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MUNICIPAL SOLID WASTE MANAGEMENT IN REWA CITY (M.P.)

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ABSTRACT

Solid waste generated from various sources needs to be disposed properly in scientific manners to ensure its minimum impacts on the quality of environment. Solid waste is a consequence of life and it varies from one society to another. In early times, humans consumed resources and had no problems with disposal of their waste. Traditional composting and producing fertilizers were very typical solutions for most of the organic waste during that time; the disposal of solid waste can be traced from that time when humans started to make communities, societies, and urban life. Municipal solid waste is one of the major problems in urban centers. Rewa city is one of the urban centers of Rewa district, Madhya Pradesh state in India, is our study area. The main objective of the study is to study the sources of solid waste generation and disposal. The present study gives details of municipal solid waste generation in the forms of residential, industrial, commercial, construction, demolition, and agriculture. The solid waste collection is in the forms of door-to-door, community bins, and storage points. Different types of vehicles are used to transport municipal solid waste. To study the implementation

of disposal methods of solid waste in Rewa city. The population of Rewa city is 3,44,309 and area covered 164.08 Sq.Km. the average solid waste generation is 206.21 Metric tons.

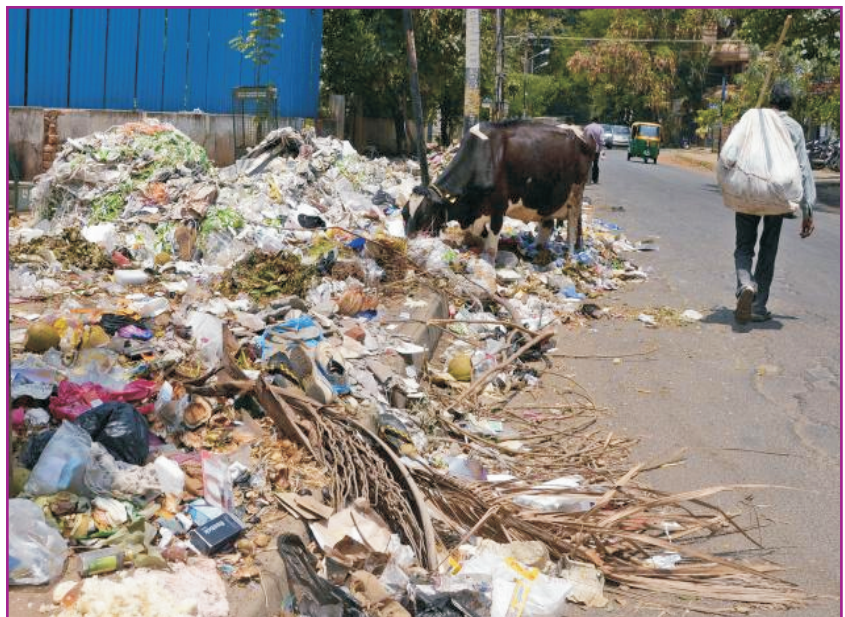
KEYWORDS: Municipal solid Waste, Waste generation, collection methods, transportation.

INTRODUCTION:

Introduction

The solid waste means anything which is useless or discarded after its use. For example, yesterday's newspaper or empty bottle which is thrown after its use. In other words, we can say that "matter in the wrong

place". The term solid waste is used internationally to describe non-liquid waste material arising out from domestic, commercial, industrial, agricultural, and mining activities and from public services. Non-liquid is a relative term because sludge of certain kinds falls within the scope of solid waste management, which arises primarily from industrial and sewage treatment plants. The part of solid waste which is related to the municipality is called Municipal Solid Waste. These kinds of waste encompass packing, food waste, bottles, glass, cans, papers, and agricultural waste. These are the wastes which are unwanted and useless for all inhabitants during their life. Because of changing consumption patterns, increasing the quantity of



solid waste as well as the toxicity of them caused that it has been concerned more and more. The relation between collection, storage and disposal of solid waste to human health is so clear. Men while ecological problems of the function of the solid waste such as air pollution and soil contamination are so important. The leach of the poor landfills which has contamination with the surface and the ground water as an example of this ecological problem.

