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# **Public Perceptions of the Effectiveness of Solid Waste Management in the Colombo Municipality Area**

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## ***Abstract***

*The general public has a perception that solid waste management is the sole responsibility of the respective local authorities. Hence, this research project attempts to understand the current practices of domestic solid waste disposal, management and related issues and importantly, to investigate the dwellers' perceptions of these issues, in the Colombo Municipal Council (CMC) area. Public opinion and perceptions of solid waste management systems are characterized by irregularities and inefficiencies in the waste collection system. Private sector participation in waste management has the highest patronage level with a 64.6% severity index, while the informal sectors have only a 48.7% severity index. The results indicated that 67% of the public is satisfied with the current waste management system of the CMC.*

*An average of 63% of total households prefer to participate in ensuring better waste management. 97.8% households favored daily collection and 82.5% of the households prefer waste segregation into different bins, if the bins are provided free of charge. Approximately, 71% of the total population prefers to use recyclable products to serve their daily waste needs. This study found that 37% of the dwellers do not have any interest in waste management and 78% of the respondents are not willing to pay for value added services. Education and awareness could generate a greater level of community engagement, in order to reduce waste at source.*

***Key words: Solid waste management, waste disposal, perception and effectiveness***

## **Introduction**

Colombo is the capital city of Sri Lanka and the most urbanized area of the island. The city of Colombo has a population of over one million, with 650,000 resident and 450,000 floating, within an area of 37 Km<sup>2</sup>. About 50% of the population living in the Colombo Municipal Council (CMC) area are low income earners, who reside in shanties and underserved settlements, mostly located in low-lying areas.

The task of daily waste collection and disposal within the Colombo municipal limit is a most difficult challenge faced by the CMC. An ever increasing population, urbanization, scarcity of land for waste disposal, the lack of stakeholders' participation, unplanned waste management systems etc. have become major reasons for this situation. Due to the linear relationship between human activities and solid waste generation and thoughtless consumerism this issue cannot be stopped, but it can be managed (Sebastian, 2010). Today however, the whole world's attention has been drawn to issues related to Municipal Solid Waste (MSW) disposal and management, because of their severity, allied with matters of public and environmental health. The CMC struggles to find alternative means to manage the solid waste related issues in its purview and spends great resources in pursuit of a solution. As a result, certain municipal wards of the CMC have contracted with private companies to collect domestic waste.

The CMC must take the necessary steps to mobilize the community and educate citizens on the rudiments of handling waste and proper practices of storing it in their own bins at the source, since stakeholders' participation is vital for efficient Solid Waste Management (Asnani, 2006). According to this study, in the absence of basic facilities for waste collection at source, dwellers are prone to dump waste on the streets, in open spaces, drains, and water bodies in their vicinity, which creates insanitary environmental conditions. The general public has a perception that the garbage disposal protocol and keeping the city clean is the sole responsibility of the respective local authority. This mindset is negatively impacted the formulation of productive systems of waste management in the country.

## **Objective**

The objective of the study is to examine public perceptions of the effectiveness of solid waste management in the CMC area.

### **Sub-objectives**

- To identify the existing partnership arrangements between private companies and the CMC with regards to waste management.
- To obtain public opinions on recycling of waste, reuse options and willingness to adopt proper waste management practices.

## **Methodology**

The study deals with the effectiveness of urban solid waste management in the CMC area. In order to accomplish the objective of this study, primary and secondary data were gathered on existing, domestic solid waste management practices and public perception of the effectiveness of the current waste management system. In assessing the general perceptions and willingness of respondents with regards to household waste management, 208 households were selected randomly within the six administrative districts of the CMC. The respondents were divided into three strata, i.e. high (above Rs. 50,000), middle (between Rs. 25,000-50,000) and low (below Rs. 25000) income earning groups, based on the State's socio-economic status index.

Primary data were generated by using formal and informal interviews and observations. Interviews were conducted with respondents from both public and private sectors. The secondary sources of data were collected from various literature in the form of publications, journals, articles, previous researches and internet.

