

# A Survey on Household Solid Waste Management in Trivandrum City, India

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## ABSTRACT

A properly managed effective waste management program will increase the health and environmental quality of the country. This survey examines the standing of Solid Waste Management unit level in Trivandrum Corporation and to understand the amount of awareness of people about the environmental and health hazards related to confused management of solid waste. A self-administered Google form was used for primary information covering Trivandrum town. Information was analyzed as per the descriptive statistics. The common waste varieties embody food, paper and carton, plastic (bag/bottles) metal, fiber bags, glass, and batteries. Different ways of organic waste disposal were composting (47%) and burning (4.8%). Compost bins were standard among 47% households. However, the results additionally showed that 26% households weren't conscious of waste employment, recycle and reduction. Suggestions created by the respondents to carry out good waste management that embody composting and economical waste separation.

*Key words : Solid Waste Management, Corporation, Respondents, Composting*

## Introduction

Solid waste management is one amongst the foremost common important issues two-faced by society these days. Because of the rise in population level, urbanization and rising living standards have increased the solid waste generation in developing countries (Guerrero *et al.*, 2013). Solid waste management is obtaining wide attention still as within the national and native levels (Solano *et al.*, 1996). The complete method of Solid Waste Management in urban areas of Trivandrum town wants enhancements. Disorganized and improper waste disposal has created severe environmental problems like surroundings. Loss (flora and fauna), pollution, destruction of aesthetic worth of the setting and polluting water bodies etc., which causes a direct impact

on the society and thereby, affects the event of the country. Therefore, effective waste management techniques are going to be very important for the proper development of the country. Improper municipal Solid Waste Management (SWM) is going to be a hazard to the public health, and that ends up in decline within the worth of people's life (Altaf and Deshazo, 1996). Solid Waste Management may be a major drawback in Trivandrum town because of the improper solid waste management systems inside the town. Gift day state of affairs; solid waste area unit collected in lots of abundances and disposed of in places, that area unit environmentally sensitive areas like miry lands, barren lands, water bodies, road sides, public places and low-lying areas. Moreover, open marketing is additionally quite common in Trivandrum town that negatively affects

the aesthetic worth of that place and causes poor scenic beauty. And conjointly will increase the chance of health problems (Zon and Siriwardana, 2000). Therefore, this survey study tries to know the standing of Solid Waste Management house level in Trivandrum Corporation and also the level of awareness of the folks concerning the environmental and health hazards related to unmethodical management of solid waste (Hai and Ali, 2005).

### Study Area

The study area is the selected problematic wards of Thiruvananthapuram Corporation, which comprises 100 wards. Thiruvananthapuram city is unremarkable, better-known by its former name Trivandrum is the capital of the Indian state of Kerala. It's the foremost inhabited town in Kerala with a population of 957,730 as of 2011. The surrounding urban agglomeration population is around 1.68 million.

#### 1. Main sources of Solid Waste

Household waste, commercials waste, hotels, clinics and dispensaries waste, construction waste, demolition waste, gardening, sludge.

#### 2. Solid Waste Management in Trivandrum town

Thiruvananthapuram is the first corporation of the Kerala State. It's a naturally undulated geographical feature and has extremely urban spots on a serenely rural base. Once upon a time referred to as the cleanest town in India, Thiruvananthapuram is an exhausting endeavor to emulate alternative cities in dirtiness. The blame squarely lies with the folks, the authorities, each political and official, the staff and also the voters themselves. The prevailing arrangements for solid waste management in most

of our urban centers are extremely unsatisfactory. Thiruvananthapuram town Corporation, which had solely fifty wards with a part of 74 Sq.km, has been distended by as well as all the contiguous panchayats and currently has hundred wards with 141.74 Sq.km areas. Resulting to the rise within the space, the population under that has magnified, and alongside that the responsibilities of the Corporation authorities. Having homes at elevated places has been given up and living in multi-storied flats is well- accepted. Hotels have mushroomed and are patronized. Edge feeding places have magnified in numbers. Markets became massive, crammed up and unsustainable. New and unofficial markets have unfolded right along the urban as rural areas. Meat stalls and poultry have increased. Lodgings and hostels for men and girls have increased, of which contribute a good deal to the amount of solid waste generated. So disposal of solid waste may be a major headache for Thiruvananthapuram Corporation. The Central Pollution control panel conducted a study on the standing of Municipal Solid Waste Treatment and Disposal in and around Trivandrum town. Most of the population of the town doesn't store the waste at the supply and instead disposes the waste into the rubbish bins, roads, open areas, emptying pipes, etc. Isolation of utile waste isn't practiced. Most of the utile material is additionally disposed of with domestic and trade waste. Therefore, utile waste is usually found mixed with rubbish on the streets, into the rubbish bins and at the merchandising zones from wherever a part of this waste is picked up by the road sweepers. There's no door-to-door assortment system accessible of waste except just in case of a few housing

