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Do economic incentives affect attitudes to solid waste source separation? Evidence from Ghana

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ABSTRACT

This paper examines the willingness of urban households in Ghana to accept economic incentives to participate in solid waste source separation. Low income households were less inclined to accept cash incentives than middle or high income households indicating that other factors than purely costs for waste management are important for households to participate in source-separation of waste. Perceptions on health and sorting and the availability of open space in the households were important for the willingness to accept incentives for source separation. The empirical findings indicate that household-level solid waste separation is positively influenced by gender (female) and sorting or health-related perceptions on source separation. About 80% of the households are willing to accept cash incentive of GH¢1.6374 (US$1.6347) per month to participate in source separation, and the mean cash incentive per month is GH¢1.2186 (US$1.2166). Fruitful solid waste management policy recommendations based on the empirical magnitudes and directions are made.

1. Introduction

Poor solid waste management is a threat to public health and reduces the quality of life for urban residents. The management of solid waste is a complex issue across the globe due to rapid population growth and urbanization, particularly in developing countries. Effective and efficient ways of managing the large amounts of solid waste generated in the urban cities in Africa are needed. Available evidence show that this can best be done by taking an integrated view on waste management, beginning at the source of waste generation (UN-Habitat, 2010). The main disposal method of solid waste in Ghana, as well as most Sub-Saharan African countries is the land disposal without prior treatment and organized resource recovery. This indiscriminate and improper dumping of solid waste, often mixed with hazardous untreated materials such as medical waste, raises several serious environmental health concerns. Moreover, recyclable resources such as metals, plastic, glass are lost, as well as potential resources such as compost from organic waste, and energy from burnable waste.

Accra, the capital city of Ghana, and Kumasi, the second largest city have a combined population of about 4 million and a floating population of about 2.5 million, and generate over 3000 tons of solid waste daily (Mensah and Larbi, 2005). Kumasi has a fairly well-functioning waste management system in an African perspective, since an estimated 70 percent of the waste is collected and transported to an engineered landfill located at the edge of the city. However, there are unresolved issues: the financing is not sustainable, a significant proportion of the waste is not collected, and the landfill has an expected remaining lifetime of less than 10 years. The leachate from the landfill is a source of water pollution to the Subin River and the greenhouse gas methane, which is formed by anaerobic decomposition of waste, is emitted to the atmosphere. Siting of new landfills is a major political and planning challenge, and new landfills are inevitably located further away from the growing urban centers, resulting in increased economic and environmental costs for longer transport distances. The solid waste collected in Kumasi contains at least 50 percent organic matter that could be composted and about 8 percent plastic waste (Asase, 2008).

A sustainable solution requires that the waste management system is economically viable, technically appropriate, socially functional and environmentally acceptable. Current focus in many developing countries is on arranging and financing waste management that fulfills basic services of waste collection (Fobil et al., 2007). However, there are opportunities for improved economic viability, as well as environmental improvements, by taking a wider systems perspective on waste management. With an integrated view on waste collection, environmental protection and recovery of resources from waste, it may be better to implement a system where different waste streams are separated at the source and transported, treated and recycled. The principle of sustainable integrated waste management includes the minimization of waste generation, maximization of waste recycling and reuse and

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ensuring environmentally sound disposal of wastes (Makau, 2005). For successful adoption of alternative methods such as composting and other recycling methods, organized solid waste separation, particularly source separation at the households, is a key factor (Suttibak and Nitivattananon, 2008). Separation of recyclables at the source is better than the recovery of materials from mixed wastes, because source separation produces cleaner, higher-quality materials (Bennagen et al., 2002).

Composting has been identified as one of the viable options in reducing the large volumes of waste generated from households in Ghana (Drechsel et al., 2004; Cofie et al., 2009). Composting can have many benefits, by transforming waste into a valuable resource, contributing to improved soil fertility and urban food security. Decentralized composting, which could be performed at various locations in the city, such as places currently used as waste dumps, could significantly reduce the need for waste transport. For high quality compost, properly sorted waste is necessary, and if the households do not separate waste at the source, compost producers must do so, which increases the cost of production (Sarkhel, 2006).