## **Data Analysis**

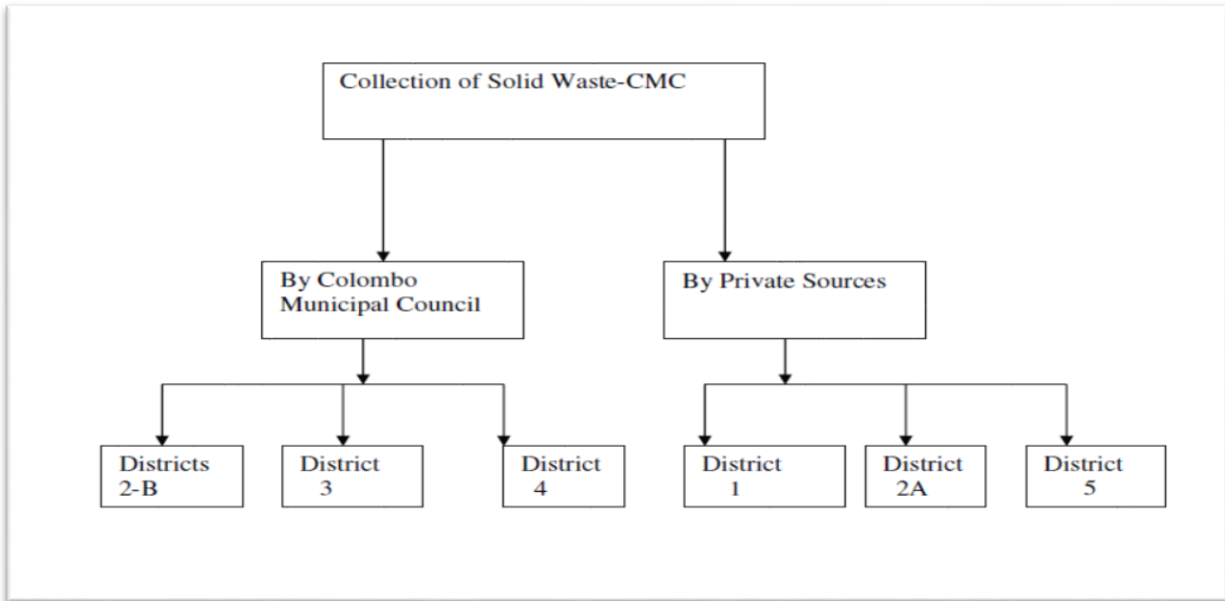
The collected information was analyzed to develop an understanding of the existing solid waste management system and its drawbacks. Discrepancies among available data and information were identified at the relevant stages. MS-word and MS-Excel computer packages were used to analyze the quantitative data. Quantitative data was presented in graphical and table formats. Analysis of qualitative data comprises of a detailed description of private sector participation in solid waste management.

## **Current solid waste management process of the CMC**

The CMC and its administration are the largest and the most developed local authority in Sri Lanka. Accordingly, the daily waste collection is approximately 900 MT, which is 70% of the total waste generation of the island. The CMC encounters challenges in managing the uncollected waste and in ensuring favorable environmental conditions for a sustainable waste management system for people to live in.

In this context, the CMC has established a Solid Waste Management unit for planning, organizing, collecting, disposing and recycling waste and for other related activities. The CMC area has been divided into 6 municipality districts and 47 municipality wards for the purpose of these operations. Hence, three districts were contracted and outsourced to private companies to manage operation of the waste management, whilst the other three districts are under the management of CMC (Figure-1). The CMC deployed 2,853 staff and 353-strong fleet of waste collection vehicles for this operation in the year 2014.

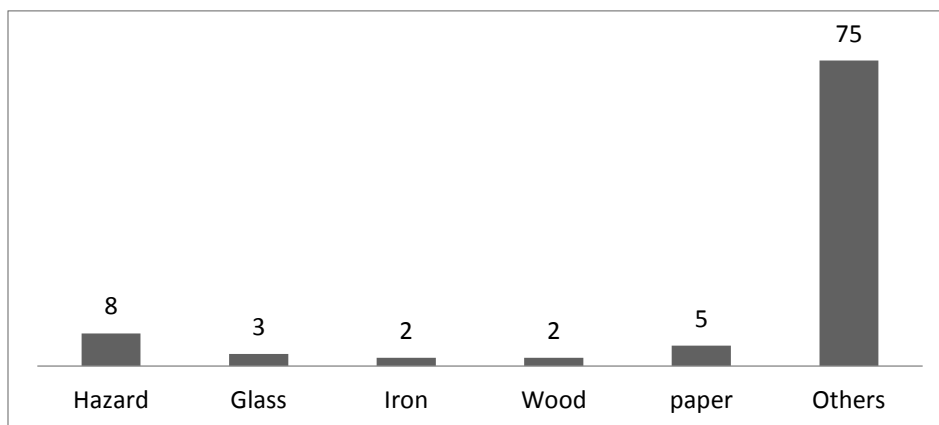
**Figure-1: Waste collection process of CMC**



