

A CASE STUDY OF SOLID WASTE MANAGEMENT IN PUTTUR: MUNICIPALITY**G. PUSHPALATHA**Research Scholar, Dept. of Chemistry, Bharatiya Engineering Science and Technology
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and Sciences, Kadapa, Andhra Pradesh, India.**Dr.T.SRINIVASULU**Professor, Dept. of Physics, Siddartha Institute of Engineering and Technology, Puttur, Andhra Pradesh,
India.**Dr.T.RAVINDRA REDDY**Assistant Professor, Dept of Humanities and Sciences (Physics), Annamacharya Institute of Technology and
Sciences, Kadapa, Andhra Pradesh, India.**ABSTRACT:**

Solid waste management is one among the fundamental and essential services provided by municipal authorities in the country to keep our villages and urban centers clean. In the present paper deals with solid waste management system of Puttur municipality, which is located in Chittoor district of Andhra Pradesh, India. Solid waste is a problem that must be properly managed to protect the human health and environment and preserve the natural resources. Many do not realize that solid wastes also make a definite impact on the climate change. The manufacturers, users and distributors of the products as well as the disposal of the resulting wastes all results in emission of the atmospheric gasses, 'green house gases' which as effected the earth's environment to a large extent. When the organic wastes decompose on the landfills and uncontrolled, it produces the methane gas, one of the major green house gasses contributing to a drastic change in the surrounding climate and the environment.

Keywords:

Solid Waste Management, Reduce, Reuse, Recycle.

INTRODUCTION

Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorized according to its origin (domestic, industrial, commercial, construction, institutional and etc.). Management of solid waste reduces or eliminates adverse impacts on the environment and human health and supports economic development and improved quality of life. A number of processes are involved in effectively managing waste for a municipality, collection, transport, processing, recycling and disposal [1]. Solid waste management has always been a serious problem for cities throughout the world. It is not different in developing countries like India. In certain regions of our country, the free disposal facilities have reached their own capacity and even local governments are confronted with difficult decisions. Modern civilization has brought a lot of luxuries and conveniences to our lives. However, with all of the amenities that modern life brings us, they also cause us to contribute to producing a large quantity of trash that needs to be taken care of. Fortunately, there's the field of solid waste management, and it is with that Solid Waste Management that modern lives are enjoyable without the disturbance or refuse. Solid waste management is an integral element of modern society. Even if we don't get to see what goes on at the facilities and plants that process and dispose of garbage, it still contributes to the well-being of our lives. There are many ways in which solid waste can be treated, and thanks to modernized practices and technological advancement, these methods are very safe and practical. In our present study we mainly confine our views on solid waste management of Puttur city which is a semi-urban area of Andhra Pradesh, India. Therefore one of the most important environmental consequences of the process of Solid Waste Management (SWM) of this area is to protect this large river from uncollected or dumped garbage from where the waste is washed into water bodies, resulting to a negative impact on the environment. The poor quality of the services provided in terms of solid waste collection and disposal is the issues of concern [2].

Puttur Municipality spread over an area of 31.89 SqKms. With a population of 1,46,505(2011 census). It is known for / famous for its. It was establishment as 3rd grade Municipality in the year 2005. Puttur is located at 13 degrees 45 minutes' North

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75 degrees 55 minutes East. It has average elevation of 144 meters, Puttur is situated on the Tirupati to Chennai Highway and 31 km from Tirupati and 105 km distance from Puttur to Chennai. Puttur Town, in general has a tropical climate, winters last from November to February, while summers last from March to June. The annual rainfall 1166.3 mm, most of it received during the months of October/November & December .The Population of the town which was 44313 in 2011 increased to 54092 in 2011 with an increase of 22.06% in the last decade. The sex ratio is 1006 females per 1000 males. The literacy rate 85%. 84% of the male population and 73% of the female population are literate. The main economy is Urban, Partially Agriculture. History and Culture is the first Railway Track in Andhra Pradesh was built between Puttur & Renigunta while laying the Railway Track, Tamil Workers called this place “Pudhu ooru” which means new place in due to course of time changed Puttur by the Telugu People. Puttur Kattu the World Famous Natural Therapy for bone fractures, Education hub in Chittoor District. 13.43°N 79.55°E.

