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PERCEPTION OF HOUSEHOLD SOLID WASTE MANAGEMENT PRACTICES IN THE SOUTH ZONE OF COIMBATORE CORPORATION, TAMIL NADU, INDIA

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Abstract

Solid waste generation depends on population characteristics and can impact local scenery and ecosystems. This study investigates household solid waste management perceptions in Coimbatore's south zone using questionnaire data analysed with SPSS factor analysis. Factor associations and variances were examined, and spatial variations were assessed using Z scores in ArcGIS 9.1 software. As a result, the findings show that the people in this region have a moderate to high standard of living. The analysis of the collected dataset proved that the eight attributes, specifically socio-economic condition, facility in the house, accessibility of dust bin, environmental problem, the standard of living, attitude towards the workers, disposal and collection of solid waste materials, determine solid waste management practices in the south zone of Coimbatore Corporation. The eight identified attributes were combined to determine household solid waste management levels in Coimbatore's south zone, ranging from very low to very high. The resulting Z scores reflected residents' perceptions of solid waste management practices in the study area. In general, most of the wards fall into the low to medium categories, with significant numbers of wards facing challenges in waste management, environmental issues, and accessibility to services like dustbins. These challenges appear to be the most pressing concerns in the study area, and it also seems to reflect that there is a need for targeted improvements in certain wards. Proper solid waste management practices are to be developed in the study area, which is vital to keeping a tidy environment in this study region.

Key Words: Solid Waste, Factor Analysis, Z-score Map, Coimbatore, Public Perception

1. Introduction

Globally, urban areas generate approximately 3.5 million tons of solid waste each day—a figure projected to rise to around 6.1 million tons per day by 2025, according to the World Bank (2019). Solid waste generation is influenced by factors such as socioeconomic status, cultural habits, population structure, and income levels (Emery et al., 2003; Ismail et al., 2018; Bradley et al., 1999; Eagles & Demare, 1999). Economic growth, urbanisation,

and rising living standards in Indian cities have increased both the quantity and complexity of solid waste, potentially impacting local landscapes and ecosystems. Research by Mohamad Noufal et al. (2020) identified several factors influencing solid waste generation rates and composition. Their findings, based on Pearson's coefficient values, indicate a positive correlation between household solid waste generation and variables such as monthly income, household size, and age of the household head. Conversely, a negative correlation exists with the education level of the household head. Roy and Deb (2013) established a positive relationship between the number of occupants in a household and the quantity of solid waste produced. Understanding residents' characteristics and their perspectives on sanitary workers is crucial for effective solid waste management.

Current solid waste management practices are frequently hampered by conventional transport methods, roadside dumping, disposal into water bodies, irregular waste collection programs, inadequate infrastructure, financial constraints, insufficient skilled personnel, and poorly regulated landfills (Mulat et al., 2019; Okeyode & Rufai, 2011; UNESC, 2009). Nkansah et al. (2015) found that household size directly impacts waste generation and positively influences improved solid waste collection services among households. Hoornweg and Bhada-Tata (2012) argued that increases in population, lifestyle changes, and rising income levels are critical contributors to solid waste generation. Additionally, Gu et al. (2015) reported that higher education is negatively associated with increased awareness of environmental issues.

Poor solid waste management exerts considerable adverse effects on public health, local and global environments, and economic stability (Hoornweg & Freire, 2013; Adeleke et al., 2021). Locally, improperly managed waste attracts disease vectors, leading to greater disease burdens among those living or working near such sites (Fadhullah et al., 2022). The diversion of recyclable, reusable, and remanufacturable materials from landfills through effective sorting methods offers significant environmental benefits (Zhang et al., 2019). Poor segregation can, however, result in both environmental and health hazards (Heidari et al., 2018). Unsuitable disposal methods, such as unsorted waste disposal, can lead to groundwater pollution, soil degradation, and other environmental disturbances. Similarly, burning unsorted solid waste contributes to air pollution and poses risks to human health (Matsuda et al., 2018). These negative impacts underscore the importance of sustainable solutions for solid waste management (Agovino & Garofalo, 2018). Human activity remains the primary source of solid waste production (Khalil et al., 2018). Efficient household solid waste management is a key challenge within urban centres, as highlighted by extensive research on generation patterns, socioeconomic dynamics, and environmental impacts. While studies such as Hoornweg and Bhada-Tata (2012), Gu et al. (2015), and Mohamad Noufal et al. (2020) have elucidated important relationships between waste generation and variables including income, education, and population density, several important research gaps persist.

This study examines the socioeconomic conditions, housing types, household waste collection, environmental issues, and residents' views toward sanitary workers in the

south zone of Coimbatore Corporation. Existing studies on household solid waste management largely focus on statistical relationships between socioeconomic factors and solid waste generation, often neglecting spatial dimensions and public perceptions. Limited attention is given to environmental challenges and operational efficiency, such as solid waste collection accessibility. Moreover, research seldom addresses region-specific contexts or provides actionable policy insights. Hence, this study fills these gaps by employing GIS-based spatial analysis, exploring public attitudes, and integrating socio-economic and environmental factors, offering tailored recommendations for the South Zone of Coimbatore Corporation.

Study Area

The South Zone of Coimbatore Corporation extends from 10°54′00″ N to 11°01′30″ N latitude and 76°54′00″E to 77°00′30″ E longitude, encompassing an area of 54.13 sq. km (Figure 1). This region is represented on Toposheet 58A16, 58B13, and 58F1. Comprising 20 wards, it is bordered by the Western Ghats Mountain range to the west and north, and by reserved forests to the north. These geographical features contribute to generally pleasant weather conditions, although the area predominantly experiences a tropical wet and dry climate. The average temperature hovers around 26°C, ranging from 24°C during the monsoon season to 30°C in summer. April is typically the hottest month, with temperatures occasionally exceeding 38°C, whereas January is the coolest, with lows down to 12.2°C.

