

A REVIEW PAPER ON PLANNING OF SOLID WASTE MANAGEMENT PLANT – A CASE STUDY FOR INDAPUR CITY

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Abstract- This paper state that existing solid waste management practices in Indapur municipal area of Pune district of Maharashtra state, India. Solid waste management is among the basic essential services provided by municipal authorities in the country to keep cities clean. Due to industrialization, rural to urban migration and high growth rate of population have induced rapid urbanisation in developing countries and obviously in India also. The haphazard urbanisation created acute problem of solid waste management. The per capita waste generation rate in India has increased from 0.44 kg per day in 2001 to 0.5 kg per day in 2011; such a steep increase in waste generation within a decade has severed the stress on all infrastructural, natural and budgetary resources. Pune is one of the developing city, it generates total quantity of waste is about 7 tons per day. So, there is need of the proper waste collection, transportation route for prevention of environment form the hazardous waste disposal. It may help in sustainable urban environment of Indapur city.

For effective management, the municipal corporation of Indapur has divided the entire region into seventeen wards which are further divided into six health units to collect the solid waste. Two alternate disposal systems are considered. In first case the entire solid waste of the city of Indapur is dumped at one dumping site. In next case there are three sites proposed at different locations in the city Indapur city.

Keywords— Municipal solid waste, Plastic, Recycling, Waste Disposal, Waste Management.

I. Introduction-

Solid Waste Management is the discipline associated with control of generation, storage collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range

of public health, conservation, economics, aesthetic, engineering and other environmental considerations.

The most common problems associated with improper management of solid waste include diseases, odor nuisance, fire hazards, atmospheric and water pollution, aesthetic nuisance and economic losses. There has been a significant increase in solid waste generation in India over the years from 100 gm per person per day in small towns to 500 grams per persons per day in large towns. Currently most of the municipal waste in India is being disposed unscientifically. Generally municipal solid waste is collected and deposited in landfill such unscientific disposal attract birds, rodents and fleas to the waste site and create unhygienic conditions. The degradation of the solid waste results in the emission of carbon dioxide (CO₂), methane (CH₄) and other trace gases. The unscientific landfill site may reduce the quality of the drinking water and causes the disease like nausea, jaundice, asthma etc.

Indapur city primary sources of solid waste are local households, commercial establishments, hospitals, hotels, restaurants, and markets. The total quantity of waste generated per day is about 7 tons (approximate generation per capita per day is 500 grams). Indapur Municipal Corporation (IMC) is responsible for collection, storage, segregation, transportation and disposal of all solid waste generated in the city. In the present research work describes an attempt to assess the collection, segregation, transportation, treatment and disposal of IMC land fill site.

II. Previous Work

1.Nitin Mundhe, Ravindra Jaybhaye(Augast2014) et al. In Pune city The total quantity of waste generated per day is about 1300 to 1400 metric tons (approximate generation per capita per day is 500 grams) The proposed

work emphasizes on the assessment of detail process of solid waste management such as collection, storage, segregation, transportation, treatment and disposal by using Geospatial tools like RS, GIS and GPS. It may help in sustainable urban environment of Pune city. PMC lies between latitudes 18° 25'N and 18° 37'N and longitudes between 73° 44'E and 73° 57'E and the geographical area is around 243.84 Sq.Km with a population of 3.1 million composed of 76 general electoral wards (according to 2011, Census of India). These wards were converted in 14 administrative wards by Pune Municipal Corporation

2. Dr. Raveesh Agarwal, Mona Chaudhary (June 2015) et al.

The objectives of writing this paper is to study the current practices related to the various waste management initiatives taken in India for human wellbeing. There are few things certain in life – one is death, second is change and the other is waste.” No one can stop these things to take place in our lives. But with better management we can prepare ourselves. There are about 593 districts and approximately 5,000 towns in India. About 27.8 percent of India's total population of more than 1 billion (as per Census 2001) lives in urban areas. The projected urban population percentage is 33.4 percent by the year 2026. The quantum of waste generated in Indian towns and cities is increasing day by day on account of its increasing population and increased GDP. The annual quantity of solid waste generated in Indian cities has increased from six million tons in 1947 to 48 million tons in 1997 with an annual growth rate of 4.25 percent, and it is expected to increase to 300 million tons by 2,047 (CPCB, 1998).

3. Rajendra Kaushal , Mayuri Chabukdhara (may 2013) et al.

Estimation on the quantity and characteristics of municipal solid waste and its forecasting over the planning period is the key to a successful management plan. India, with a population of over 1.21 billion account for 17.5% of the world population (Census of India 2011). According to the provisional figures of Census of India 2011, 377 million people live in the urban areas of the country. This is 31.16 % of the Country's total population. Generally in India, MSW is disposed of in low-lying areas without taking proper precautions or operational controls. Therefore, municipal solid waste management (MSWM) is one of the major environmental problems of Indian megacities. SWM involves activities associated with generation, storage and collection, transfer and transport, treatment and disposal of solid wastes. But, in most Indian cities, the MSWM system comprises only four activities, i.e., waste generation, collection, transportation, and disposal. Poor collection and inadequate transportation causes the accumulation of MSW at every nook and corner. The management of MSW is going through a critical phase, due to the unavailability of suitable facilities to treat and dispose of the larger amounts of MSW generated daily in metropolitan cities.

