

Disparity among Urban, Rural and Estate Sector Communities in Solid Waste Management

Thilini Rajapaksha ^{1*}, Anurudda Karunarathna ²

Postgraduate Institute of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka ¹, Department of Agricultural Engineering, University of Peradeniya, Peradeniya, Sri Lanka ²

*teenr@gmail.com

Abstract – The legislative framework in Sri Lanka has given the mandate and responsibility of waste management to Local Authorities where the Local Authorities are supposed to deliver waste collection service to all citizens. However, all communities in the country are not equally served by waste collection service due to various issues in administrative structure and infrastructure facilitation. This research was conducted to assess the waste management practice of Urban, rural, and estate communities in different income groups. The results revealed that the urban poor has equal access to waste collection services (>98%) as of other communities in urban cities. However, a disparity exists between urban and rural communities in receiving the waste collection service. Rural communities in Pradeshiya Sabha areas have very limited access to Local Authority waste collection (<60%) and rural households tend to practice onsite disposal. The most marginalized community is the estate sector household having very limited access to formal waste collection service (<24%); thus, opted to use inappropriate waste disposal practices such as onsite burring, disposal on water bodies and illegal disposal that pose a great risk on health and environment sanitation. Introduction of onsite waste management systems for degradable and recyclable waste has identified the feasible solution; however, intervene solution is required to manage the non-recyclable waste disposal.

Keywords: *Low-income, Access to services, Estate*

I. INTRODUCTION

Population in developing countries are rapidly growing while governors are struggling to supply adequate basic infrastructures like water supply, sanitation, transport, and Municipal Solid Waste (MSW) management services. The MSW has been traditionally recognized as an urban issue with the economic reforms in 80's; however, rising evidence suggest that the demand for a quality and reliable waste management service is increased from rapidly urbanizing semi urban cities and townships [1]. The expansion of middle-income population in semi-urban and rural areas brought up new challenges for rural Local Authorities (LAs) because many agricultural lands were converted to residential areas and new townships appeared leaving no room for open disposal of household waste in rural communities [2].

There are three types of LA in Sri-Lanka namely Municipal Councils (MC), Urban Councils (UC) and Pradeshiya Sabha (PS) responsible for providing a variety of local public services including roads, sanitation, drains, waste collection, housing, libraries, public parks and recreational facilities in provincial level. There are 341 LAs comprise of 24 MCs, 41, UCs, 276 PSs in Sri Lanka. Waste generation rates are directly related to urbanization and economic development. Waste collection rates also correlate to the income level. Waste collection rate of low-income countries is 41% whereas high-income countries have 98% coverage of waste collection services. [3]. This study is geared towards evaluating and understanding the availability, efficiency of solid waste collection service and waste disposal practices of three different social segments, plantation rural and urban communities.

II. MATERIAL AND METHODS

As this study focused on three social segments namely urban, rural and estate communities it identifies 4 MC areas, 2 PS areas and six major tea plantations in Sri Lanka as study locations. Urban populations were identified from four MC areas including Kurunegala MC (KMC), Nuwara Eliya MC (NMC), Jaffna MC (JMC) and Moratuwa MC (MMC). Rural population was identified from two PS areas, including Thamankaduwa PS (TPS) and Kathragama PS (KPS). Plantation communities were identified from 6 major tea estates from Ambagamuwa (2) and Nuwara Eliya (4) areas in the Central Province. Study locations (LAs and tea estates) were randomly selected for the research.

A structured questionnaire was used to collect primary data from all the communities. Stratified random sampling was used in each estate to represent all the divisions in estates that comprises of several worker communities. The study sample size for urban areas were 606 and 309 for rural areas, which represent high, middle, and low-income categories. There were 104 low-income households were identified from rural households. Share of household monthly income quintiles described in household income and expenditure survey 2019 was used to define income levels for this study.

III. RESULTS AND DISCUSSION

The waste composition of the three different segments clearly shows the differences in consumption patterns. Table 1 reveals the data on solid waste composition in different segments. Kitchen waste is the major type of waste among all communities. Even though the line houses are compacted, the garden waste is higher (29%) among the estate communities as the arable lands are high. According to Table 1, polythene, and plastic content (12%), paper (14%), and textile (2%) content is comparatively higher among urban communities. Waste composition is more important in determining the solid waste management process.