The Noyyal River traverses this zone, delineating the southern boundary of the Corporation. The city lies within the Noyyal basin and benefits from an extensive tank system supplied by the river and rainwater. Topographically, the surface slope trends from west to east, while altitudes vary between 256 feet and 6,371 feet above mean sea level. As of 2021, the projected population is 537,019, comprising 268,939 males and 268,080 females. The area exhibits an average population density of 9,920 per sq. km, an average sex ratio of 964.35, and a literacy rate of 80.96%. Coimbatore is renowned for its textile industries, engineering firms, machine and machine tool manufacturing, healthcare facilities, and educational institutions. Within this context, the current study examines public perceptions regarding household solid waste management practices in the region.

2. Methodology

The information for the study was collected through a structured questionnaire via a stratified random sampling method—100 households from each of the 20 wards, resulting in a total sample size of 2,000. The survey included socio-economic details, household facilities, and accessibility of disposal infrastructure, environmental problems, and solid waste disposal practices. A total of 69 variables were initially recorded. Given the large number of variables, Principal Component Analysis (PCA) was used for dimensionality reduction in SPSS. Based on factor loadings (≥0.5), eigenvalues (>1), and thematic relevance, 20 key variables were retained and grouped under eight principal components.

Variables with low communalities, cross-loadings, or conceptual redundancy were excluded. A total of 20 out of 69 variables were extracted across eight dimensions to characterise the relationships and variance among all attributes. Furthermore, spatial variations for each factor were analysed by incorporating Z-score values within ArcGIS 9.1 software. The resulting maps facilitate further interpretation and provide insights into the influence of each factor within its respective regions.

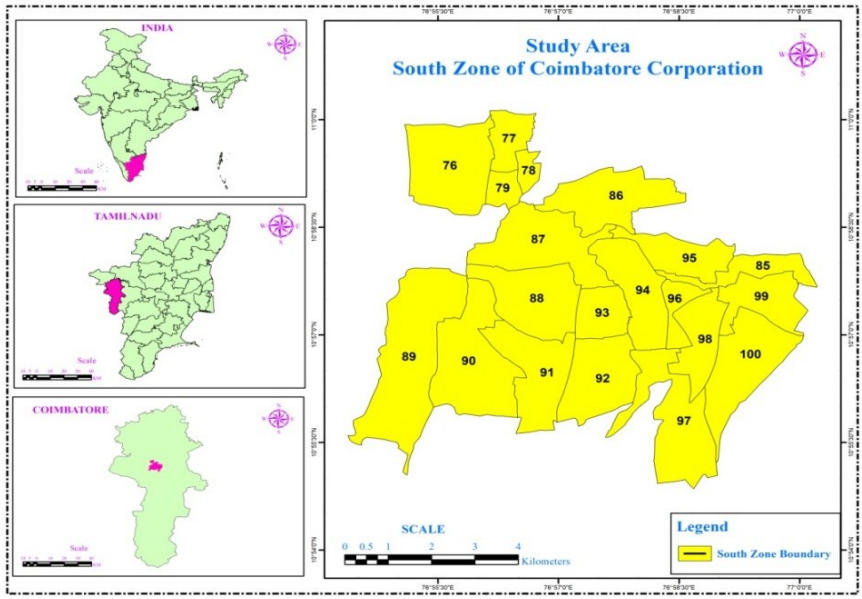

Figure 1. Study Area-South Zone of Coimbatore Corporation

3. Results and Discussion

3.1 Factors Extraction

Factor analysis identified eight key dimensions driving household solid waste generation and management in the South Zone, Coimbatore Corporation. These factors cover infrastructure, socio-economic status, public attitudes, and environmental issues. The Kaiser-Meyer-Olkin (KMO) value was 0.702, indicating a sufficient sample size for analysis. Bartlett's Test of Sphericity was significant ($p = 0.001$), validating the correlation matrix for factor analysis. Eight dimensions were interpreted based on Eigenvalues (>1) and scree plot results. Variables with factor loadings ≥ 0.6 were deemed important, though variable selection varied by factor.

All retained variables had loadings ≥0.64 and communalities ≥0.5, ensuring high statistical and thematic relevance. Factor-wise spatial Z-score maps were created for each component to visualise their influence across wards. These maps reveal spatial disparities in infrastructure, waste collection efficiency, and environmental problems. For instance, households in wards with higher Z-scores for infrastructure (e.g., Ward 89) do not

necessarily face higher environmental risks, indicating the moderating effect of institutional services. Tables in the sections below summarise the number of variables associated with each factor and the respective survey questions.

Table 1. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.702
Bartlett's Test of Sphericity	Approx. Chi-Square	11856.512
	Df	190
	Sig.	0.001

3.2 Socio-Economic Conditions

Among 2000 respondents who live in the south zone of the Coimbatore corporation 45% and 55 % are male and female respondents, respectively. Their ages were < 20 (6.10%), 21 to 40 (43.30%), 41 to 60 (38.00%) and > 61 (12.80%) years. Religiously, they are Hindu (70.80%), Christian (16.20%), Muslim (12.00%) and others (01.05%). Their educational backgrounds are illiterate (16.20%), elementary (20.10%), high school (19.90%), higher secondary school or diploma (18.40%), bachelor's (22.20%) and master's degree (3.20%). The respondents are engaged in daily labour (22.30%), private jobs (22.70%), government jobs (9.40%), doing their own business (16.70%) and housewives/retired (28.90%). They live as a separate (62.00%) and joint family (38.00%), and their family sizes were <2 (11.30%), 3 to 5 (66.00%) and >6 (22.70%). The respondent's average monthly incomes were ₹<10,000 (17.20%), ₹10,001-20,000 (33.60%), ₹20,001-30,000 (25.60%), ₹30,001-40,000 (14.00%) and ₹>40001(9.60%).