Source: Colombo Municipal Council, 2015

The following graph provides statistical information in terms of per day waste generation mix in the CMC area. According to these figures, 8% hazardous, 3% glass, 2% iron, 2% wood, 5% paper and 75% of other waste -are-collected by CMC every day.

**Figure-2: Combination of Solid Waste Generation per day in CMC area (%)**



Source: Colombo Municipal Council, 2015.

## Results

As stated above, the CMC has taken every effort to manage solid waste and its related issues in its territory. But, this study found a gap, which needs to be addressed in a productive manner by the Municipal Authorities. The attitude of the general public is a key factor in hedging this gap and to comment on their level of satisfaction with the services rendered by public and private sectors. This study investigates the level of satisfaction and public perceptions of the waste management activities of the CMC.

The CMC area is divided into 6 municipal districts for the purpose of waste management and administration. Each district consists of 6 to 8 wards, and the total amounts to 47 municipal wards. Each district has a solid management depot, which is managed by a trained engineer together with overseers, assistants and laborers. The entire collection is coordinated by a Superintending engineer, employed under a Deputy Municipal Engineer. Yet 45% of the respondents are not aware of this hierarchy and 36% of the door to door clients are not satisfied with their services.

**Table-1: Mode of storing SW categories**

<b>Storing Option</b>	<b>Frequency</b>	<b>Percentage -%</b>
Refuse Bin	9	28
Carton Box	8	25
Bucket/Basket	10	31.3
Polythene bag	3	9.4
Others	2	6.3
<b>Total</b>	<b>32</b>	<b>100</b>

Source: Field Survey, September, 2015

Table-1 indicates that the respondents use Central Collection Points to store solid waste in buckets/baskets. These bucket/baskets are not usually covered and their weight is not ascertained. However, the clients of the door-to-door service, store solid waste in dustbins provided to them at zero cost by the company.

The process of waste collection in Colombo city generally involves loading from curbside into handcarts, which is then unloaded into transfer bins at secondary collection points. The CMC has about 2,000 secondary collection points. Some secondary collection points have no containers and waste is simply disposed the roadside. 67% of respondents replied that in certain places containers and collection bins were not adequate for waste collection. Waste is transferred or loaded into compactor trucks and tippers for final disposal from the secondary collection points.

The general public also revealed that the secondary collection process is a duplicate of the waste handling operation.

**Table-2: Frequency of waste collection**

Frequency	Percentage-%
Daily	16
Every 3 days	55
Weekly	25
Others	4

Source: Field Survey, September, 2015

From the data collected above, 55% of the door-to-door services have their waste collected every 3 days, while 16% of them were collected on a daily basis, as shown in table 2.

**Table-3: Rating of Services of CMC (%)**

Related Services	Exception	Satisfied	Not known	Not satisfied	Dissatisfied
Frequency of garbage collection from the Central Point	6.3	59.4	9.4	21.9	3.1
Reliability/Regularity of collection	-	40.6	15.6	43.8	-
Prompt response to user complaints	-	21.9	43.8	28.1	6.3
Vehicles and equipment used to transport and dispose waste	6.3	90.6	3.1	-	-
Handling of waste containers during transportation	6.3	53.1	21.9	18.8	-
Costs of service	3.1	78.1	18.1	-	-
Final disposal site where vehicles unload refuse	-	3.1	75.0	18.8	3.1
Cleanliness of service area (cleaning of spillage/degree of littering)	3.1	65.6	6.3	18.8	6.3
Public monitoring and sanctioning	3.1	21.9	50.0	21.9	3.1
Behavior /attitude of collection crew towards residents	3.1	68.8	25.0	3.1	-