In many technological societies after the industrial revolution the problem of solid waste was appeared because of changing the consumption pattern of society. The clear example of municipal solid waste is packing which is usually used for many goods in our life. Usage of plastic and cardboard as the basic materials for packing cause increasing the amount of in our life every day.

STUDY AREA

Our study area Rewa is formerly the capital of the princely state of Rewa and former state of Vindhya Pradesh in central India. Rewa city is governed by Municipal Corporation and is situated in Madhya Pradesh State/UT. As per provisional reports of Census India, population of Rewa in 2011 is 235,654; of which male and female are 124,012 and 111,642 respectively. It is an important city in the North Eastern part of Madhya Pradesh state of India bordering Allahabad, Mirzapur and Banda Districts of Uttar Pradesh and Satna and Sidhi Districts of Madhya Pradesh. It is the administrative center of Rewa District and Rewa Division. The City lies about 420 kilometres (261 mi) northeast of state capital Bhopal and 130 kilometres (81 mi) south of the city of Allahabad. Rewa derives its name from another name for Narmada River. Rewa lies between 24°18' and 25°12' north latitudes and 81°2' and 82°18' east longitudes in the north-east of the division of the same name. The district is bounded on the north and east by the state of Uttar Pradesh, in the south Sidhi district and in the west with Amarpatan and Raghurajnagar tahsils of Satna district. In shape the district can be compared to an isosceles triangle, with its base along the Satna border and the two longer arms converging towards Mauganj in east.

OBJECTIVES

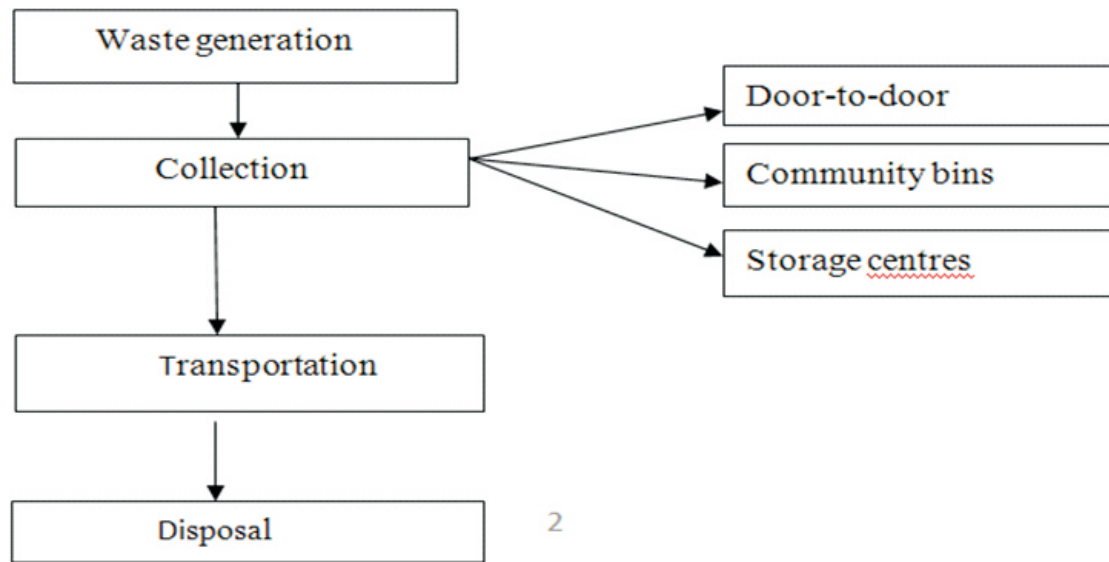
1. To study the Municipal solid waste generation
2. To study the collection methods of solid wastes, Solid waste transportation process and disposal methods.