3.3 Factor I: Facility in the House

Factor analysis in this study effectively identified key dimensions of people's attitudes toward sanitary workers in Coimbatore's south zone. Residents evaluated solid waste management workers on tasks such as waste collection, bin clearing, transport, and local challenges. Household waste generation varies by socio-economic status and living standards. The primary factor, ‘facility in the house,’ had an eigenvalue of 3.152 and explained 15.8% of the total variance (Table 2). Although this may seem modest, Principal Component Analysis identifies key patterns, and the results were validated by KMO and Bartlett’s tests, confirming statistical significance.

There are four variables positively loaded on this factor, specifically toilet facility (0.953), bathing room facility (0.946), drainage facility (0.912) and LPG gas cylinder (0.646). These positive scores of the variables undoubtedly proved that the people's standard of living is very high in this region. As a result, it is proven that the people in this region have a chance of producing large quantities of solid waste material, and they are fond of a clean environment. This paves the way for solid waste management workers to maintain a tidy environment in this study area.

Table 2. Factor I: Facility in the House

Variable No.	Variable Name	Factor Loading	Communalities
Ih1	Toilet Facility	0.953	0.915
Ih7	Bathe Room Facility	0.946	0.901
Ih12	Drainage Facility	0.912	0.835
Ih16	LPG Gas Cylinder	0.646	0.630
Eigen value:3.152			**Total Variance:15.759**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. Rotation converged in 5 iterations.			

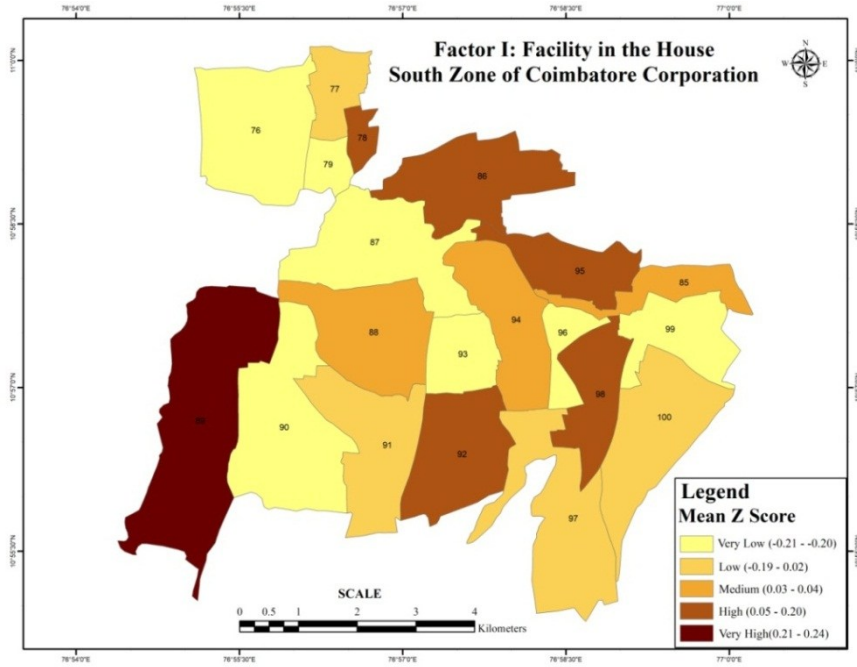

Figure 2. Facility in the House

Figure 2 shows the residents' facility in the south zone of Coimbatore Corporation. Hence, the very meagre negative Z score (-0.21 to -0.20) has registered in seven wards. This unquestionably exhibits that the facilities in their house were meagre among the people residing in these wards. Likewise, the low Z score values (-0.21 to -0.13) were observed in three wards, indicating that the people have fewer facilities in their houses. The medium negative to positive Z score (-0.14 to 0.06) was recorded in four wards of the study region, so the inhabitants in these wards have moderate amenities at their homes. The high positive Z score (0.07 to 0.33) for five regions indicates that the people have high facilities in their houses.

Likewise, a very high positive Z score (0.34 to 0.61) was observed in one ward, which shows the higher level of facilities at their home. Z-scores were computed from 20 selected variables across eight dimensions (possibly socio-economic, housing, sanitation, water, waste management, etc.). Based on PCA analysis, Wards 77, 88, 85, and 100 have high Z-scores, indicating a higher standard of living overall. However, wards 89, 95, and 96 have higher household facilities scores (not aligning with the high Z-score wards). A high standard of living Z-score doesn't necessarily imply high household facilities, because the Z-score is a weighted composite of many variables, and facilities may not dominate or correlate strongly. Also, recent targeted interventions might raise facility scores in wards with otherwise lower socio-economic status.

