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A Comparative Study of Waste Management Practices in Telangana and Other States

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Abstract

India's municipal solid waste volume and complexity have grown significantly as an outcome of rapid urbanization, population growth, and shifting consumption patterns. As a result, effective waste management has become necessary for both environmental preservation and sustainable urban growth. Based on their administrative capacity, policy priorities, and resource availability, Indian states have implemented a numerous different waste management strategy, leading to regional disparities in performance. In order to evaluate relative performance, identify gaps, and derive useful lessons for policy improvement, the present study compares waste management practices in Telangana and some other Indian states.

Waste generation, collection coverage, source separation, processing and disposal methods, institutional frameworks, and stakeholder participation are among the main elements of municipal solid waste management which are the subject of this study. Relatively new Indian state, Telangana established in 2014, has put in place several initiatives, including decentralized waste processing, digital monitoring system, and door-to-door waste collection. These strategies are compared to those used in states with much established waste management system and different functioning experiences, like Tamil Nadu, Maharashtra, and Karnataka.

Using a mixed-method approach, the study uses secondary data from state urban development records, Central Pollution Control Board publications, Swachh Survekshan assessments, and official government reports. When possible, field observations and conversations with local authorities and community stakeholders were used to augment primary insights. Quantitative indicators like daily waste generation, the percentage of waste processed, door-to-door collection coverage, and segregation rates were used in comparative analysis, which is bolstered by qualitative assessments of government mechanisms and policy execution.

With roughly three-fourth of generated municipal waste being processed, the results show that Telangana outperforms the national average in terms of waste processing efficiency and collection coverage. High levels of source segregation and service coverage are evident in urban areas, especially in Hyderabad. Substantial differences do exist within the state, though, as smaller towns still struggle with issues of financial sustainability, technical capability, and infrastructure. States like Maharashtra, in contrast, enjoy the advantages of more extensive infrastructure and public-private partnerships, whereas Tamil Nadu and Karnataka exhibit conflicting results that are impacted by enforcement and public involvement.

This study comes to the conclusion that even though Telangana has a fairly solid foundation in tackling the waste management, more advancements are needed to produce consistent and long-lasting results across all urban local bodies. Major priorities include integrating informal waste workers, strengthening segregation at the initial level, expanding treatment infrastructure, and increasing performance monitoring systems. Policymakers and urban administrators looking to improve waste management procedures in Telangana and other Indian states can benefit from the comparative insights this study produced.

Introduction

In India, efficient waste management is now necessary to sustainable urban growth. Municipal systems are under more strain as a result of growing urbanization, changing consumption habits, and

scarce resources. States have taken several approaches to waste management in light of this, with varying degree of success.

Telangana, a more recent state that was created in 2014, has implemented cutting-edge policies like digital monitoring and decentralized processing. Other states with more established systems and varied institutional experiences include Tamil Nadu, Maharashtra, and Karnataka. In order to determine Telangana's waste management framework's advantages, disadvantages, and practical lessons, this study contrasts it with those of other states.

Review of Literature

Waste management in India has been studied by several academics. Chintan Environmental Research's (2018) studies draw attention to the problem of source separation and countrywide insufficient funding. Through public engagement and enforcement mechanisms, state-level policies have a crucial impact on urban waste outcomes, according to the study of Kumar and Bhunia (2019). The importance of public-private partnerships in growing processing infrastructure is highlighted by the research conducted in Maharashtra (Patil 2020). The influence of local engagement is exemplified by community-led projects in the cities of Tamil Nadu state such as Coimbatore (Ramesh 2021). According to the comparative research, jurisdictions with transparent performance indicators and accountability frameworks typically outperform others in terms of garbage recycling rates (Jain and Singh, 2022). Common themes in literature which include the necessity of integrating informal labour, implementing policies effectively, and using technology for monitoring.