4. A Study of Literature on Solid Waste Management Mansi Khadke (2015)-

A Literature review on the subject of Solid waste Management (SWM) is yet in the formative stage as a well classified and large quantum of information is not at hand. This paper summarises the literature and inferences gathered so far pertained to the topic. The main focus of this research paper is on Financial Aspect of Solid Waste Management (SWM). Area such as challenges facing SWM, sustainable SWM, Integrated approach to SWM, Financing options, centralised – decentralised systems of SWM, Environmental Audit of SWM system, Importance of Public Private Partnerships in SWM, Financial performance analysis of SWM through Cost-Benefit Analysis are covered in this paper.

5. Management and Disposal of Municipal Solid Wastes in Abakaliki Metropolis, Ebonyi State, Nigeria Patrick AkataNwofe (Feb 2015)-

In this study, the municipal solid waste management and disposal methods in Abakaliki Metropolis, Ebonyi State, Nigeria is presented. The characteristics and composition of these wastes and the environmental issues associated with its management are also investigated. Environmental and health issues arising from the unsustainable management of the wastes were assessed from oral interviews and field observations in the study areas. The results indicate that the waste dump sites (designated and non-designated) on the major streets and several open spaces. The study strongly recommends that Ebonyi State Environmental Protection Agency (EBSEPA) be made to sit up on their functions while Government should strongly consider introducing "waste to energy" as a way of curbing the menace of waste management and simultaneously solving the energy needs of the State.

6. Garbage Collection Management System Pranjal Lokhande (Nov 2016)-

Introduction of adamantine problem for environment is pollution that causes fickleness, instability, hard or disquiet to ecosystem. Now days, there are a number of techniques, which are used for the collection and management of the garbage. Zigbee and GSM technologies are not only latest trends but also one of the best combinations to use in the project. Set of carefully chosen sensors to monitor the status of garbage bin. The smart garbage bin consist sensors namely ultrasonic sensor, gas sensor and moisture sensor. Ultrasonic Sensor is used for detect the garbage level. The ultrasonic sensor is placed inside the garbage bin at lead position, gas sensor will sense the toxic gases and moisture sensor will sense moist in bin then that indication will give to PIC micro-controller.

Data collection :-

Indapur is a Municipal Council city in district of Pune, Maharashtra. The Indapur city is divided into 17 wards for which elections are held every 5 years. The Indapur Municipal Council has population of 25,515 of which 13,252 are males while 12,263 are females. as per report released by Census India 2011 Population of Children with age of 0-6 is 3027 which is 11.86 % of total population of Indapur (M Cl). In Indapur Municipal Council, Female Sex Ratio is of 925 against state average of 929. Moreover Child Sex Ratio in Indapur is around 863 compared to

Maharashtra state average of 894. Literacy rate of Indapur city is 88.22 % higher than state average of 82.34 %. In Indapur, Male literacy is around 92.82 % while female literacy rate is 83.31 %.Indapur Municipal Council has total administration over 5,228 houses to which it supplies basic amenities like water and sewerage. It is also authorize to build roads within Municipal Council limits and impose taxes on properties coming under its jurisdiction.

In Indapur city total waste generated is 7 tonnes per day out of this 5.6 tons are generated from wet waste,160 kg waste generated from hazardous waste (medical waste,etc) and remaining 1.4 tons waste generated is total dry waste.

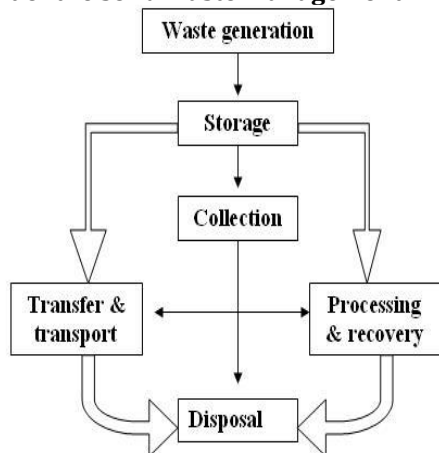
Total waste generated from indapur city (7tonns/day)

1. Wet waste :- 5.6 tonnes
2. Hazardous waste :- 160 kg
3. Dry waste :- 1.4 tonnes
 - I. Paper :- 640kg
 - II. Plastic :- 640kg
 - III. Glass bottle :- 160kg
 - IV. Other waste :- 160 kg

Methodology

- 1) Collection Method
- 2) Transportation Method
- 3) Disposal Method

Flow chart of the solid waste management:-



1.Collection Method :-

1. House To House: small vehicals are provided with alarm which visit each individual house to collect garbage. The user generally pays a fee for this service.
2. Community Bins: Uses bring their garbage to community bins that are placed at fixed points in a neighborhood or locality.
3. Self Delivered: Generators deliver the waste directly to disposal sites or transfer station.
4. Smart Bins with ultrasonic sensor are used to detect the garbage level in bin.

2.Transportation Method

- 1) Functional element of transportation refers to mean facilities used to effect the transfer of wastes from one location to another usually more distant location.

2) Small collection vehicles are transferred to larger vehicles that are used to the waste over extended distances to disposal sites.
 Source of generation → local transport →transfer station →long distance →treatment or disposal facility

3.Disposal Method

- 1) Open burning.
- 2) Sanitary landfids.
- 3) Biological digestion.
- 4) Composting.

Conclusion-

In the present work an effort has been made to design and develop an appropriate collection, transportation and SWM plant for the Indapur city Municipality Corporation (ICMC).

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