3.4 Factor II: Environmental Problem

Usually, the solid waste material thrown in the dust bins flies away by the wind or is picked by the birds and animals and is spread on the street and blocks sewage channels, which creates environmental problems (Table 3). Therefore, the factor 'environmental problem' emerged as the second most important factor with an eigenvalue of 1.699 %and a total variance of 8.494 %. There are three variables positively laden with this factor, namely, Does solid waste create environmental problems in your locality? (0.800), Are birds and animals eating and sitting in and around the dust bin? (0.732), Is solid waste material decreasing soil fertility? (0.700). Therefore, this factor unquestionably established that in this study area, people are facing environmental problems with household solid waste materials. Hence, it is confirmed that the corporation's sanitary workers should take necessary action against the above-mentioned problems. In the environmental problem survey, multiple variables were initially considered. However, only the three most significant variables were presented in Table 3, as they had the highest factor loadings and were statistically relevant based on the Principal Component Analysis (PCA) output.

Table 3. Factor II: Environmental Problem

Variable No.	Variable Name	Factor Loading	Communalities
Ep4	Is solid waste creating environmental problems in your locality?	0.800	0.652
Ep1	Are birds and animals eating and sitting in and around the dustbin?	0.732	0.559
Ep8	Is solid waste material decreasing soil fertility?	0.700	0.504
Eigen value:1.699		**Total Variance:8.494**	

These variables, shown in Table 3, were selected because they exhibited strong correlations with the primary environmental challenges in the study area, making them the most representative indicators. While the survey included more variables, only those with significant loading values were displayed to ensure a concise and meaningful representation of the data. Figure 3 demonstrates the mean of environmental problems of

people living in the study area. Accordingly, a very low negative Z score (-0.45 to -0.38) was registered in four wards, and it shows that the people of this region are facing tremendously fewer environmental problems. The low negative Z score (-0.38 to -0.13) has been recorded in three wards, and it indicates that in this region, people have fewer environmental issues.

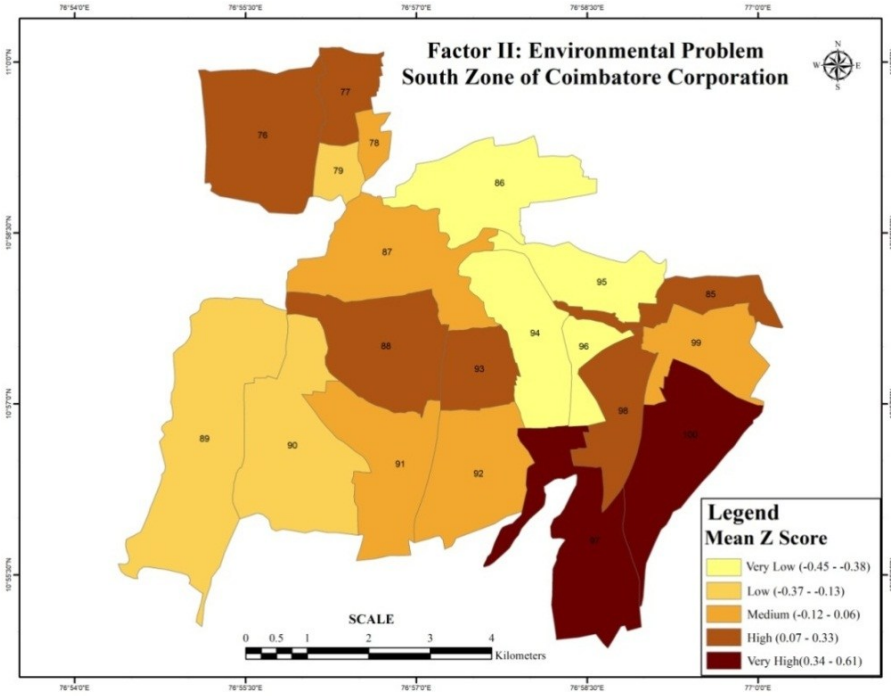

Figure 3. Environmental Problem

However, the medium negative to positive Z score (-0.13 to 0.06) was established in five wards, which shows signs of moderate environmental problems. On the contrary, the high positive Z score (0.06 to 0.33) has been recorded in six wards, and it proved that the greater numbers of people living in these wards are facing high levels of environmental inconvenience. Similarly, the extremely high positive Z score (0.33 to 0.61) has been traced in the two wards, which reveals that the environmental problems are very high in these regions.

3.5 Factor III: Standard of Living

The variables, particularly Air Conditioner (0.770), Micro Oven (0.727) and Washing Machine (0.699), are absolutely loaded on this third factor of Standard of Living, with an eigenvalue of 1.653 % and a total variance of 8.267 % (Table 4).

Table 4. Factor III: Standard of Living

Variable No.	Variable Name	Factor Loading	Communalities
SI6	Air Condition	0.770	0.635
SI12	Micro Oven	0.727	0.542
SI14	Washing Machine	0.699	0.561
Eigen value:1.653		**Total Variance:8.267**	

Figure 4 shows the standard of living of the people in the south zone of Coimbatore Corporation. The extremely low negative Z score (-0.08 To -0.07) observed in three wards, the low negative Z score (-0.08 To -0.05) in the four wards, the medium negative to positive Z score (-0.06 To -0.02) in the six wards, the high positive Z score (0.03 To 0.09) in three wards and the very high positive Z score (0.09 To 0.11) in four wards. Hence, the standard of living conditions of the people differ from very low to very high in this study area.