Statement of the Problem

Waste management in India continues to encounter difficulties such as low levels of source separation, insufficient treatment capacity, and uneven performance across the states, despite policy frameworks and investments. Despite their potential, Telangana's practices need to be compared to those of other states in order to identify any shortcomings and the areas that could want development.
This research investigates:
What are the differences between Telangana's waste management methods and those in other Indian states?
What variables explain the variations in results?
What can Telangana learn from other states to improve its policies and practices?

Objectives

1. To document the existing waste management practices in Telangana.
2. To compare them with practices in chosen Indian states.
3. To identify key factors contributing to variations in performance.
4. To propose actionable plans for improving waste management in Telangana.

Hypothesis

H1: States with stronger institutional frameworks and community participation show better waste management performance than Telangana.
H0: There is no significant difference between waste management performance in Telangana and other states.

Research Methodology

Approach: The mixed approaches that incorporate both qualitative and quantitative data.

Data Sources:

Secondary data from government reports (Swachh Survekshan, state urban development departments, CPCB).
Field surveys in selected cities in Telangana and comparison states.
Interviews with municipal officials, NGOs, and waste workers.
Sampling: Purposive sampling of cities representing high and low performers in waste management.
Analysis Tools: Descriptive statistics, comparative performance indicators, thematic analysis of interviews.

Scope

This study focuses on municipal solid waste management. It includes policy frameworks, collection systems, processing mechanisms (composting, recycling, landfills), and stakeholder perspectives. The comparison covers Telangana and three other states with varying performance levels.

Limitations

Limited availability of consistent data across states for certain indicators.
Time and resource constraints restricted the number of field sites.
Potential reporting bias in self-reported data from officials and citizens.

Analysis

1. Waste Generation and Processing at the National Level

Approximately 1.48 lakh (148,960) tons of municipal solid trash is produced daily in India. About 57% of this is recycled or processed, with the remainder ending up in landfills or dumpsites because of their limited capability for treatment.
Comparisons of state-level performance are contextualized by this baseline.

2. Telangana's MSW Collection and Processing Performance

The official data indicates that 2,020 out of 2,112 urban wards in Telangana (about 96%) have full door-to-door waste collection. Every day, the state produces about 8,634 tons of municipal solid trash. Approximately 78% of this is digested.
Comparatively, Karnataka, a crucial comparator state, generates 10,000 tons of garbage daily and processes just 41% of it; 6,256 out of 6,464 wards have door-to-door collection (about 97%). About 96 percent of the waste generated in Tamil Nadu is collected from 12,301 of 12,814 wards, and about 62 percent of the 15,437 tons of rubbish generated daily is processed. With 6,589 of 7,322 wards having collection (about 90% door-to-door coverage), Maharashtra produces 23,450 tons daily and processes roughly 57% of that amount.
Key insight: Telangana state's processing rate of 78% is higher than Karnataka (41%) and Maharashtra (57%), and higher than the national processing average (57%).

3. State Performance Rankings in Solid Waste Management

The state rankings on environmental performance, including waste management, are released by the Central Pollution Control Board (CPCB). Telangana received 63.00 points in the 2020–21 annual report, ranking it higher than Karnataka (62.75) and Tamil Nadu (62.25) but lower than Maharashtra (67.50) and high-achieving states like Madhya Pradesh (76.75) and Goa (71.50). According to the earlier data for 2019–20. Telangana was at 59.5 points, ahead of Karnataka (41) but behind Maharashtra (70.5) and Tamil Nadu (63.5). These ratings take into account reporting procedures, infrastructure investment, and institutional performance at the state level.

4. City-Level Waste Processing Data

From the Swachhatam Portal city-wise data:
Several municipalities in Telangana, including Kothur, Nakrekal, and Yadagirigutta, say that all of their daily trash is treated. On the other hand, Wyra reports only 5% processing, while Yallareddy, a smaller local body, reports 0% processing. This demonstrates how infrastructure and capacity affect intra-state performance variance.

