

NON-BIODEGRADABLE WASTE MANAGEMENT IN THRISSUR

INTRODUCTION

Urban regions around the world face a serious problem with effective garbage management, and Thrissur, a well-known city in Kerala, India, is no different.

The amount of waste that is not biodegradable, mostly plastics and other synthetic materials, has increased dramatically as urbanization and population density rise. The objective of this study is to investigate the non-biodegradable waste management tactics now in use in Thrissur.

Specifically, the methods of segregation, recycling, and public awareness campaigns that support a sustainable waste management system will be examined.

Non-biodegradable trash still poses serious dangers to the environment and public health despite numerous efforts, thus a closer examination of the advantages and disadvantages of current methods is required.

This study examines current waste management regulations and community involvement to find areas for improvement, highlight best practices, and make recommendations for action. Like in many cities, Thrissur's non-biodegradable waste is mainly composed of glass, metal, plastic, and certain electronic waste items. Recycling initiatives and public awareness campaigns are being used to handle this trash. In addition to programs to promote alternatives and lessen the use of plastic, the local government supports source segregation. Waste output has significantly increased in recent years due to the rapid rise of urbanization, especially non-biodegradable materials like electronics, metals, and plastics. The objective of this presentation is to analyze the state

of waste management in Thrissur at the moment, the difficulties we confront, and the steps being made to encourage sustainability.

We'll talk about how non-biodegradable garbage affects our health and the environment, look at efficient waste segregation techniques, and showcase neighborhood initiatives to solve this pressing problem. We can all work together to make Thrissur greener and more sustainable.

PROBLEM IDENTIFICATION

AREA

With 1.3 billion inhabitants, India is the world's second most populous country and accounts for about a fifth of the global population. With 18% of the world's population, India is expected to become the most populated country by 2022. In 2013, it had a population growth rate of 1.2% and ranked 94th globally. Solid waste management is a crucial aspect of physical infrastructure, but is facing challenges due to

population growth and urbanization. Kerala, India's 29th state, has the highest population density at 859 people per square kilometer, trailing only West Bengal and Bihar. Thiruvananthapuram, Kochi, Calicut, Kollam, Thrissur, Alappuzha, and Palakkad are the seven Class I cities, in decreasing order of population size. Thrissur ranks fifth in population. There are a number of important sites in Thrissur that make managing non-biodegradable trash more difficult. Areas with a high population density, especially cities and residential areas, produce a lot of trash. Due to ineffective waste segregation procedures, biodegradable and non-biodegradable materials are frequently mixed together in these locations. The handling of non-

biodegradable garbage consequently becomes more difficult and complicated. Market places like shopping malls and neighborhood bazaars in Thrissur are major sources of non-biodegradable rubbish. Waste management systems work harder when plastic packaging and other non-recyclable materials are used extensively. Unfortunately, the trash problem is made worse by the fact that these markets usually lack suitable recycling programs and disposal facilities. This waste's environmental impact keeps increasing in the absence of focused initiatives. Schools and other educational establishments.

DETAIL STUDY OF AREA

Thrissur, situated in the heart of Kerala, is widely recognized as the state's cultural hub. The city is positioned between 10°47' N and 10°15' N latitude and 75°57'E and 76°54'E longitudes. Thrissur Municipality was established on July 1, 1949. During the 1990s, it was among the smallest municipalities in Kerala, covering an area of 12.65 sq.km. According to the 1991 census, the population was approximately 74,640. On October 2, 2000, the city became a Municipal Corporation. This upgrade involved merging the existing municipal area with neighbouring regions, including Ayyanthole, Ollur, Ollukkara, Koorkkenchery, Vilvattom, and a portion of Nadathara Village, as illustrated in Fig.



Thrissur Municipal Corporation covers an area of 101.42 sq.km. According to the 2011 census, the population was 3,15,957, with a population density of 3115 individuals per sq. km. Waste management is a significant environmental concern in Thrissur City. Previously, the corporation operated a

municipal waste composting facility and disposal site spanning 4 Ha in Laloor, Ayyanthole village, located 8 km from the city center. This facility began operations in 2002 but was later shut down due to various social and environmental issues. Our survey revealed that according to a Laloor resident, the site is currently being transformed into a stadium. The survey also indicated that the Thrissur Municipal Corporation currently lacks landfills. Based on the current information, non-biodegradable municipal

Solid waste in Thrissur is primarily handled in a decentralized manner. It is likely to be collected at Material Collection Facilities (MCFs) and then directed to recycling units for reusable materials or to co-processing facilities such as cement plants for energy recovery. This approach is necessary because of the absence of a dedicated landfill for residual waste disposal in Kerala.