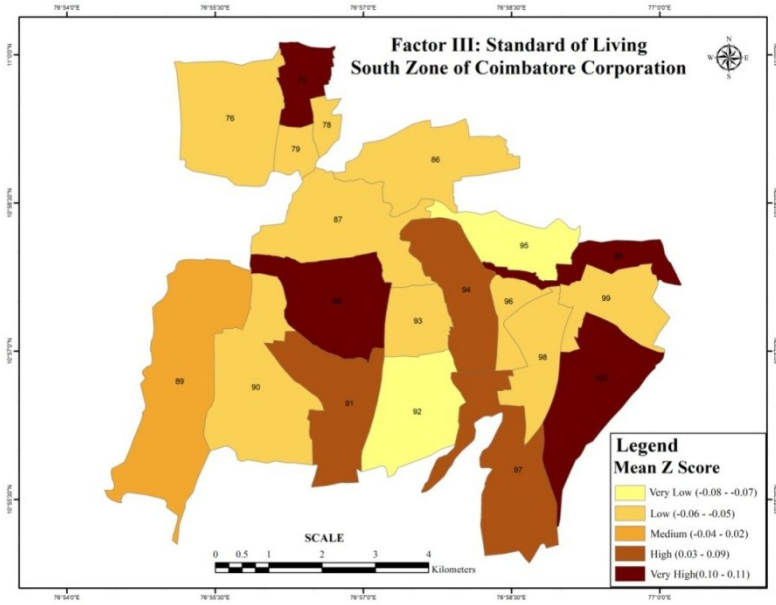

Figure 4. Standard of Living

3.6 Factor IV: Socio-Economic Condition

The amount of solid waste disposal in a household or region chiefly depends on socioeconomic and demographic conditions (Table 5). Accordingly, the fourth important factor, 'Socio-Economic Condition', emerged with an eigenvalue of 1.352 % and a total variance of 6.758 %. The variables, namely family size (0.818) and monthly income (0.804), are confidently loaded on this factor. It was established that the people's socio-economic conditions in this region influence the solid waste management activities of this study area.

Therefore, socioeconomic factors that significantly influenced waste generation are supported by factor loadings.

Table 5. Factor IV: Socio-Economic Condition

Variable No.	Variable Name	Factor Loading	Communalities
Se4	Family Size	0.818	0.675
Se7	Monthly Income	0.804	0.658
Eigen value:1.352		**Total Variance:6.758**	

Socio-economic conditions in the study area differ across wards (Figure 5). Five wards show very low socio-economic status with Z scores from -0.26 to -0.16, while three wards have low status with Z scores between -0.17 and -0.05. Four wards fall in the medium range, with Z scores from -0.06 to 0.05. Z-scores indicate how far data points deviate from the mean; higher positive values suggest above-average socioeconomic status. Six wards have high socioeconomic levels (Z scores 0.06 to 0.16), and two wards have very high status (Z scores 0.17 to 0.31).

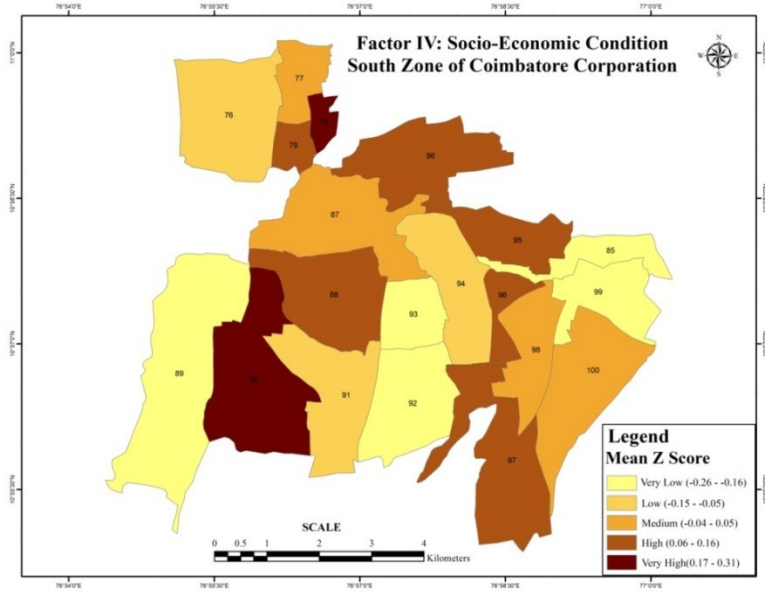

Figure 5. Socio-Economic Condition

3.7 Factor V: Collection of Solid Waste

Clearing the dust bins and collecting solid waste materials from the place of dust bins and households are respectively the most important activities of workers engaged in cleaning activities of this study area (Table 6). For that reason, the variables specifically are: When they are clearing the dust bins? (0.804) and How they collect solid waste from the house? (0.798) are positively encumbered on this fifth factor, 'collection of solid waste'.

Table 6. Factor V: Collection of Solid Waste

Variable No.	Variable Name	Factor Loading	Communalities
Csw4	When are they clearing the dustbins?	0.804	0.657
Csw6	How do they collect solid waste from the house?	0.798	0.649
Eigen value:1.348		**Total Variance:6.742**	