5. Segregation and Compliance Metrics

In the Swachh Survekshan evaluation, Hyderabad, which is part of the Greater Hyderabad Municipal Corporation (GHMC), obtained a 93% source segregation rate. Additionally, it scored 95% or higher in areas like cleanliness in different zones and door-to-door pickup. While other Telangana municipal bodies exhibit variation, this high level of segregation shows great urban compliance.

6. E-Waste Management Comparisons

In the Swachh Survekshan evaluation, Hyderabad, which is part of the Greater Hyderabad Municipal Corporation (GHMC), obtained a 93% source segregation rate. Additionally, it scored 95% or higher in areas like cleanliness in different zones and door-to-door collection. While other Telangana municipal bodies exhibit variation, this high level of segregation indicates strong urban compliance.

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7. Comparative Strengths and Weaknesses Summarized

Table 1: State-wise Municipal Solid Waste Generation and Processing

State	Waste Generated (MT/day)	Waste Processed (%)	Unprocessed Waste (%)
Telangana	8,634	78	22
Karnataka	10,000	41	59
Tamil Nadu	15,437	62	38
Maharashtra	23,450	57	43
National Average	148,960 (total)	57	43

A comparison of the production and processing of municipal solid waste in a few Indian states is shown in Table 1. About 78 percent of the 8,634 metric tons of waste produced daily in Telangana are processed, with only 22 percent going unprocessed. Compared to Karnataka, which processes only 41% of its daily waste despite producing a larger volume, this processing rate is much higher. Maharashtra and Tamil Nadu process 57% and 62%, respectively, which is a moderate performance. With a processing rate of 57%, Telangana outperforms the national average and the majority of comparator states in terms of waste treatment effectiveness.

Table 2: Door-to-Door Waste Collection Coverage

State	Total Urban Wards	Wards with Door-to-Door Collection	Coverage (%)
Telangana	2,112	2,020	96
Karnataka	6,464	6,256	97
Tamil Nadu	12,814	12,301	96
Maharashtra	7,322	6,589	90
National Average	—	—	93

The scope of door-to-door waste collection services in each state is shown in Table 2. Similar to Tamil Nadu and Karnataka, Telangana covers roughly 96% of its urban wards. However, with only 90% coverage, Maharashtra falls behind. Telangana's high collection coverage indicates a robust primary collection system, which is necessary for efficient segregation and downstream processing. Telangana's above-average performance in providing basic services is further supported by the 93 percent national average coverage.

Table 3: CPCB State Performance Scores (Solid Waste Management)

State	CPCB Score (2020–21)	Performance Category
Telangana	63.00	Moderate–Good
Karnataka	62.75	Moderate
Tamil Nadu	62.25	Moderate
Maharashtra	67.50	Good
Madhya Pradesh	76.75	Very Good
Goa	71.50	Very Good

The Central Pollution Control Board's solid waste management performance ratings are displayed in Table 3. With a score of 63.00, Telangana was classified as having moderate to good performance. This score is lower than Maharashtra's but marginally higher than Tamil Nadu and Karnataka's. With scores above 70, states like Madhya Pradesh and Goa are at the top of the rankings, indicating greater institutional capacity and enforcement. The findings show that although Telangana's framework is competitive, it could be improved to match that of the best-performing states.

Table 4: Source Segregation and Compliance Indicators

State / City	Source Segregation Rate (%)	Door-to-Door Collection (%)
Hyderabad (Telangana)	93	95
Bengaluru (Karnataka)	75	96
Chennai (Tamil Nadu)	80	95
Mumbai (Maharashtra)	85	90

The source segregation and compliance rates in major cities are contrasted in Table 4. With a high segregation rate of 93%, Hyderabad performs similarly to Mumbai and higher than Bengaluru and

Chennai. Hyderabad's high level of segregation is a result of successful public awareness initiatives and local law enforcement. Variations among cities, however, indicate that monitoring and consistent behavioural change continue to be major obstacles, particularly when expanding these practices outside of urban areas.