DATA SOURCE AND METHODOLOGY:

Population data will be collected from census of India, 2011, Data collected in the forms of working employs, waste generation, collection centers, no of vehicles used in transport for disposal of solid waste, disposal methods are using municipality from Municipal Corporation of Rewa City.

METHODOLOGY

The study is conducted for a period of five months by taking reading after every month and data obtained thus processed to draw conclusion. The waste material is segregated into bio degradable and non-bio degradable which can be further divided into various groups, and measured in kg by using weigh-balance machine so that qualitative and quantitative aspect of solid waste can be calculated. The different component of waste generated from different sources such as shops, hotels, restaurants etc. is collected by safai karamchari of municipal committee of Rewa town formerly it was Notified Area Committee manually either in baskets, wheel harrow etc. and dumped at nearby temporary dumping site, which was an open area nearby the city from where it carried away for disposal of weekly on trucks. Before every reading the solid waste from this temporary dumping site is segregated into bio degradable and non-biodegradable groups, which are further divided into different sub groups on the basis of their nature such as plastic, polythene, rubber leather, glasses etc. the quantity of the waste material is measured by using weight measuring machine. The reading taken in morning so that estimation of waste generated during the previous day can be quantified. The composition of solid waste is determined.



Municipal solid waste Generation :

In our study area solid waste is available in the forms of residential, industrial, construction, demolition, municipal services and agriculture.

Sources of municipal solid waste in Rewa City

Source Solid waste contents:

Residential

Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g., bulky items, consumer electronics, batteries, oil, tires), and household hazardous wastes.

Industrial

Housekeeping wastes, packaging, food wastes, construction and demolition materials, hazardous wastes, ashes, special wastes.

Collection is the component of waste management which comprises lifting and removal / passage of a waste material from the source of production to either the point of treatment or final disposal. Collection of generated solid waste is the crucial part in MSW management. Efficiency in collecting solid waste and segregating it decides how well solid waste is managed. Collection includes not only the gathering of solid waste, but also the transport of these materials, after collection, to the location where the collection vehicle is emptied.

This location may be a material processing facility, a transfer station or a landfill disposal site.

Table 1
Waste Collection points in Rewa City-2015

S. No.	Collection points	No of collection points
1.	Door-to-door	72,256
2.	Collection points	134
3.	Community bins	100
4.	Storage points	08

Source: Data collected from Municipal Corporation of Rewa

Door-to-door Collection of waste:

This stage includes door-to-door collection of waste. Most collection is done by garbage collectors who are employees or firms under contract to the government. Garbage collectors employed by local governing bodies manually collect the waste generated at the household level. In our study area door to door collection nearly about 72,256 points are there. The municipality workers are collecting solid waste and transfer with help of trolleys, tricycles and trippers.

Communal bins:

Communal bins are placed near markets, in apartment complexes, and in other appropriate locations. Shopping complex, hotels, public places like gardens, religious places are other definite point sources. In Rewa city 100 communal bins are there. Vehicles collect large amount of waste from these point sources and then transport it to transfer stations and disposal sites.

Storage of Municipal Solid Wastes

Municipal authorities shall establish and maintain storage facilities in such a manner as they do not create unhygienic and unsanitary conditions around it. Following criteria shall be taken into account while establishing and maintaining storage facilities, namely:

1. Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so placed that it is accessible to users.
2. Storage facilities to be set up by municipal authorities or any other agency shall be so designated that wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user-friendly.
3. Storage facilities or 'bins' shall have 'easy to operate' design for handling, transfer and transportation of waste. Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be painted white and those for storage of other wastes shall be painted black.
4. Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers. In our study area having 8 storage points are there.