Household education on waste management	6.3	28.1	28.1	34.4	3.1
Neatness of waste collection crew, wearing of protective clothing	3.1	78.1	9.4	9.4	
Overall service quality	90.6	3.1	-	3.1	3.1

**Source: Field Survey, September, 2015**

The CMC has initiated measures to offer garbage containers with three cubic meters capacity each, as part of its constant efforts to improve the solid waste management system. However, 67% of clients are satisfied with this service delivery of the CMC. This study found that 70% of garbage bins of 300 constructed across the city by the CMC were damaged, owing to corrosion or poor maintenance. Subsequently, the plastic cans with lesser capacity were installed at certain places. A majority of such cans were damaged and a few were stolen by unidentified persons, for which 95% of the public responded negatively.

According to table-3, 47% of the clients of the Central Collection Point are satisfied with the overall services delivered by the Municipal authority because of their regular collection. However, they have negative perceptions of on the vehicles used by them as the CMC does not take responsibility for educating or raising awareness in households about solid waste management, while engaging in their periodical monitoring and supervisory work.

In a few municipal wards, households are provided with free refuse bins by the CMC and private organizations, at no cost. The private companies often appeal to the public to purchase these pay for these, based on the type of refuse bin used. However, 78% of the respondents are not willing to pay for such services. The interest and awareness of households is are very important for successful waste management activities. Without the householders' involvement in solid waste management; "Waste from Wealth" cannot be achieved. Yet, a majority of householders were found to have no interest in the final disposal of waste.

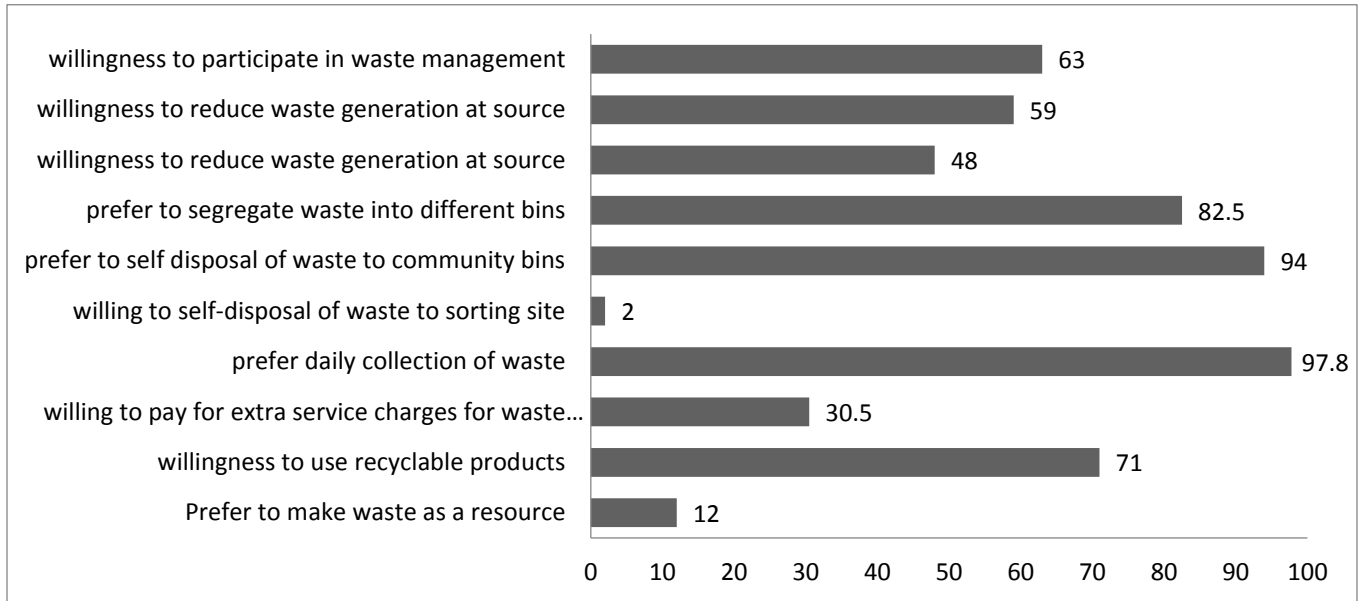
On average, 63% of the households are willing to participate in the better management of waste. About 97.8 % of households prefer the daily collection of waste while 94% of households are in favour to dispose the waste themselves, rather than using the community bins. About 82.5% of the households preferred to segregate their waste into different bins, only if the bins are provided by Government/Non-Government organizations.