EXISTING NON-BIODEGRADABLE WASTE DISPOSAL PLAN FOR TMC

1.WASTE GENERATION

In Thrissur, solid waste generation is a multifaceted issue encompassing various types of materials sourced from diverse origins. The city produces approximately 160 tons of waste daily, highlighting the urgent need for efficient waste-management strategies.

Municipal Solid Waste (MSW) is a primary component of this waste and includes both biodegradable and non-biodegradable materials. Biodegradable waste, which consists of kitchen scraps, garden waste, and food waste, represents the largest portion of the MSW. To manage this, Thrissur utilized organic waste converters located at Shakthan Stand, where such waste is processed into compost or biogas, thereby reducing landfill dependency and promoting sustainability. In contrast, nonbiodegradable waste, comprising plastics, metals, glass, and paper, poses significant environmental challenges owing to its long decomposition period. Effective recycling programs are essential to address this category of waste because improper disposal can lead to severe ecological impacts.

Another significant category is Construction and Demolition Waste, which includes heavy materials, such as concrete, bricks, wood, and metals generated from construction sites and renovation activities. This type of waste requires specialized handling and disposal methods to mitigate its impact on the environment.

Additionally, Industrial Solid Waste contributes to the waste stream, consisting of by-products from local industries, such as scrap metals and plastics. Proper management practices, including recycling and resource recovery, are crucial for minimizing the environmental footprint of industrial wastes.

E-waste, or electronic waste, represents a growing concern owing to the rapid advancement of technology and the resulting accumulation of discarded electronics, such as old computers, phones, and appliances. E-waste contains hazardous materials such as lead and mercury, necessitating specialized recycling facilities that can safely process these items and recover valuable components while ensuring the disposal of hazardous substances.

Moreover, Healthcare Solid Waste, including used syringes, bandages, and other materials from healthcare facilities, poses serious health risks and requires stringent disposal protocols. This waste is typically managed through incineration or other specialized methods to prevent contamination and ensure public safety.

2.WASTE COLLECTION

According to the Sanctioned Master Plan for Thrissur city (AMRUT), only twenty three percent of the solid waste produced in the city is collected. There are forty eight vehicles used for waste collection which includes thirty four goods autos, seven mini trucks, four tippers, three tractors

The waste management team consists of eleven sanitary supervisors, thirty health assistants, one hundred and sixty one health workers, three hundred and thirty daily labor workers.

Waste is collected using:

- Open storage points
- Small bins which are emptied manually under a government scheme called Swarna Jayanthi Shahari Rozgar Yojana (SJSRY).
- A door-to-door garbage collection service is provided by a Kudumbasree unit.
- Non Biodegradable wastes are processed by private companies

3.WASTE SEGREGATION

Thrissur Municipal Corporation has taken a thorough approach to waste segregation, requiring all households and businesses to separate their waste at the source. This initiative is led by Kudumbashree workers, who make sure that waste is divided into biodegradable and non-biodegradable categories before collection. Biodegradable waste, which consists of organic materials like food scraps and garden waste, is taken to local composting centers or processing plants. A major enhancement to the city's waste processing infrastructure is the new rotary composting plant at Vadakke stand, where biodegradable waste will be converted into manure within a 12-day cycle, removing the need for curing sheds. This plant will be crucial in decreasing the amount of organic waste that goes to landfills while producing compost suitable for agricultural use. Meanwhile, non-biodegradable waste, such as glass, paper, and plastics, is sorted at six segregation centers throughout the city. For instance, glass is stored at the Paravattani central store and subsequently sent to recycling factories in Coimbatore, Tamil Nadu. This organized approach not only diverts a significant amount of waste from landfills but also generates income for the municipal corporation, with Thrissur earning approximately Rs 1,50,000 annually by selling recyclable materials to private agencies. This combined emphasis on effective waste segregation and recycling helps the city progress toward a more sustainable waste management system.