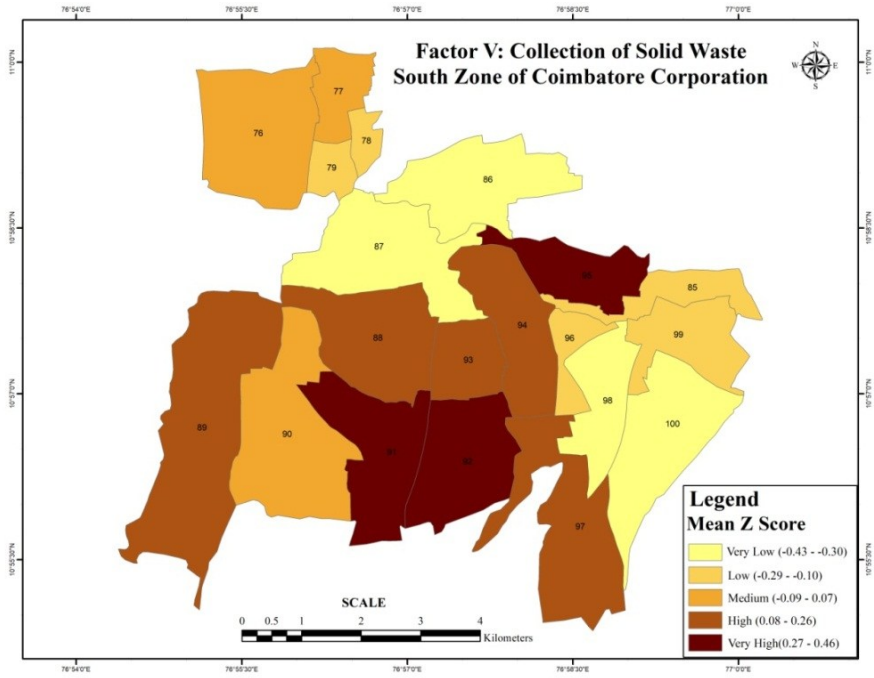

Figure 6: Collection of Solid Waste

This factor comes into view with an eigenvalue of 1.348%and a total variance of 6.742%. Thus, it is demonstrated that the collection and clearance of solid waste from this study area was perfect and on time by the sanitary workers working in this region. The extremely low negative Z score (-0.43 to -0.30) was established in four wards for the collection of solid waste (Figure 6). It reveals that the collection of solid waste is very low in these regions.

Similarly, the low negative Z score (-0.30 to -0.10) has been registered in five wards and shows that the people in this region are producing less amount of solid waste. The medium negative to positive Z score (-0.11 to 0.07) has been recorded in three wards, and it is confirmed that the residents of this region are generating moderate levels of solid waste. The high (0.08 to 0.26) and very high (0.27 to 0.46) positive Z scores come out in five and three wards, respectively, revealing that the collection of solid wastes is high and very high in these regions.

3.8 Factor VI: Accessibility of Dust Bin

Accessibility to the location of dust bins is more important for the disposal of household solid waste materials every day (Table 7). Herein, there are two variables, particularly the distance from the house to the dust bin. (0.784) and dispose of solid waste every day (0.739) are positively loaded on this factor. Accordingly, it is unquestionably confirmed that the dust bin locations are easily accessible to the people, and they dispose of solid waste material in the dust bin every day.

Table 7. Factor VI: Accessibility of Dust Bin

Variable No.	Variable Name	Factor Loading	Communalities
Db3	How much of the distance from the house to the dustbin?	0.784	0.646
Db1	Do you dispose of solid waste every day?	0.739	0.599
Eigen value:1.209		**Total Variance:6.047**	

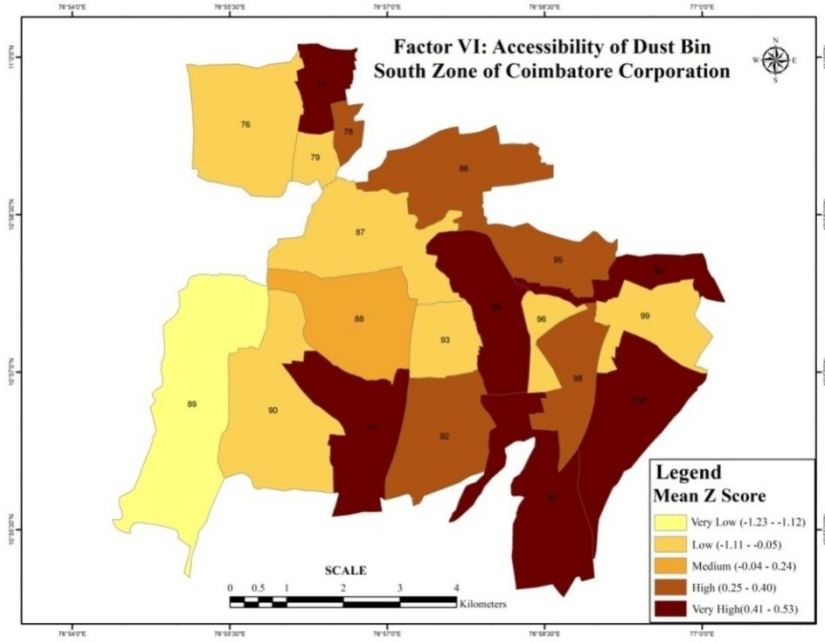

Figure 7. Accessibility of the Dust Bin

The extremely low negative Z score (-1.23 to -1.22) registered (Figure 7) in only one ward for the accessibility of the dust bin reveals that the people living in this ward are unable to access the dust bin. Similarly, the low negative Z score (-1.23to -0.52) has been recorded in the seven wards of this study area, the medium negative to positive Z score (-0.53 to 0.24) witnessed in one ward, the high positive Z score (0.25 to 0.40) established in five wards and, the high positive Z score (0.41 to 0.53) listed in six wards. As a result, the accessibility of dust bins is very low to very high in this study area.

3.9 Factor VII: Attitude towards Workers

The people's attitude towards the sanitary workers is more important for the measurement of the cleaning activity of a region. The variables are as follows: Do you dispose of solid food waste? (0.725) and the opinion of people towards sanitary workers (0.702) positively encumbered this factor. Therefore, it is recognised that the people in the study area are highly satisfied with the workers who are engaged in solid waste disposal activities.