Household waste is collected every three days in a week, while commercial waste is collected daily. According to the CMC, the collection network covers nearly all areas of the city. 76% of the respondents claim that on many occasions, due to inadequate vehicle maintenance and temporary breakdowns in service, uncollected waste are left out for more than two days at secondary collection points. The majority of the households of approximately 71% were willing to use recyclable products for their daily needs as they have an understanding of the 3Rs concept



(reduce, recycle and reuse). About 12% of the households are in favour to convert waste as a resource, while 59% of the households were willing to reduce waste generation at source, as they are aware about the consequences

**Figure-3: Perception and willingness of households in solid waste management (%)**



**Source: Field Survey, 2015.**

Approximately 48% of the households wish to sort the recyclable waste at the source. The level of environmental awareness of these households is low and they tend to dispose of all their waste directly into the waste stream as their intention is to get rid of the waste. About 30.5% of the households are willing to pay an additional fee for the value added services provided in terms of waste collection and thereafter they were satisfied once the waste was removed from the residence.

This shows that the average level of interest in waste disposal has a positive correlation with household income and household size. Approximately, 2% of households prefer to dispose their waste themselves rather than sending it to the sorting site, as they are aware of the concept of reduce, recycle and reuse.

This study reveals that 37% of residents do not show any interest in waste management, since they merely dispose the waste either on the road, into a lake, or into any open area as they believe that waste collection is the sole responsibility of the municipality. Further, their income level is very low and 34% of the households can be categorized as low income earners.

## Conclusion

This study was able to provide an indication of the current household solid waste management practices of the CMC and peoples' perception of waste management. Although, most residents are concerned about the environment, the domestic solid waste management processes and active participation of all stakeholders are still limited and have large gaps. This has been attributed to various constraints; such as lack of education and awareness, lack of support from the regional authorities, lack of financial support and inadequate solid waste disposal facilities etc. There should be arrangements in place to collect non-bio degradable waste such as plastic, e-waste and metals. Furthermore, the public perception of various solid waste management strategies is positive and people are willing to support the implementation of proper solid waste management and disposal strategies in their localities.

Furthermore, the CMC should play their role in being more concerned in monitoring and supervising these matters to ensure the productivity of the outsourced/contracted management services, ensuring value for money and reducing instances of shoddy work. The Municipal Assembly should set performance and target indicators to guide private stakeholders, in order to hold them accountable for poor service delivery. This study suggests that public opinion should be sought, prior to implementing any solid waste management strategy.