Table 5: Intra-State Variation in Telangana (Selected Municipalities)

Municipality	Waste Processed (%)	Remarks
Kothur	100	Fully processed
Nakrekal	100	Fully processed
Yadagirigutta	100	Fully processed
Wyra	5	Limited facilities
Yellareddy	0	No processing infrastructure

Significant differences in Telangana municipalities' waste processing performance are shown in Table 5. Towns like Wyra and Yellareddy exhibit very little or no processing capacity, whereas Kothur, Nakrekal, and Yadagirigutta process all of their waste. This disparity draws attention to the state's unequal administrative and infrastructure development. In order to guarantee consistent service delivery, it implies that underperforming municipalities require targeted assistance.

Table 6: Comparative E-Waste Processing Performance

State	E-Waste Processed (MT/year)	Share of National Processing (%)
Telangana	119,187	8.5
Tamil Nadu	17,205	1.2
Maharashtra	160,000 (approx.)	11.0
National Total	~1.4 million	100

The capacity of each state to process e-waste is compared in Table 6. Over 119,000 metric tonnes of e-waste are processed in Telangana each year, making up roughly 8.5 percent of the country's processing capacity. Compared to Tamil Nadu, which handles a far lower portion of its created e-waste, this performance is noticeably better. The state with the largest processing volume is Maharashtra. Telangana's success in e-waste management suggests improved regulatory backing and technology adoption, and it can also be used as a model to improve municipal solid waste management systems. When compared to several Indian states, Telangana has demonstrated the strong results in terms of waste processing efficiency and collection coverage, according to the combined interpretation of these tables. Disparities within the state and poorer performance in comparison to states with the highest rankings, however, highlight the necessity of ongoing investments in public participation, monitoring systems, and infrastructure. By improving these areas, Telangana can become a leader in sustainable waste management, rather than just a state with mediocre performance.

Waste management practices differ across Indian states due to variations in policies, infrastructure, and public participation. Studies and government reports show that states with better planning, strong administrative systems, and active involvement of citizens generally perform better in waste segregation, recycling, and disposal.

Since its creation, Telangana has improved waste management in a number of ways. But compared to states with more developed waste management infrastructure, its systems are still in their infancy as a relatively new state. This establishes a legitimate foundation for anticipating variations in performance. The purpose of the hypothesis is to determine if these differences are noteworthy. It is useful to investigate if improved waste management results from enhanced governance, increased public knowledge, and successful implementation. In order to comprehend Telangana's situation in relation to other states and to pinpoint areas that require improvement, the hypothesis is therefore pertinent and essential.

8. Summary Interpretation

When it comes to door-to-door collection and solid waste processing, Telangana outperforms the national average when compared to key comparator states.

Although certain local bodies lag, processing rates of about 78% demonstrate stronger infrastructure utilization than Karnataka and Maharashtra. Hyderabad and other urban areas have significant source segregation, which enhances recycling results. Telangana's systems are competitive, according to performance scores from the CPCB rankings, but they still lag below states like Madhya Pradesh and Goa.

Findings

1. Policy Implementation Matters: States that have ongoing cycles for implementation and assessment do better.
2. Segregation is driven by Public Awareness: Higher levels of segregation at the source are associated with regular citizen engagement.
3. Persistent Infrastructure Gaps: To accommodate the levels of municipal garbage, Telangana must increase its processing capacity.
4. Informal Sector involvement: Recycling results are improved when the involvement of informal workers is formalized.

Suggestions

Boost awareness initiatives that highlight source segregation. Increase the infrastructure for garbage processing by utilizing public-private partnerships. Create dashboards for performance monitoring that include accountability measures. Make the contributions of unorganized garbage workers official and provide incentives. To exchange the resources and best practices, promote regional cooperation.

Conclusions

According to the comparison analysis, Telangana has implemented notable initiatives and built a strong policy base, but its actual waste management results are not as good as those of states with more established waste management histories. Improvement opportunities are provided by lessons learned about infrastructure scaling, performance monitoring, and stakeholder involvement. By addressing these issues, Telangana's waste management performance might be considerably improved and brought into compliance with the international best practices.

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