Table 8. Factor VII: Attitude towards the Workers

Variable No.	Variable Name	Factor Loading	Communalities
Aw15	Do you dispose of solid food waste?	0.725	0.583
Aw2	Opinion of People Towards Workers	0.702	0.538
Eigen value:1.164		**Total Variance:5.818**	

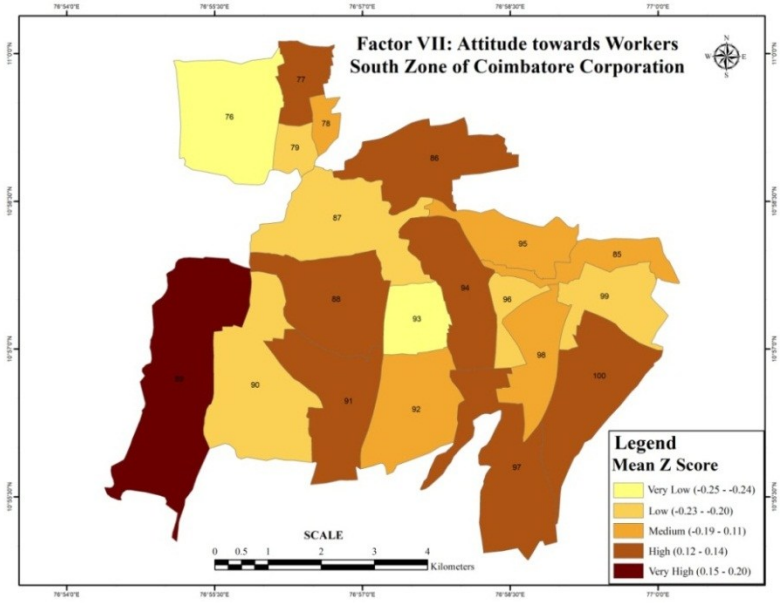

Figure 8. Attitude towards Workers

The extremely low negative Z score (-0.25 to -0.24) was registered in one ward for the variable attitude towards the workers and it shows that the people in this region (Figure 8) have very low thoughts towards the sanitary workers. Similarly, the low negative Z score (-0.25 to -0.20) has been traced in six wards, and it is recognised that the people of this region have a low level of attitude towards the workers. The medium negative to positive Z score (-0.21 to 0.11) was recorded in five wards of this region, so the people living in this region have a moderate mindset towards the workers. The high positive Z score (0.12 to 0.14) has been established in seven wards, and the very high positive Z score (0.14 to

0.20) has been found in one ward, which indicates that this region's people have a higher level of opinion towards the sanitary workers.

3.10 Factor VIII: Disposal of Solid Waste Material

The factor 'Disposal of solid waste material' emerged as an eighth factor with an eigenvalue of 1.161%and a total variance of 5.803% (Table 9). There are two variables, particularly, Do you dispose of solid clothes waste? (0.803) and Do you dispose of solid battery waste? (0.673) are positively loaded on this factor. It is confirmed that the people living in the study also dispose of solid cloth and battery waste.

Table 9. Factor VIII: Disposal of Waste Material

Variable No.	Variable Name	Factor Loading	Communalities
Wm8	Do you dispose of solid clothes waste?	0.803	0.679
Wm10	Do you dispose of solid battery waste?	0.673	0.519
Eigen value:1.161		**Total Variance:5.803**	

The disposal of solid waste materials is very low in five wards in the study region because the mean value was a very small negative Z score (-0.16 to -0.14), which has been observed (Figure 9) in these wards. Likewise, the low negative Z score (-0.15 to -0.11) has been recorded in the five wards of this study area, the medium negative to positive Z score (-0.12 to 0.09) was well recognized in two wards, the high positive Z score (0.09 to 0.22) recorded in the seven wards and, the extremely high positive Z score (0.22 to 0.25) viewed in one ward. Hence, the disposal of solid waste materials differs from very low to very high among the wards in the study region.

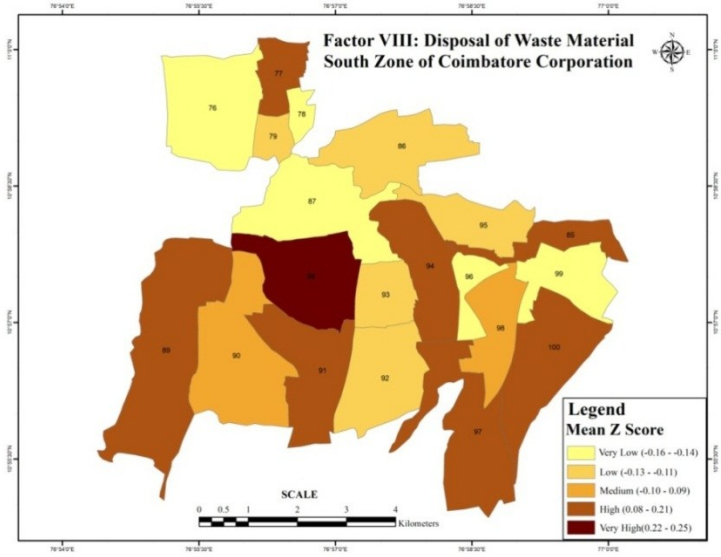

Figure 9. Disposal of Solid Waste Material

3.11 Spatial Analysis of the Factors

Overall, the spatial analysis of residents' factor structure in the south zone of Coimbatore Corporation established that the eight factors, such as facility in the home, environmental problem, standard of living, socio-economic condition, collection of solid waste, accessibility of dust bin, attitude towards workers and disposal of solid waste materials, are shared in overlaps under different categories. The wards are divided into categories based on the level of these factors, ranging from "Very Low" to "Very High", and are presented in Table 10.