Solid waste separation by households ensures various benefits to municipalities, recycling industries, farmers, compost producers and other stakeholders of waste management (Bennagen et al., 2002). Such benefits include provision of a steady supply of materials to composting facilities and other recycling industries; reduced disposal costs; possibly reduced waste collection costs; reduced environmental impacts from the extraction of natural resources; reduction of leachate and landfill gas emissions by reducing organic material in landfills; and the creation of compost to return humus and nutrients to the soil. Since source separation of waste has all these benefits, but requires extra work from households, it is reasonable that households are compensated for their contribution to improved waste management. This could be done through reduced collection fees, direct monetary compensation for delivery of source separated materials, or free provision of waste bins. In waste management systems based on collection, transport and disposal of waste, households can be considered as passive producers of waste. In contrast, households have a central role in waste management systems involving source-separation, as their work in separating waste forms the basis for all later steps in collection and recycling of waste. It is therefore necessary that municipalities and policy makers have an understanding of the perceptions of households toward waste, so that services can be designed to fit the needs of households. Moreover, information and communication programs, as well as waste collection fees, can be designed to promote certain behavior.[1]

In Ghana, the provision of environmental sanitation services including solid waste disposal and management is the responsibility of the District Assemblies (Government of Ghana, 1999). As in many other countries, waste collection is sub-contracted to private companies in most cities, including Kumasi, where private sector participation in solid waste management system began in 2002. Presently the collection and disposal of solid waste in the metropolis is carried out by 7 different private waste collection companies. The Municipal Authorities pay the companies for the service delivered. Formerly, waste management has been fully funded through government budgets, but increasingly efforts are made to retrieve funding through fees for waste collection (Owusu et al., 2011). The main types of collection services are the communal and house-to-house collection methods (Oduro-Kwarteng and van Dijk, 2008). In communal collection, individuals bring their solid waste directly to communal skip containers from where the waste is collected and transported to the disposal site by the companies. Recently, a system has been introduced whereby individuals are expected to pay for disposal of waste at the communal sites, in a system known as pay-as-you-dump. House-to-house collection is a method of collecting domestic solid waste in which the individuals place bins full of waste outside their houses at the curbside or roadside on specific days for collection. The house-to-house service which is rendered mainly to the residents in the high and middle income areas is provided under franchise contract arrangement between Municipal Authorities and the private companies, which collect revenue from the users and subsidy from the Municipal Authorities for some areas. Fees charged for the house-to-house service ranges from GH¢2.00 (US$ 1.9) to GH¢5.00 (US$ 4.9) per month for each household head based on the residential class (Oduro-Kwarteng and van Dijk, 2008).[2]

In developing countries, recycling is to a large extent carried out by informal recyclers, both by waste pickers and by itinerant waste buyers. In Ghana, as in most countries, this informal recycling is not acknowledged in formal waste management and planning, However, informal recycling is a major part of waste management in developing countries, and there are successful examples where inclusion of informal recycling into the formal waste planning and management has resulted in improved services as well as stronger finances of waste management (Wilson et al., 2009). As waste collection is no longer seen as a service that should be provided by municipalities at no cost for the inhabitants, it is relevant to investigate what kind of services the inhabitants are willing to pay for, and how much. Moreover, it is worthwhile to investigate the households' willingness to perform an additional waste management service, by sorting their waste at the source, and what incentives would be needed for that to function.

Though there have been numerous studies on solid waste management conducted in Ghana, little attention has been paid to solid waste separation at the household-level. However, Asase (2008) analyzed source separation of solid waste at the household-level, through a pilot study involving about 100 households. It assessed the feasibility of source separation from a technical perspective; assessing the quantities and qualities of collected source-separated waste fractions. The study briefly covered attitudes of the households to source separation of solid waste but did not address the economic viability of household-level source separation. Given the increasing significance of solid waste management and the role solid waste separation could play, additional work is needed to shed more light on the factors which could promote the willingness of households to separate their solid waste at the household-level.

Experiences from other parts of the world indicate that important factors in the success of household participation in waste management, especially source-separation, include socio-economic factors, as well as perceptions toward the practical, health-related and environmental benefits or problems related to source separation. Moreover, the physical infrastructure, such as availability of waste bins close to the households, are important for the success of waste management in general, and source separation in particular (Parrot et al., 2009). This study therefore seeks to contribute to the existing literature by exploring empirically the factors that tend to promote household solid waste separation. More specifically, the study examines what socioeconomic factors as well as household attitudes and awareness tend to affect the willingness of households to accept cash and non-cash incentives to sort their solid waste at the household-level in the Kumasi metropolis of Ghana.

[1] One policy instrument that is commonly used in Europe is that of differentiated waste fees for households, depending on waste amounts and degrees of waste separation (Bilitewski, 2008).

[2] 1 US Dollar = 1.0016 Ghanaian New Cedi in 2008.