Table 1 Waste Composition

Sector	Kitchen waste (%)	Paper (%)	Textile (%)	Plastic & Polythene (%)	Metal (%)	Garden waste (%)	Other (%)
Urban	48	14	2	12	1	6	17
Estate	38.2	3.7	0.8	2.6	2.4	29	23.4
Rural	57.5	11.6	1.6	7	0.9	17	4.5

The results of the study reveal that Nuwara Eliya, Moratuwa, and Kurunegala MCs cover waste collection in more than 90% of its population irrespective of income status. Among these municipalities, MMC area has the highest population density (7317 persons/sq.km) and waste collection coverage is 100% in MMC. Low-income population in NMC and JMC areas receive lesser extent (10% reduction) of waste collection coverage compared to high and middle-income communities in the same area. Poor access roads to households are a major reason to have less availability of waste collection services. In rural areas waste collection services mainly cover high and middle-income

segments. Low-income categories of the rural areas receive lesser waste collection coverage (Thamankaduwa PS 9.8%, Katharagama PS 25%) than the high and middle-income in the same group. Majority of the urban people are satisfied about the waste collection services provided by the local authorities. Lack of waste disposal sites and facilities of the LAs hinder its performance in service deliveries.

According to the study findings there were more than three fourth (76%) of the estate community have no access to garbage collection service. However, a few estate communities (24%) those who reside close in roadsides used to dispose garbage into the Local Authority collection vehicles though the LAs did not serve them. So, it is rather than the availability of the service, the estate Community residing near the service coverage areas put their garbage into the collection vehicles. Estates are demarked as privet properties in the PS and there are no provisions to extend the public services to the estate sector.

This research also focused on waste collection frequency in addition to the availability of the collection service. There were 22% of the urban population receive daily waste collection service and 47% receives waste collection at least 2-4 times per week. Rural communities (40%) receive less frequent waste collection service (irregular/less than once a week or once a week) compared to the urban community. Estate sector community receive less frequent or no service from the local authorities.

Table 2 Waste Disposal Methods

Sector	Method	High (%)	Middle (%)	Low (%)
MC	Curbside	7.7	9.5	13.6
	Open dump	5.1	2.8	2.8
	Onsite burning	9.4	7.9	7.7
	Recycling	3.2	3.6	3.4
	Composting	3.8	5.8	2.3
	Waste collection service LA	70.7	70.3	70.3
PS	Curbside	9.2	2.3	1.5
	Open dump	11.7	19.1	27.1
	onsite burning	36.0	42.2	49.1
	Recycling	0.0	0.0	0.0
	Composting	2.3	6.9	5.6
	Waste collection service LA	40.8	29.5	16.6
Estate Sector	Curbside			0
	Open dump			8.5
	Onsite burning			47.5
	Recycling			30
	Composting			10
	Waste collection service LA			4

Table 2 illustrates the waste disposal methods by three different groups. In contrast to the urban low-income groups, there is only 4% of the plantation community access garbage collection services. There are more than two third of the urban population use waste collection services provided to them. Fever usage of waste collection service was observed as a waste disposal

practice by the low and middle-income groups of the rural community than the same income groups of the urban communities. Less frequent service, distance to the collection point and arable land to go for other disposal methods are some of the reasons for the fewer usage of waste collection s by the rural sector.

Burning of waste is the most popular waste management practice among the plantation and rural communities, which are underserved or excluded by the LA collection system. The burning of waste creates enormous health and environmental problems. As urban people receive a satisfactory waste collection system, inappropriate waste disposal practices such as open dumping and burning remain low compared to the people who do not receive proper waste collection service.

IV. CONCLUSIONS

The comparative study between urban, rural and plantation communities revealed that plantation community practice primitive waste disposal methods such as onsite burning and illegal disposal of water resources due to the absence of proper waste collection service. Availability and Frequency of the waste collection service are also inversely proportionate to the usage of inappropriate waste management practices. Rural communities also tend to use inappropriate waste management practices due to less access to the waste collection service. Traditionally plantation administration was given the responsibility to provide waste management service but gradually decline over the time due to changes in administrative structure in the plantation sector. Continuation of inappropriate waste management practices by estate communities pose a great risk on pristine water resources. Decentralize waste resource recovery (composting, recycling etc.), non-degradable waste collection service by the local authority and small landfill and bailing of non-recyclable waste for a less frequent collection seem feasible solutions to the issue.

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