Table 10: Spatial Overlaps of Factor Structure

No.	Category	Factors								Total	Percentage
		Factor I Facility in the House	Factor II Environmental Problem	Factor III Standard of Living	Factor IV Socio-Economic Condition	Factor V Collection of Solid Waste	Factor VI Accessibility of Dust Bin	Factor VII Attitude towards Workers	Factor VIII Disposal of Solid Waste Material		
		No. of Wards									
1	Very Low	7	4	3	5	4	1	1	5	30	18.75
2	Low	3	3	4	3	5	7	6	5	36	22.50
3	Medium	4	5	6	4	3	1	5	2	30	18.75
4	High	5	6	3	6	5	5	7	7	44	27.50
5	Very High	1	2	4	2	3	6	1	1	20	12.50
Total		20	20	20	20	20	20	20	20	160	100.00

The overall spatial analysis of factor structure data reflects an analysis of various factors that influence the quality of services or conditions in different wards. Ward 89 records the highest waste generation; its comparatively lower environmental problem index may reflect stronger municipal infrastructure and efficient waste management. Conversely, Wards 100 (Nearby Vellalore Dumping Site) and 97 (Tomato Market), though generating lesser waste, exhibit higher environmental concerns, possibly due to inefficient collection systems, poor public awareness, or institutional neglect. These factors cover a wide range of aspects related to the environment, socio-economic conditions, waste management, and public attitudes.

Facility in the House seems to be relatively evenly spread across the categories. The distribution indicates that, for some wards, housing facilities may be in poor condition, while others show a higher standard of living in terms of available amenities. Environmental problems are most common in the "Low" and "Medium" categories, which suggests that a significant number of wards are facing environmental issues that are moderate or relatively

manageable but still problematic. However, the "Very Low" and "Very High" categories are less populated, indicating that extreme cases are rare.

The spread across categories for the Standard of Living factor shows that while there are some wards with a higher standard of living, many wards still fall into the "Medium" and "Low" categories. This indicates that, generally, many wards experience a standard of living that is neither excellent nor poor but somewhere in between. Likewise, the socio-economic condition of the wards also seems to have a broad distribution. This might indicate that there are disparities in the socio-economic status across different wards, with some experiencing more favourable conditions than others. However, the concentration in the "High" category suggests that a significant portion of wards may be relatively better off.

The collection of solid waste shows a higher concentration in the "Low" and "High" categories, with the "Low" category reflecting wards where waste collection services are lacking, and the "High" category indicating wards where waste collection is more efficient. This could point to inconsistent waste management services across the wards. While the accessibility of Dust bins falls mostly under the "Low" category, suggesting that access to dust bins is a problem for many of the wards. This might point to a lack of infrastructure or insufficient waste disposal facilities in certain areas. On the other hand, the "Very Low" and "Very High" categories are less common, indicating that extreme cases are rare, but the problem still affects a substantial number of areas.

The factor of Attitude towards Workers has a wide distribution, but the number of wards falling under the "High" and "Very High" categories suggests that there may be positive public attitudes towards workers in many areas. Still, a portion of wards does show more neutral or negative attitudes. The data shows a relatively equal spread of wards across the categories for the factor ‘Disposal of Solid Waste Material’. This might suggest that while waste disposal services are generally available, they are not uniformly efficient. Some wards are managing waste disposal effectively, while others are not.

In general, the wards in the area show a range of conditions across various factors, with most wards falling into the "Low" to "Medium" categories. While there are some areas with high standards of living and good services, there are also significant numbers of wards that face challenges in areas such as waste management, environmental issues, and accessibility to services like dustbins. This suggests a need for targeted improvements in certain wards, particularly in waste collection and accessibility, which appear to be the most pressing concerns. There also seems to be room for improvement in addressing socio-economic disparities and the overall standard of living in some areas.

4. Conclusion

The present study has concluded that the people in this region have moderate to high standards of living conditions. The factor analysis of collected primary datasets reveals

that the variables, namely socio-economic condition, facility in the house, accessibility of dust bin, environmental problem, and the standard of living, attitude towards the workers, disposal and collection of solid waste materials, are determining the solid waste management practices. The analysis reveals that certain socio-economic factors—such as household income, education level, occupation type, family size, housing type, access to services, and awareness levels—play a more pronounced role in influencing the quantity and type of waste generated. For example, households with higher income and education levels tend to produce more packaging and electronic waste, whereas lower-income households are more associated with organic and mixed waste due to consumption patterns and limited segregation practices. In addition, the people of this region are suggesting and conveying that they are facing problems in the separation of household solid waste into degradable and non-degradable; recycling of household solid wastes and proper solid waste management practices are playing a vital role in keeping a tidy environment in this study region. To further understand these dynamics, Z-score normalisation was employed to examine the spatial variations of these key socio-economic factors across different neighbourhoods. This helped highlight clusters or areas where specific socio-economic profiles correlate strongly with waste management behaviours—such as lack of source segregation, irregular collection practices, or higher per capita waste generation. Thus, the study emphasises the need for targeted interventions in waste management policy and education programs that are sensitive to the socio-economic contexts of different localities within the South Zone of Coimbatore.

This study fails to address the working conditions of sanitary workers and the involvement of the Corporation in the solid waste management activities in this study area. Therefore, the above-mentioned area will be covered in future research.

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