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SHORT COMMUNICATION


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# Solid waste management in urban landscape area

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## ABSTRACT

Waste generation has increased rapidly due to population growth and industrialization. Because of this, the management of municipal solid waste has become an acute problem to the society. Solid waste management is an important obligatory function and also one of the primary responsibilities of the municipal authorities. There are many operations performed in the process of collection, segregation, processing and disposal of the municipal solid waste. This paper deals with the general view of municipal solid waste management, practices and its implications on environment in Annamalainagar region of Cuddalore district. The solid wastes accumulated in Annamalainagar town panchayat is perfectly managed by the municipal authorities. Resource Recovery Park is a place where the collected and segregated solid wastes are further processed. Under the scheme of URBAN INFRASTRUCTURE DEVELOPEMENT SCHEME IN SATELLITE TOWN, the resource recovery park in Annamalai nagar was set up at an area of 4650 $m^2$. This park had an objective to recover some beneficial materials from the municipal solid waste generated by the people through compost making. This is an ideal solution for urban environmental problems caused by solid waste generation.

**KEYWORDS:** Urban landscape, waste management, municipal waste

## INTRODUCTION

Solid waste management has become an acute problem nowadays. Anthropogenic activities led to the accumulation of more solid wastes. The quantum of waste generated by households, commercial centers, institutions, industries etc has been increasing. India produces 62 million tones of solid wastes annually but only 20 to 25 percent is properly treated and processed [1]. The Common method of disposal of municipal solid waste is dumping in our country or stored them in an open space. Even though some of the wastes can be recycled by us, segregation of the recyclable and reuse materials from the municipal solid waste collection is the challenging work in many places of our country. In this paper, the effective method of municipal solid waste management in Annamalai Nagar region is to be investigated. The main objective of this study is to properly treat, control, dispose and recycle the solid waste in an economical manner and to recover some beneficial materials through compost making.

### Study Area

Annamalai Nagar is a special grade panchayat town in Cuddalore district of Tamilnadu. It is located at about 6 Km west of Bay of Bengal at 11° 24' North latitude and 79° 41' East longitude and at an altitude of +5.79 M above the Mean sea level (MSL). The climate is moderately warm with hot summer months. There are 15 wards comes under this panchayat. Out of these 15 wards, 2 wards belong to Annamalai University.

### Methodology

Government bodies at all levels (central, state and municipal) are taking proactive steps to improve the municipal solid waste scene in India. The Government of India issued new rules that regulate the MSWM [2] at the local level. There are many rules for handling, segregation and disposal of the municipal solid waste. The mandatory requirements of the rule are, Door to door collection, Source segregation and storage at source, Abolition of open storage, Daily sweeping of the street, Transportation of waste in covered vehicles, Waste processing by composting or energy recovery and Disposal of inerts by sanitary landfilling.

### Collection and Segregation

The first step in solid waste management is the collection process. The household waste is collected everyday by door to door primary collection using push carts that carries the collection boxes. The 15 wards generate an average of 4 to 6 tonnes of solid waste per day. For each ward, one push cart is allotted and one labour is assigned to do this collection process. So, there are 15 labours and 15 push carts used for this

**Figure 1:** Collection vehicles

**Figure 2:** Segregation process

**Figure 3:** Recovery park

collection purpose. They collect the wastes daily during 6-11 a.m. The commercial and road cleaning wastes (industries, factories, shops etc) are collected using one small truck [Figure. 1, Table 1]. These wastes are then totally put into a secondary collection vehicle (tractor) for further process.

The next process is segregation in which the wastes are separated as Biodegradable and Non-biodegradable wastes [Figure. 2, Table 2]. Most of the people dispose their household products in a segregated manner during collection time. But in some cases, the labours separate the wastes if the segregation is not properly done by the people.

## Treatment and Processing

Resource Recovery Park is a place where the collected and segregated solid wastes are further processed [Figure. 3, Table 3]. Under the scheme of URBAN INFRASTRUCTURE DEVELOPEMENT SCHEME IN SATELLITE TOWN, the resource recovery park in Annamalai nagar was set up at an area of 4650 $m^2$. This park had an objective to recover some beneficial materials from the municipal solid waste generated by the people.