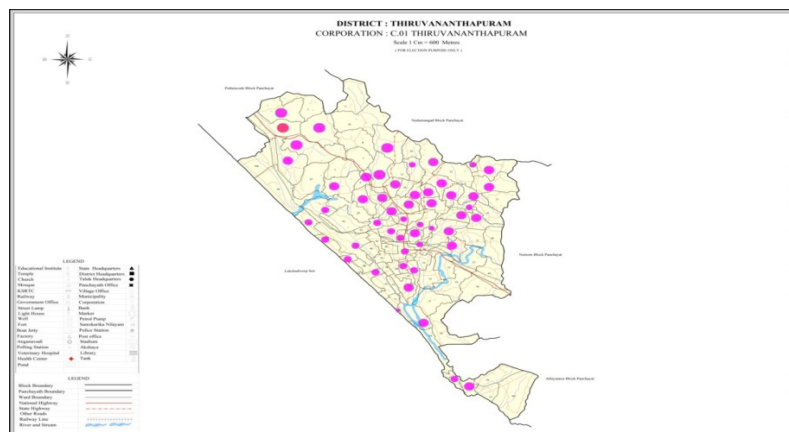


Fig. 1. Plot area shows the Trivandrum Corporation, the problematic wards are marked as bullets

societies. The street sweeping is the sole method of primary assortment of waste. There has been an important increase in the production of solid waste in Trivandrum town over the previous couple of decades. Today, Thiruvananthapuram generates 350 heaps of waste per day. Out of this, 49% is from households, eleven percent from business centers, and 10% from hotels and restaurants, and therefore the rest is from alternative segments that are collected through street sweepers and from community waste storage sites. This report makes a case for the SWM of Trivandrum town is that the most primary assortment of waste is street sweeping. Regard the square measure, about 6400 street sweepers are within the town for street cleanup. Some roads square measure clean day after day and a few square measure clean sporadically, twice per week or once in an exceedingly week.

**Waste Generation in Trivandrum town**

It is estimated that the Thiruvananthapuram city generates about 350 tons of waste per day. Out of this, about (49%) is from households, (11%) from commercial centers, (10%) from hotels and restaurants, and the rest is from other segments. About (11%) consists of inert, (7%) forms paper, (5%) makes for plastics and the rest comprises other dry waste.

**Environmental and Health Impacts**

The rate of solid waste generation has inflated to a devastating and uncontrollable rate in Trivandrum town as a result of human daily and economic activities. The indiscriminate dumping of solid waste in public places is a relevant factor. Waste may be a solid, liquid, semi-solid or instrumentation of gas-

eous material. Therefore, the unlawful manner of marketing these refuse like garbage, sludge from water or manufacturing waste, pollution management facilities and totally different useless materials whereas not considering the adverse result on human health is termed indiscriminate solid waste disposal. In Trivandrum town these days, prohibited marketing of refuse primarily in industrial and municipal areas has become a heavy issue of concern to humans and its surroundings. This environmental pollution derived from solid waste littering has created an excellent deal of health challenges to family residents round the marketing sites. It's evident that nearly all the people living around the marketing location do not appear to be attentive to the harmful effects of refuse marketing except for the offensive odors spreading around the untidy surroundings and collectively once the wastes become wet and start to decay. Urbanization, population, has become a serious reason for waste generation and inappropriate disposal techniques, notably in urban areas of Trivandrum town.

Human exposure to this unlawful act has triggered a great deal of health risks to the public that inadvertently affects the whole sustenance and their major landscape. Lack of applicable storage facilities, inadequate waste management and planning, wrong perceptions by residents and attitudes towards environmental improvement and sanitation is also a reason for this draw back. Once associate surroundings is not healthful and clean it poses an excellent deal of harms and negative impacts on human notably open air workers, workers producing infectious materials whereas young youngsters get merely contacted and area unit most liable to this act of content and dirtiness the end result of indiscriminate disposal of solid wastes expose human to environmental degradation like in flooding, emptying obstruction, widespread of infectious diseases, cholera, diarrhea, infectious disease, waterway blockage that ends up in infestation of flies, ticks and breeding of mosquitoes that cause infection and totally different plagues. In most remote parts of Trivandrum town, it has been detected that a great deal of littering wastes drop area unit in nearly all market areas, outskirts of the cities and even on roadsides for weeks whereas not devising any adequate suggests that of wastes assortment either by the personal sector or government. It might be of nice profit if solid waste are organized, collected and channeled through fashionable lowland for employ-

