J. Natn.Sci.Foundation Sri Lanka 2005 33 (1): 51-53

SHORT COMMUNICATION

THE PROBLEM OF SOLID WASTE : A CASE STUDY OF THE MAHARAGAMA LOCAL AUTHORITY

DUMINDA KURUPPUARACHCHI[1*] and PRASANSA KALUKOTTEGE[2]

[1] *Department of Information Technology & Decision Science, University of Sri Jayewardenepura, Nugegoda.*

[2] *Department of Statistics & Computer Science, University of Sri Jayewardenepura, Nugegoda.*

(Received: 24 April 2003 ; accepted: 20 October 2004)

Abstract: Environment friendly disposal of solid waste is often not being practised in most developing countries. The problem of solid waste arises because of its improper dumping. Modern waste management approaches that rely on integrated waste management, are popular world wide. This approach includes practical measures for the problem such as reuse, recycling, combustion and landfills. A case study of the Maharagama area had been conducted to identify the current status of the problem in a typical residential zone. Findings are summarized and discussed separately under the above mentioned features of an Integrated Solid Waste Management hierarchy.

Key words: organic waste, recycling, reusing, source reduction.

INTRODUCTION

The Administrative Division selected for this study is the Maharagama Pradeshiya Sabha (PS) which has changed dramatically during the past few decades. At the time this study begun (in 2002), it was a PS, but now it is an Urban Council (UC). The sampling survey, which was a part of this study, was conducted considering the Grama Seva Niladhari Divisions (GND) in Maharagama PS. According to 2001 census, the total population of Maharagama PS is 125,460.

Though the generation of solid waste is from various sources such as residential, commercial, industrial and public places, only residential sites were selected for this study. Since the major part of Maharagama area is covered by residences, this survey addressed a major part of the relevant problem.

Organizations such as the EPA (Environmental Protection Agency of USA) have introduced modern Integrated Solid Waste Management systems to solve most of the problems that the public and local authorities have faced. In brief, the modern 'Integrated Waste Management' concept has several solutions for the problem of solid waste, such as 'Source reduction' and 'Reuse', 'Recycling' (plus Composting), 'Combustion' and 'Landfills' (as disposal methods).[1,2]

METHODOLOGY

Most of the secondary data were received from the Maharagama PS and therefore, this study mainly targets the PS area and not the UC. Therefore, the statistical analysis and decisions will be valid only for the PS area as most of the data and information is based on the GNDs of PS.

For the sample selection, the GNDs were first classified in to 6 groups with respect to their population densities. These groups were taken as strata of the population. By optimal allocation method, 10 GNDs were selected as the sample. From each of these GNDs, 70 residential units were selected for data collection. A sequential sampling procedure was carried out for the selection of residential units within each GND. The data simultaneously collected from the 10 GNDs within one day. A questionnaire was prepared to gather data from residential units, but for accuracy students of the department visited and interviewed each residential unit and filled the questionnaires. A well-prepared sampling plan was used in order to get more accurate statistical data. Altogether there were 743 residential units in the sample and on average 74 residential units represented a GND. Collected data were statistically analyzed using a level of significance of 5%.

RESULTS & FINDINGS

Vegetables, Fruit, Meat, Fish, Bread, Rice and Coconuts were considered as the major sources

* Corresponding author

of organic waste of the average consumption per month, per person, 41% is rice, 19% is bread 18% is vegetables 11% is fruit, 7% is fish, and 4% is meat. Consumption of reusable/recyclable material averaged 34 coconuts, 36 shopping bags, 10 news papers, 8 king coconuts, 1 battery, and 10 yogurt cups per household per month. Further statistical analysis confirmed that, the number of members in a family is positively related while family income is negatively related to usage of shopping bags. Monthly total usage of shopping bags in Maharagama PS lies between 1,078,993 and 1,197,353 at 95% confidence level. This is a considerable amount as polythene is not a bio degradable material. The reusable bags were being used by 20% of residents. Among them, 46% percent use degradable bags such as paper or fabric.

The way that the residents manage their daily waste output is an important factor to study the problem of solid waste. Generally most of the residents store waste temporarily, prior to final disposal. According to the survey data, most of the residents (49%) collect waste in shopping bags. Commonly, the bag is also thrown away with the waste. Therefore, using shopping bags increases the polythene content of the waste directly. Using reusable waste bins to collect waste until final disposal, is a better method. Almost 25% of the residents use a waste bin. The usage of shopping bags as waste containers was significantly less with educated (A/L or higher) mothers. Residents who handover the waste to PS, use a greater number of shopping bags and garbage bags provided by PS. Availability of free land space for the residents significantly decreases the usage of shopping bags and garbage bags provided by PS as waste containers. The maximum percentage (70%) of residents dispose their waste once or twice a day while 5.3% dispose their waste more than twice a day. Others disposal frequency is less than once a day. Further analysis verified that the usage of waste bins and PS bags significantly reduces the disposal frequency relative to shopping bag users. Out of food consumption, increment of vegetable, fruit, and bread usages significantly increase the disposal frequency while increment of rice consumption reduces it. Collection of waste by the PS covered 60% of the area. With this, almost half of the residents stated that the collection was less than once a week and this frequency is sufficient considering the quantity of waste generated. The collection frequency is significantly high for areas with more than 75 houses than in the other areas.

Composting is an easier and important way of recycling organic waste materials. In domestic waste, a maximum percentage of organic waste (commonly, food waste) can be expected. Organic waste is quickly and naturally degradable. The information on composting practice of residents indicated that only 17% of residents compost their waste. All of them use the compost for gardening and 10% use compost barrels while others do natural composting. Data showed that the education level of the housewife was an important factor to increase composting practice. Majority of the residents (50%) did not compost their organic waste due to lack of time. The space was not adequate for 22% of the residents and 19% were not interested in composting.

CONCLUSION

Most of the waste in the sample area was organic (mainly food residues). Out of non-organic consumable material, shopping bags contribute most to the waste. Large number of households use shopping bags as waste containers. Less number of residents compost their waste and this practice is significantly affected by the level of the education of the housewives. The service provided by Pradeshiya Sabha is not adequate in comparison to the population density of the area.

Composting practices can be increased by educating the housewives. Also separated collection of waste will lead to efficient collection of reusable and recyclable material by the local authority. This will also reduce the ground capacity needed for landfilling and other disposal methods.

References

1. EPA (1989). *Decision Makers Guide to Solid Waste Management,* Environmental Pollution Agency, Washington DC, USA..

2. IETC (1996). *International Source Book on Environmentally Sound Technologies for Municipal Solid Waste Management*, Technical Publication Series VI, International Environmental Technology Centre, Osaka, Japan.

3. Chang Ni-Bin, Pan Y. C. & Huang S.D. (1993). Time series analysis of solid waste generation, *Journal of Research Management & Technology* **21**(1): 1-10