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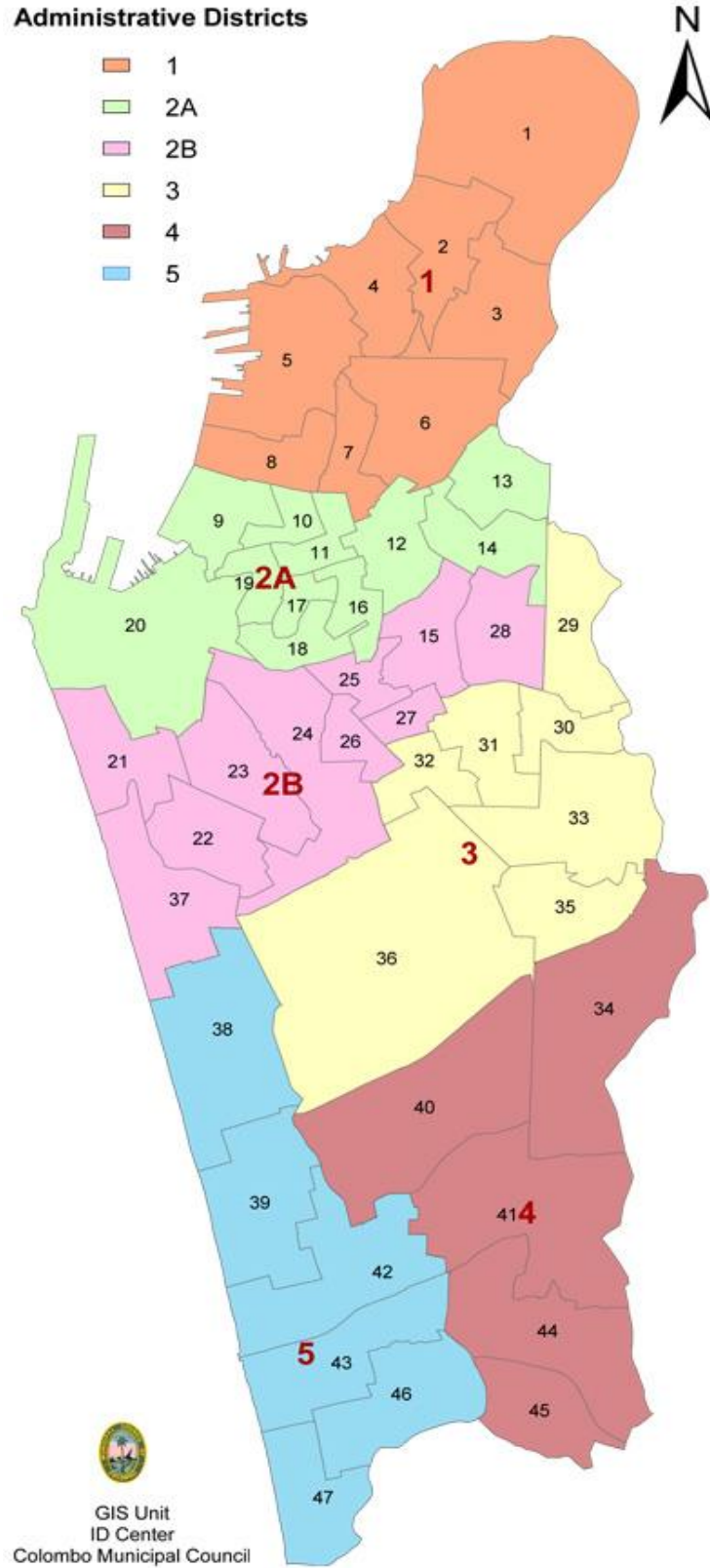
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**Appendix-1:**

Administrative Districts of the Colombo Municipal Council



**Appendix-2:**

## Wards of Colombo Municipal Council

- |                       |                       |
|-----------------------|-----------------------|
| 1. Mattakkuliya       | 29. Dematagoda        |
| 2. Modera             | 30. Wanathamulla      |
| 3. Mahawatte          | 31. Kuppiyawatte East |
| 4. Aluthmawatha       | 32. Kuppiyawatte West |
| 5. Lunupokuna         | 33. Borella North     |
| 6. Bloemandhal        | 34. Narahenpita       |
| 7. Kotahena East      | 35. Borella South     |
| 8. Kotahena West      | 36. Cinnamon Gardens  |
| 9. Kochchikade North  | 37. Kollupitiya       |
| 10. Gintupitiya       | 38. Bambalapitiya     |
| 11. Masangas Weediya  | 39. Milagiriya        |
| 12. New Bazaar        | 40. Thimbirigasyaya   |
| 13. Grandpass North   | 41. Kirula            |
| 14. Grandpass South   | 42. Havelokk Town     |
| 15. Maligawatte West  | 43. Wellawatte North  |
| 16. Aluthkade East    | 44. Kirulapone        |
| 17. Aluthkade West    | 45. Pamankada East    |
| 18. Kehelwatte        | 46. Pamankada West    |
| 19. Kochchikade South | 47. Wellawatte South  |
| 20. Fort              |                       |
| 21. Kompannaweediya   |                       |
| 22. Wekanda           |                       |
| 23. Hunupitiya        |                       |
| 24. Suduwella         |                       |
| 25. Panchikawatte     |                       |
| 26. Maradana          |                       |
| 27. Maligakanda       |                       |
| 28. Maligawatte East  |                       |