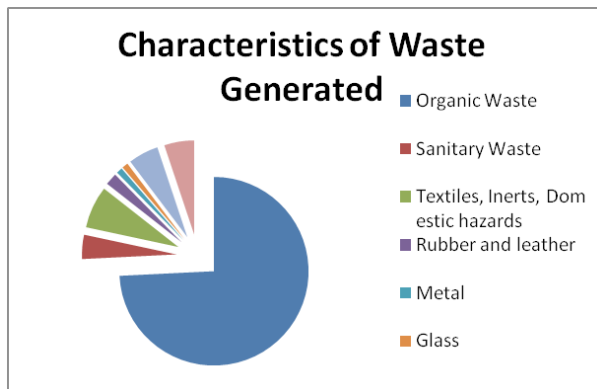


Fig. 2. Characteristics of Waste Generated in Trivandrum Corporation.

ment, whereas such areas ought to be away from human residents to avoid environmental disorder, all kinds of pollution and health hazards.

### Materials and Methods

The study was conducted in Trivandrum Corporation. The administrative division may be industrial space characterized by high enterprise throughout the day which ends up in high production of waste. Because of the ascent of population, the quantity of solid waste created in administrative division has inflated over the years. The Trivandrum Corporation has one hundred wards with a complete population of nine, 57,730. The first information assortment is finished indiscriminately through an internet platform known as Google forms. And responses were collected from the residents of Trivandrum town. The target of the survey was to gather information supporting solid waste management in Trivandrum Corporation. Information assortment occurred across Trivandrum corporation space. Around a hundred and fifty responses were collected; this was done to calculate scores and comparative information to guide to results and conclusions.

### Results and Discussion

According to the collected demographic information, the majority of the households (52%) comprised over 3 members of the family and most of the respondents' area units were literate and with a larger proportion. Results further delineate that room waste is the commonest (94%) domestic waste kind among alternative forms of waste like plastic, papers, fibers, metals, glasses, batteries and physical science. Touching on the previous studies, it's been shown that family waste separation before disposal is at a poor level. In line with the results of the current study, a hefty fraction of the households (48%) don't separate waste before disposal. Composting is one among the usual mistreatment and environmental friendly ways to manage the degradable waste. Of the sample, (47%) respondents prepare the compost domestically, and only half of the respondents have customary composting bins. (46%) respondents place the waste within the pits in their home and (7.9%) use public bins. (63%) respondents say that waste disposal could be a major drawback in their neighborhood. Regarding (81%) respondents,

have no biogas plant in their residence. (58.3%) aren't happy with the municipal staff. Inadequate awareness has been given for disposal strategies. Generally, the bulk of respondents showed concern regarding problems with solid waste management. (100%) were involved regarding the environmental hazards associated with improper waste storage and disposal of waste. Most of the respondents are concerned regarding the health problems associated with burning garbage and the improper management of waste. Results clearly show that (96%) respondents are willing to participate in any program that aims to reduce, recycling, composting of domestic garbage. There are a few suggestions from respondents to manage the waste. These embody, institution of state waste grouping centers (28%), home composting (34%), Majority of the respondents (54%) aren't happy with the performance of current waste grouping vehicles. Most of the respondents (94%) are willing to separate analyzable and non-analyzable waste if the government establishes the correct waste management channel, and the majority of them (66%) prefer to bring their domestic waste to the waste grouping centers. Results further delineate that respondents prefer to transfer into biodegradable waste grouping bins (66%) with the aim of reducing environmental problems arising from non-analyzable waste. (17%) respondents expect high contributions from the government in the Solid Waste Management sector.

### Conclusion

The survey has the flexibility to produce an inspiration of the prevailing household Solid Waste Management in Trivandrum Corporation. Their knowledge on environmental and health issues connected with inappropriate waste management. Though a number of them practice improper waste disposal ways such as open dumping, dumping waste in flowing water which they are not active in, the waste utilization, reusing and reduction sufficiently. People in the Trivandrum city wish to collaborate and participate in an accurate waste management system. Therefore, their involvement needs to be impressive for the event and implementation of a waste management system. Also, it has been found that an additional commitment of the government is required for implementing an accurate solid waste management system. It'll be really effective if a non-public sector collaborates with the government for

the sustainable management of solid waste.

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