**Figure 4:** Windrow composting

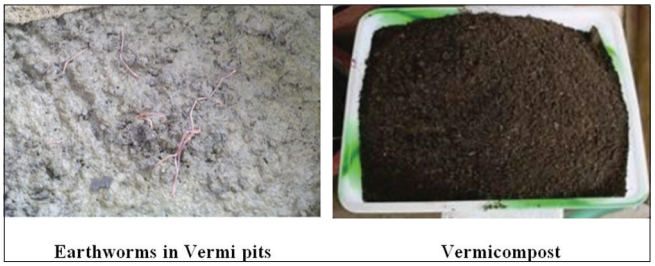


**Figure 5:** Vermicomposting

**Figure 6:** Storage room

The treatment practices normally followed by this municipality for managing the solid wastes are:

i. Windrow composting
ii. Vermicomposting.

These practices are considered as the environmentally and economically sustainable solution for municipal solid wastes [3].

## Windrow Composting

The solid waste material received is pulverized and stacked in windrows (elongated rows) of 6m length, 2 m wide and 1.5 to 2 m high [Figure 4]. For biodegradation of organic matter, cowdung slurry is used to cover the windrows and then treat them with with EM fungi. Daily spraying of water and weekly aeration is carried out. Fermentation completed within two months time and then the well decomposed biomass is dried,

Table 1: Details of the collection vehicles

| S.No | Name of the panchayat | No. of vehicles used | No. of trips/day | Capacity of vehicle |
|---|---|---|---|---|
| 1 | Annamalai Nagar | Push carts (15) | 1 | 150 kg |
| 2 | | Tractor (1) | 1 | 4 tonnes |
| 3 | | Truck (1) | 1 | 1 tonnes |

Table 2: Waste characterization

| S.No | Types of waste | Amount in kg |
|---|---|---|
| 1 | Organic | 1230 |
| 2 | Milk and oil covers | 31 |
| 3 | Pet bottles | 29 |
| 4 | Carry bag | 215 |
| 5 | Paper | 172 |
| 6 | Metal | 65 |
| 7 | Cloth | 52 |
| 8 | Tyres | 15 |
| 9 | Coconut shell | 26 |
| 10 | Landfill | 447 |

Table 3: Sections in recovery park

| S.No | Sections in recovery park | Area ($m^2$) |
|---|---|---|
| 1 | Windrow yard | 1080 |
| 2 | Vermicompost yard | 220 |
| 3 | Area for storage of recyclable materials | 150 |
| 4 | Dumping yard | 3000 |
| 5 | Area of plantation | 200 |

graded and sieved. By means of this process, they can produce 150 kg of compost per day by using 4 tonnes of biodegradable wastes. The produced compost is sold at the rate of Rs. 5/kg.

### Vermicomposting

Degradation of the organic wastes by earthworm consumption is known as 'Vermicompost' [Figure 5] [4]. This composting process is done by using the vegetable wastes or domestic segregated wastes collected from the markets and households [5]. There are two stages in the process of Vermicomposting. Initial is the decomposition of waste because earthworms do not eat fresh food wastes and later its conversion [6].

Vermi pits are generally made having a maximum depth of 2 to 3 feet, width of 5 to 6 feet and can have any suitable length. In the bottom layer, the vermibed is filled with bricks and sand. Above that 45 days old compost with worms are introduced and then it is layered with organic wastes and cowdung. Water is sprayed at regular intervals to maintain the moisture level. The matured compost after three months is sieved, dried and stored in moist conditions. By this method, they can produce 10 kg of vermicompost using 25 kg of organic wastes weekly and the resulting product is sold at the rate of Rs. 10/kg.

### Storage of Recyclable Materials

The labours separate the recyclable materials such as plastic, glass, metal, rubber, bricks etc and stored in a separate compatible room allotted in the recovery park [Figure 6]. The plastic materials are dumped in a pressing machine to reduce the volume and made it easier for further handling. From this park, they transport these recyclable wastes into private sectors where further recycling process is done.

### Disposal of Inorganic Wastes

The inorganic wastes are the only problem and are dumped in a separate land around the park. The scientific landfill comes in future which is designed to effectively dump the inorganic wastes.

## CONCLUSION

Thus, the solid waste management is the prime responsibility not only to the municipal workers but also the people who are involved in waste generation. The solid wastes accumulated in Annamalai nagar town panchayat is perfectly managed by them. The risks faced by the existing methods of segregation, processing and disposal of inorganic wastes are completely reduced by the emergence of new technologies in near future. Hence, these techniques are an ideal solution for the urban environmental problems caused by solid waste generation. This makes way to reduce the dumping sites and to maintain an aesthetic and sanitary environment.

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