such as waiving waste disposal fees in the pay as you throw system will be a source of motivation or increasing the price of recyclables will also help. The downfall of financial incentives is the short term effects it has on recycling behavior because as soon as the incentive is taken away recycling and source separation efforts reduce (Purdon et al., 2010).

### Way forward in Achieving Sustainability

Sustainability was considered from the socio-economic, public health and ecological perspective. Households were asked to rank in order of importance some of the ways to achieve sustainability and effectiveness of the measures to promote household separation of waste and recycling.

<table>
<thead>
<tr>
<th>Way Forward</th>
<th>Rank</th>
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<tbody>
<tr>
<td>Encouraging habit of labeling waste at the household level</td>
<td>5</td>
</tr>
<tr>
<td>Affordability of waste collection services (low cost for separation)</td>
<td>4</td>
</tr>
<tr>
<td>Provision of free colored bins to make source separation easier</td>
<td>1</td>
</tr>
<tr>
<td>Reliability of collection services (frequency/regularity of collection)</td>
<td>3</td>
</tr>
<tr>
<td>Constant campaign of source separation and recycling methods at the community level</td>
<td>2</td>
</tr>
<tr>
<td>Reward for correct source separation and recycling</td>
<td>3</td>
</tr>
<tr>
<td>Punishment for non-separation or incorrect separation of waste</td>
<td>6</td>
</tr>
<tr>
<td>Government supervision of household waste separation and recycling</td>
<td>7</td>
</tr>
</tbody>
</table>

Rank from 1- most efficient way forward to 8- least efficient way forward

### Conclusion and recommendations

A majority of the collected household waste in Ghanaian urban areas including Accra is being disposed at open dumping sites and unsanitary landfills in an uncontrolled manner. Overall, the study highlighted the fact that households are not entirely satisfied with current solid waste management in their communities and this is supported by their high willingness to source
separate waste and although the respondents have a very positive attitude about household waste source separation, it has not transformed into separation behavior. Households have knowledge of solid waste recycling possibilities but the absence of organized arrangements for recycling means there will be a huge obstacle in adopting or practicing.

This article therefore recommends that the city of Accra should now strive for 100% collection of household waste, but the existing system of waste collection which does not provide the separation of waste into various components must be eradicated. There must be mechanisms put in place for selective acceptance of waste from the population and subsequent processing. The system of separate waste management should be based on centralized economical and institutional arrangements. The continued use of policies, which influence the development of sustainable waste management systems, provide education and raise awareness of environmental issues, and promote positive behavioral changes, will move towards achieving sustainability.

References


