Solid Waste Management in Urban Centres in Kenya: Operations, Community Environmental Concerns and Participation

Francis Nyadero Sira

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ABSTRACT

Solid waste management is a discipline associated with the control of generation, storage, collection, transport and disposal of solid wastes. It includes all the necessary operations to remove solid wastes from the sources of generation to the disposal sites and the activities performed at the landfill to ensure environmental safety. Solid wastes should be managed adequately to conform to the best principles of public health and the environment and be responsive to public concerns and attitudes. Although solid waste management has remained the purview of the municipal authorities, it is important for the urban populations to participate in some waste management operations to augment municipal involvement and thus ameliorate the burden of increasing costs of management, inadequate transport and inappropriate disposal.

This study investigated the solid waste management practices in Nakuru and Thika towns in Kenya. The residential estates were stratified by income variable into high, medium and low-income estates. The respondents were sampled by simple random sampling technique and interviewed using questionnaires. The data was entered into the Statistical Package for Social Scientists (SPSS) version 15.0 for windows and analyzed using descriptive statistics, chi-square tests and tests of proportions using the z-test.

The results revealed that residents of Nakuru and Thika towns generated solid wastes at rates of 0.49kg/person/day and 0.55kg/person/day, respectively. Some 79% of the solid wastes were compostable organics (food wastes), 10% were plastics, 8% were metal and 3% of the solid wastes consisted of mixed wastes including glass, dirt and hazardous household wastes. Solid wastes were collected by the municipalities and by the private sector twice a week for most residential areas. The majority of the respondents were happier with private solid waste collection. Although it would be more convenient to transport solid wastes on motorized garbage trucks, the respondents suggested that other modes of transport, such as bicycles and private trucks, could be used to improve the collection and transport of solid wastes from residential areas to disposal points.

Most of the residential houses in Thika and Nakuru towns are accessible by road and solid wastes could be conveniently collected. Most respondents were employed and this could enhance the privatization of solid waste management services. Private waste collectors managed 85% and 15% of the wastes from households in Nakuru and Thika municipalities, respectively.

Regarding environmental concerns, the respondents considered the fly menace and the presence of hazardous household wastes as serious environmental concerns in waste management. When wastes were not collected adequately, residents burnt some wastes, buried others and indiscriminately dumped others in open spaces. However, the practice of burning combustible solid wastes should be discouraged on environmental grounds as it could contribute to air pollution.

Urban communities are willing to participate in the management of solid wastes to complement the services of the municipal authority and any other environmental management agencies. However, to enhance community participation the municipal authorities should

develop and implement community sensitization programs to enable urban residents to adopt appropriate waste handling practices. The municipality should also encourage the private enterprise to invest in solid waste collection, transport and disposal facilities. In addition, the municipal authorities should provide sites for the construction and use of landfills for the disposal of solid wastes and waste residuals that cannot be recycled or diverted.

A solid waste management model has been developed that could be used to predict the impact of population on solid waste production, the impact of waste quantity on transport trucks and landfill requirements and the impact of changing proportions of compostable organic wastes on the capacity of composting facility at household level.

In order to adequately manage solid wastes under Kenyans conditions, it is concluded that a town with a population of 100,000 people requires about six, 7-ton trucks for daily transport of solid waste and a landfill area of 2 hectares for a period of 20 years, if the maximum depth of waste in the landfill is 10 metres.

Using the model, it has been shown that an in-vessel reactor with a volume of 300 litres would be sufficient for household composting needs for a family of eight persons under Kenyan conditions. Kenyan engineers should collaborate with the private sector to develop and commercialize appropriate compost reactors that could be used by households to manage organic wastes.