REDUCE, REUSE, RECYCLE

Methods of waste reduction, waste reuse and recycling are the preferred options when managing waste. There are many environmental benefits that can be derived from the use of these methods. They reduce or prevent green house gas emissions, reduce the release of pollutants, conserve resources, save energy and reduce the demand for waste treatment technology and land fill space. Therefore it is advisable that these methods be adopted and incorporated as part of the waste management plan [1].

WASTE REDUCTION AND REUSE

Waste reduction and reuse of products are both methods of waste prevention. They eliminate the production of waste at the source of usual generation and reduce the demands for large scale treatment and disposal facilities. Methods of waste reduction include manufacturing products with less packaging, encouraging customers to bring their own reusable bags for packaging, encouraging the public to choose reusable plastic and glass containers, backyard composting and sharing any unwanted items rather than discarding them. All of the methods of waste prevention mentioned require public participation.

INTEGRATED SOLID WASTE MANAGEMENT

Integrated Solid Waste management (ISWM) takes an overall approach to creating sustainable systems that are economically affordable, socially acceptable and environmentally effective [1]. An integrated solid waste management system involves the use of a range of different treatment methods, and key to the functioning of such a system is the collection and sorting of the waste. It is important to note that no one single treatment method can manage all the waste materials in an environmentally effective way. Thus all of the available treatment and disposal options must be evaluated equally and the best combination of the available options suited to the particular community chosen. Effective management schemes therefore need to operate in ways which best meet current social, economic, and environmental conditions of the municipality.

General Information

The Govt. of Karnataka awarded the Certificate of appreciation to Puttur Municipality in the year 1986-87 and in 1992-93 for providing excellent Municipal Services, maintaining Healthy Environment, the best utilization of 18% reserved Fund and also for the Social services activities.

Puttur serves near by 6 major mandals. Puttur consists of ten ZPHS government Schools, twelve MPPS schools, many private schools and many junior and degree colleges along with three major Engineering colleges under the *School Education Department* of the state. Puttur is an agro based town of Coastal region surrounded by several hillocks with lush green forest situated in the belt of Western Ghat heavy rain fall. The Major occupation of the people is agriculture. The crops grown mainly are paddy, areca, coconut, cashew, rubber, cocoa, vanilla, pepper and plantains. In addition dairy farming, sericulture and horticulture activities supplements the earnings of the people to some extent.

Population Growth in Puttur Municipality:

Table-1 Population growth in Puttur

Years	Population	Decade Variation	Decadal growth (%)
1991	29,887	0	
2001	38,890	9007	30.13
2011	54,092	15202	39.08
2021	77000	22908	42.35

Source: Municipal Corporation: Puttur

For effective urban and environmental management, solid waste management plays an important role [3,4]. Current In India, municipal solid waste management, like most of other infrastructural services has come under great stress, consider low

priority areas, solid waste management was never taken up seriously either by public or by concerned agency or authorities and now the large amount of waste is threatening our health, environment and wellbeing. (Chouhan and Reddy 1996, Mazumdar 1994) [5, 6, 7 & 8]. Puttur Municipal Corporation is responsible for better management of solid waste that are produced everyday and the present study has been carried out in Puttur in the year 2022 to understand the problems and perspective associated with solid waste management in the semi-urban area.

In our present study we concentrate on the area belongs to Puttur Municipal Corporation. The solid waste from the different area of society was collected, mixed and one Kg sample was prepared by using quartering method. The waste was then characterized and the percentage of each constituent was calculated. Secondary data regarding solid waste generation, collection system and disposal methods were collected from Puttur Municipality. Figure.1 Show the concerned area which was considered in our study.



Figure 1: Area of Puttur City depicted as study area

ANALYSIS AND DISCUSSIONS

Puttur Municipality is responsible for collection of solid waste which is produced day by day from different areas of Puttur Municipality. It is noted that there are five borough and 38 wards in Puttur town. There are 85,630 houses in this area which was considered in our study. There are several sources for solid waste generation in this city which are as follows:

- i) Markets
- ii) Play Ground/ Parks
- iii) Domestic Buildings/ Houses
- iv) Houses containing shops
- v) Institutions
- vi) Hospitals /Hotels
- vii) Small scale industries

Following are the statistical information of puttur municipaliy.