TRANSPORTATION:

Transfer refers to the movement of waste or materials from collection points to disposal sites. Transportation of waste from collection point to disposal sites is carried out by using different types of vehicles depending on the distances to be covered by them. Larger vehicles carry the waste from the collection points to the disposal sites. Comparatively small vehicles discharge waste at transfer stations where the wastes are loaded into larger vehicles for transportation to the disposal sites. In metro cities transfer stations are located at different places to support intermediate transfer of waste from the surrounding areas up to the dumping grounds. Transfer stations are centralized facilities where waste is unloaded from smaller collection vehicles and re-loaded into larger vehicles (including in some instances barges or railroads) for transport to a disposal or processing site. Rewa municipality authorities are using 18 tractors, 30 trippers, 150 tricycles and 300 hand trolleys for transporting the solid waste from collection points door to door collection community bins and storage points to disposing places. In our study area they have collected municipal solid waste generation average per day 206.21 Metric tons.

Disposal

There are three main disposal methods are land fill, Incineration and Composting

Landfill

Landfill is a carefully designed structure built in to or on top of the ground in which waste is isolated from the surrounding environment. The purpose is to avoid any water related connection between the waste and the surrounding environment, particularly groundwater. Landfills are generally located in urban areas where a large

amount of waste is generated and has to be dumped in a common place. Serious threat to community health represented by open dumping or burning is avoided in this method. 54 per cent of solid waste of study area by disposal land filling method.

Incineration

The process of burning waste in large furnaces is known as incineration. Incineration is a disposal method that involves combustion of waste material. Incineration and other high temperature waste treatment systems are sometimes described as "thermal treatment". Incineration is carried out both on a small scale by individuals and on a large scale by industry. It is used to dispose of solid, liquid and gaseous waste. Incineration facilities generally do not require as much area as landfills. At the end of the process all that is left behind is ash. This method produces heat that can be used as energy. Incinerators convert waste materials into heat, gas, steam, and ash. It is recognized as a practical method of disposing of certain hazardous waste materials (such as biological medical waste). Medical waste and liquid from chemical industries are 14 percentage generated solid waste Rewa city. This solid waste disposal by using Incineration method.

Composting

Composting is the process of decomposition and stabilization of organic matter under controlled condition. Waste materials that are organic in nature, such as plant material, food scraps, and paper products, can be recycled using biological composting and digestion processes to decompose the organic matter. It is a biological process in which micro-organisms, mainly fungi and bacteria, convert degradable organic waste into humus like substance. The resulting organic material is compost for agricultural or landscaping purposes. In addition, waste gas from the process (such as methane) can be captured and used for generating electricity. The intention of biological processing in waste management is to control and accelerate the natural process of decomposition of organic matter. 32% of municipal solid waste of our study area is processed as bio fertilizers.

CONCLUSION

In our study area Municipal solid waste generated per day 206.21 metric tons. The waste collection Process Door to door 72,256, Collection points 134, Community bins 100 and Storage points 08. Rewa municipality authorities are using 18 tractors, 30 trippers, 150 tricycles and 300 hand trolleys for transporting the solid waste from collection points door to door collection community bins and storage points to disposing places. In solid waste disposal by using three methods is 54 % of soiled waste by using land filling, 14% of soiled waste by using Incineration and remaining per cent age of soiled waste by using composting method. We will suggest generating electricity and bio gas by using Municipal solid waste.

Recommendations for the solid waste management:

Solid waste management includes the process of generation, collection, storage, transport and disposal or reuse and recirculation or incineration or any relevant method of disposal. Jain (1884) stressed the need for recycling of municipal solid waste in developing countries and recommended the use of incineration methods for proper disposal of solid waste in urban centres. Keeping in view the problems of open dumping solid waste the recommendations for the solid waste management is suggested as below:

1. Bio degradable waste can be treated by composting techniques by which waste material can be converted into compost which can be used as fertilizers in agricultural fields.
2. For the treatment of non-biodegradable methods such as sanitary landfill can be used.
3. Authorities need to install dustbins provided with lids at major prominent location at the bus stand.
4. Reduce and recycling techniques can be further helpful for reducing the load of waste generation and at the same time conservation of natural resources.
5. Public awareness programmes need to be organized at regular interval to impart knowledge about the ill effects of open dumping methods of solid waste and methods of solid waste management.
6. People need to be aware about the open dumping menace of solid waste so they need to use ecofriendly

bags while go for shopping rather than the use of polythene.

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