4.WASTE TRANSPORTATION

In Thrissur, the transportation of waste is meticulously organized to enhance efficiency and lessen environmental impact. The city operates a fleet that includes two truck tippers, three tractor-trailers, 38 pickup vans, and two dumper placers, all dedicated to collecting waste from homes, businesses, and public areas across different zones. Each type of vehicle is assigned based on the waste type and the specific characteristics of the area it serves. Pickup vans mainly handle segregated waste from households, while dumper placers are responsible for larger volumes of waste from commercial hubs and markets. After collection, the waste is taken to nearby segregation centers or processing facilities, minimizing the need for long-distance transport. Thrissur has adopted a proximity-based transport model, ensuring that waste is processed or transferred over the shortest distances possible, which not only reduces fuel expenses but also helps avoid delays in disposal. The municipal corporation is also looking to implement GPS tracking systems for its waste collection vehicles, allowing for real-time route optimization to reduce delays caused by traffic or other issues. Additionally, there are plans to shift towards electric or hybrid vehicles in the near future, which will help lower the carbon footprint of waste transportation operations. By concentrating on zonal collection, improving route efficiency, and embracing sustainable transport methods, Thrissur is making strides toward a more environmentally friendly and cost-effective waste transportation system.

5.WASTE PROCESSING

1.Bio-Medical Waste

Reports indicate that Kerala has over 1.5 Lakh patient beds available across both government and private sectors. Health care facilities in the region generate between 0.5 and 2.0 kg of waste per bed daily. The composition of hospital solid waste includes 30-35% infectious materials like bandages and linen, 7-10% plastics, 0.3-0.5% disposable syringes, 3-5% glass, and 40-45% general waste, including food. Consequently, the

estimated biomedical waste production in Kerala is approximately 50-60 tons per day.

Most hospitals and clinics in Kerala dispose of their biomedical waste through agreements with IMAGE, an initiative of IMA. The exception is Mother Hospital, which operates its own plant for biomedical waste disposal. The IMAGE Plant Common Bio-medical Waste Treatment Facility (CBWTF) in Palakkad currently has the capacity to process about 80 tons of biomedical waste daily.

2.E-waste

Electronic waste can be categorized into recyclable and non-recyclable materials. While recyclables can generate income, non-recyclables require financial support from authorities for disposal or repurposing. The primary challenge in e-waste collection lies in the fact that non-recyclables are typically gathered by official entities, whereas recyclables are often collected by informal waste pickers. Earth sense recyclables in Hyderabad, which collaborates with Clean Kerala Company, offers 10 rupees per kilogram for recyclable materials. However, this system is not yet operational in Thrissur Corporation.

The Government of Kerala established Clean Kerala Company Ltd (CKCL), a local self-government department initiative. One of CKCL's key functions is the collection of e-waste and its transfer to authorized recycling facilities approved by both Central and State Pollution Control Boards. The recycling company maintained a collection center in Kanjikode, Palakkad. From 2014-15 to 2017-18, CKCL amassed 1064.124 metric tons of e-waste, which was subsequently handed over to the recycler for safe disposal. In the 2018-19, as of October 31, 2018, 136.323 metric tons of e-waste were collected and transferred for processing. During the years 2022-23 and 2023-24, CKCL gathered 14456 kilograms of e-waste from Thrissur.

3. Paper & Plastic waste

White paper cannot be produced from paper waste. Instead, this waste is recycled into low-grade cardboard and transported to Tamil Nadu, similar to plastic waste. This transportation is costly unless large volumes are compressed for each trip. Thrissur Corporation is planning to install a baling machine to make this process more economical, although the proposal is still in its early stages. In Ollur, a private company

collected and compressed plastic waste into balls for use in road tarring.

The Government of Kerala has established Clean Kerala Company Ltd (CKCL), an initiative under the Local Self-Government Department, to collect and grade plastic waste. CKCL provides hands-on training to Haritha Karma Sena members to enhance their waste segregation skills, potentially increasing their income. This creates an additional revenue stream for the members who collect door-to-door waste. Proper segregation significantly increases the value of the plastic waste. CKCL's collection data shows: 610,899 kg of segregated plastic waste from January to March 2021; 44,14,808 kg from April 2022 to March 2023; 1,30,90,277 kg from April 2023 to March 2024; and 40,52,801 kg from April to July 2024.

Between 2016 and 2024, the CKCL amassed 3617 MT of shredded plastic. In total, 3360 MT were sold to contractors involved in road construction projects for the Public Works Department (PWD) and Local Self-Government Department (LSGD).

4.Glass waste

The Government of Kerala established the Clean Kerala Company Ltd. (CKCL), an initiative under the local government. CKCL reports indicate that glass waste is a significant component of the solid waste. Currently, scrap dealers collect this waste and transport it from the state. The state's only glass factory ceased operations a decade ago, leading to challenges in glass waste management for the public. CKCL has collected 228700Kg in 2022-23, 350547 Kg in 2023-24, and 25300 Kg in 2024 to date.