Number of Secretariats	Secretariats Name	Ward No.
1	Palluru	1
2	Rachapalem	2, 24
3	Satyanarayana Colony	4, 5
4	Dasarigunta	6,7
5	Govindapalem	8,9
6	Nandhimangalam	10,11
7	NGO Colony	12,14
8	Ambedhkar Circle	13,22,23
9	Lakshmi Nagar	20,21
10	RTC Colony	15

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11	Kalyanapuram	16,17
12	Aretamma Colony	18,19
13	Pillari Pattu	3

Table 1. Total Secretariats (13), Wards 24 and Secretariats boundary in Puttur Municipality.

Area	No. of borough	No. of ward	No. of house hold	Population	No. of Market	No. of Hospital
22.03km ²	5	33	35630	162187	7	6

Table 2: Wards, house hold, Markets, Hospital and population in Puttur

Serial No.	Ward Number	Number of Market	Population
1	6	1	4688
2	8	1	7632
3	18	1	5453
4	21	1	5919
5	23	1	4202
6	30	1	4994
7	31	1	3321

Table 3: Markets in Puttur*Figure.2. Urban Demographic Structure of puttur City, Tirupati District in Andhra Pradesh*



Figure.3. Waste dumping yard area in Puttur

Awareness programs on solid waste

- Community Awareness
- Door – to – Door
- School Awareness
- Rallies
- Auto Awareness

Bulk Waste Collection points

1. Hotels
2. Chicken & Mutton Stalls
3. Marriage halls
4. Theatres
5. Hospitals (non toxic)



Figure.4. Waste management in Puttur

S. No	Heads	Before 2010	2020
1	Dust Bins	167	268
2	Collection points (Heaps)	208	234
3	Coverage of households through door to door collection	700-800	1112-1300

4	No. of Tri-cycles	20	38
5	Material Recovery Facilities	1	5

Table 4: Waste collection in Puttur

S. No	Heads	Before 2010	2020
1	Tractors	4	8
2	Mini Tippers	1	3
3	No. of Trips Per day	11	14
4	Cost of Transportation per year	Rs. 40 lacs	Rs. 67 lacs

Table.5. Waste Transportation in Puttur**Transpires from the above two tables:**

1. Garbage production from house is higher in ward number 8 among all wards as this ward is densely populated
2. Garbage production is rich in 7 areas other than remaining areas
- c) 2 wards having hospitals produce higher amount of garbage than rest of wards .

Garbage Collection Procedure

Puttur Municipality is responsible for collecting the garbage from different areas of Puttur town. Municipal Authority is collecting this garbage in regular manner. Large dustbins are arranged in several areas. In each block three sweepers are working. For garbage collection procedure, 250 persons are involved. They are involving in sweeping the roads and collecting the garbage and transferring the waste into the bins. Several number of sweepers are working for the collection of waste garbage from dust bins. The collected garbage is carried by small cart, tractors or trucks which are dedicated for collection purpose.

Transportation of garbage

Collected garbage is transported to the disposal areas in specific manner. It starts from small dumper and ends into big dust bins. Among the collected garbage, both degradable and non-degradable wastes are present. It is alarming that several plastic products are dumped into the dust bins[10]. Several types of vehicles are used for transporting garbage to disposal sites which are as follows:

- i) Tri cycle carts
- ii) Tractors
- iii)Mini Lorrys

Three tri cycle carts are provided in each ward for collection of garbage from door to door. But in market area extra two tri cycle carts are provided. There are nearly 7 tractors which are used for transporting garbage from different areas. The tractors carrying waste are not covered or partially covered during the journey and waste tends to spill on the roads [2]. The loading and unloading of waste is done through manual as well as mechanical system.

Disposal of waste

Normally the collected garbage is disposed without treatment of reuse reduce and recycling. So till now there is no recycling procedure of garbage according to the normal specification i.e. Municipal Solid Waste (Management & Handling) Rules 2000 of solid waste treatment.

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CONCLUSIONS

The solid waste management in Puttur city appears to be inadequate and needs up gradation. The solid waste has to be disposed off scientifically through sanitary landfill and recyclable portion of the waste should be salvaged. Segregation of recyclable material would also lead to reduction in quantity of solid waste for final disposal. Higher priority needs to be assigned to the management of municipal solid waste by the local authority and a system approach needs to be adopted for optimizing the entire operation of SWM encompassing segregation at source, timely and proper collection, transportation routes and types of vehicles and development and proper operation of sanitary landfill site. The density of population along with number of offices and institutions are continuously increasing thus there should be effective management activity for managing the solid waste which is generated daily in Puttur area.

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