

### **Generation of Solid Waste in the City:**

Solid Waste Management is one of the most important mandatory functions of the Urban Local Bodies. ULB is the only agency involved in solid waste management. However ULBs in Kerala are aware of the problems of health, sanitation and environmental degradation. Though there have been a lot of developments in this sector during the last decade. However, during the last few years there has been a quantum shift in ULB attitudes towards collection and disposal of solid waste. Attempts have been made in this area and more concerted efforts made to improve SWM system to ensure a better urban environment.

- Total Population : 436527 (2001 census)
- Total Area : 82.67 Sq km
- Electoral Wards : 55 (Previously 51)
- Revenue Wards : 39
- Total households : 82,369
- Commercial Establishments : 12,853

### **Land Use**

- Residential : 52.27 %
- Commercial : 1.45 %
- Industrial : 4.5 %
- Transportation : 16.95 %
- Recreation : 0.76 %
- Water Sources : 2.21 %
- Vacant / Public Purpose lands : 8.60 %

### **Nature of City Wastes.....**

Total generation of waste 250 tones / day

Waste collected 120-150 Tones / day

- Bio - Degradable wastes : 70 %
- Recyclable wastes : 15 %
- (Paper, plastic, metal, rubber, glass)
- Inert : 10 %
- Others : 5 %
- Per Capita generation of wastes 500 gm / day

Waste generation points

- Households : 82639 Nos
- Hotels and Restaurants : 1012 Nos
- Commercial Establishments : 12, 853 Nos
- Markets Large : 2 Nos
- Markets - Medium : 4 Nos
- Markets - Small : 13 Nos
- Offices and Institutions 300 approx
- Hospitals - 58 Nos - 5530 beds
- Marriage community hall : 21 Nos

**The Situation that was.....**

- No system for segregation and daily collection..
- Inadequate transportation facilities..
- Waste thrown away into the bins on the road sides..
- Waste are thrown away on to road side..
- Wastes dumped in to Sub depots in the city..
- Public places made dumping yards..

- Kallai river became filthy..
- Canoli canal was full of thrown away wastes...
- Drains were full of plastic bags and bottles..
- Became breeding place to mosquitoes..
- Unhygienic

### **Sources and Quantity of solid Waste Generated**

About 213 MT of Municipal solid waste is generated in Kozhikode corporation every day. The per capita waste generation is estimated to be 477 gms / cap/day Out of this about 100 tones is collected by the corporation every day

The physical and chemical findings are below:

- Generation : 213 tones / day
- Organic fraction : 84 %
- Recyclables : 7 - 8 %
- C / N Ratio : 21 - 31
- Calorific Value : 1762 - 1815 kcal / kg

In terms of percentage contribution, domestic waste generated from the house hold account for 47 percentage of total waste generated. Waste from commercial establishments and hotels account for 24 percent of the waste. High organic fraction is available for bio conversion especially for composting. Segregate at source and store the organic fraction (Wet organic) and inert, inorganic and recyclables. MC has supplied bins to residents and has initiated campaign in 2004. Separation of wet organic and dry inorganic and inert is in around 25-30 % of premises.

## **MSWM System**

- Primary Collection: Separate bins (Green and white bins) have been provided in each house for segregated collection of wastes. The kudumbashree Volunteers organize door to door collection of the waste and moved to secondary collection points.
- Secondary collection: The waste, in its segregated form transferred to the secondary collection vehicles (Tractors etc) and then transported to the treatment plant.
- Transportation: The waste is being transported to corporation's waste treatment plant site.
- Processing: At the treatment plant, Bio degradable waste is being converted into bio manure.

## **Distributed Auto Rickshaw**

- Two units (each units consist of 10 members) of kudumbashree have been formed in each of the select wards.
- Each unit procured 2 Auto Rickshaws for primary collection through Bank Finance.
- Arranged subsidy from the plan fund for purchasing Auto Rickshaw

## **Other Equipments for Primary Collection:**

- Corporation distributed separate 15 Litter bins (Green and White) to each and every households, and 50 litter bins to Kudumbashree volunteers for primary collection, free of cost.
- Commercial establishments have to provide two bins at their institution for source segregation.

## **Primary Collection:**

Primary Collection .....For the corporation ..... for a lively hood

- The wastes are being segregated at source and being stored in the bins provided by the corporation.
- Kudumbashree volunteers collect them in the 50 litter bins in segregated way and placed in the Auto rickshaw and then moved to secondary collection points.

**Secondary Collection:**

- The Waste collected by the kudumbashree Volunteers are shifted directly to the Corporation vehicles from the Secondary collection points. There are about 32 Secondary collection points identified by the corporation.
- These wastes are directly transported to the solid waste treatment plant at Nheliyanparamba 10 KM away from the city and then being processed and converted into manure.
- The projects are to be landfilled.

**Transportation:**

- The transportation facilities have been strengthened by purchasing adequate vehicles for waste transportation.
- 8 Covered type of LCV's, with internal separation for bio and non bio - degradable wastes, have been purchased as part of the project implementation.
- Open tractor trailers are modified into covered type.

**Processing plant site:**

- Processing plant is situated at Nheliyan Paramba, 10 KM away the corporation in the Cheruvannur Nallalam Panchayath.
- There are 18.98 acres of land for this purpose.
- Even human Excreta were bought to this land since 1984.
- Till 1990's waste was not a problem since major part of it is biodegradable.
- But when non biodegradable components increased, it became a challenge to the corporation.
- A waste processing plant has been set up in the processing plant site in the year 2000 by Excel industries, Bombay
- The wastes have been processed in the plant and converted into Bio- manure
- The waste are being heaped into windrows and treated with adequate inoculums and then subjected to aerobic composting. These wastes are fed in to the plant and converted in to bio- manure.

### **Action against littering:**

- Organised squad works against littering. Spot fine imposed against littering or dumping wastes in public places.
- Started a debris service by which public can hire the service of the corporation for removing construction wastes, garden wastes etc with a nominal fee.
- Strengthened the system of sweeping, drain cleaning, and waste collection by the contingent workers of the Corporation.

### **Project gets acceptance .....**

- No littering in public places. City remains clean
- No more waste depots, no more waste bins in public places, Calicut became bin less city.
- The project is being studied by other local self government institutions to implement the same in their institutions.
- Wins 'Green City Award' of Plastic India Foundation on October 1st, 2005.
- The SWM Experts like Smt Almitra Patel and Sri Asnani visited the Corporation and appreciated the waste collection by the Kudumbashree and has observed that the city remains clean.
- KILA Identified Calicut Corporation's MSWM Project as one of the best practices.
- ISCON from Bangalore visited Calicut and appreciated the project.
- Study teams from MADHURA, SREELANKA and other parts of the country.

### **Decentralized SWM**

The compost treatment plant was planned for 300 MT of waste every day. There has been a drastic increase in the quantity of waste collected and reaching the compost facility during the last few years increasing from 111 MT reaching the plant in 2002 to an average of 210 MT now (2006). It is not desirable to increase the quantity of waste. The necessity of decentralization of treatment and disposal of waste is a crucial challenge to the Municipal Corporation.

Hence a Concerted effort to reduce the waste at Source should be planned. Decentralized treatment of waste should be given priority so as to save on cost and to mitigate the ill effects to big plants. Various options are available for household to process biodegradable waste. This includes household burial, aerobic / anaerobic composting, Vermin composting, bio- gas production etc. Ward level decentralized Vermin composting or bio gas production can be considered. Corporation is promoting Bio- gas plants by

providing subsidies for it. As a start Institutions are selected for this project. Biogas plants (Waste to energy plants ) in markets, Slaughter house, Schools and other such institutions based on quantity & nature of waste. Decentralized SWM requires massive awareness campaign to bring about a change in behavior of the public.