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Strategic Planning Of Solid Waste Management Of Vidisha City , (M.P.)

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Abstract— The most important problem we are facing nowadays is solid waste management. More people, rapid city growth without the proper planning & few other options are making the issue worse. The solid waste management system is governed by the urban local bodies (ULBs) or the local municipal authority. The amount of solid waste produced is more than what the local government can handle. Because of this, waste is not properly managed, which causes issues with health, cleanliness, and damage to the environment. The problem is getting worse over time. The infrastr ucture isn't growing fast enough to match the increas ing population because most urban local governments are in financial trouble. They don't have enough money, their systems are weak, they choose the wrong technologies, and the public doesn't care much about managing solid waste. Because of all these issues, the waste management service is not good enough.

Urbanization is now happening all around the world, but its effects are more noticeable in developing countries. In 2001, the urban population was 285 million, which made up 27% of the total population. From a global perspective, when a country's urban population reaches nearly 25% of its total population, like in India, the rate of urbanization starts to speed up.

1. INTRODUCTION

One of the clear signs of urbanization in India is how the population is spread out, with as much as 32.5% of the urban people living in just 23 big cities. The fast and uncontrolled growth of cities over the past two decades, without proper systems to collect, treat, and dispose of waste, has made pollution and health problems worse. The word "waste" means something that is no longer useful or wanted. These wastes are most ly solid and come from different human activities. H owever, pollution from solid waste is often not taken seriously because of the idea that if something is out of sight, it is out of mind.

However, solid wastes leave a cumulative long-term effect on environmental quality. Solid waste from any source and of any quantity is a nuisance.

1.1 Aim & Objective

The objective of study the solid waste management system in Vidisha.

The objective of the project is processed in the following steps:

Study of the existing solid waste management system and suggesting ways to improve the

Characterization of solid waste generated

Spatial and social data collection

Development of a Geographic Information System

1.2 Scope of Work

This is an overview of the work's scope:

- An examination of the SWM now in use, including global standards;
- Provide suggestions for health impact criteria for the variables for which basic water quality standards are established;
- Goals, health consequences, water quality standards, present and future surveillance scenarios, including parameters, methods, and measurement recurrence, as well as other relevant elements, should all be taken into account when determining an accurate ;
- Using data from a few key cities and towns, analyze the SWM.
- Create a web-based system for disseminating SWM to the public using the current and historical air quality database.
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1.3Waste production

Waste produced by human activity is frequently thrown away because it is thought to be useless. The three media—air, water, and land—all contain trash. Since air and water are necessities for human survival, pollution from these sources is immediately apparent in both developed and developing nations. In developing nations like India, there is a dearth of knowledge and technology regarding the "Third pollution" brought on by the improper disposal of solid waste. Solid garbage creation has risen quickly due to unplanned urbanization and population growth.

India, the world most populous country with over 150 crore people, of whom roughly 30% live in cities, faces difficulties with solid waste disposal. Approximately 62 million tons of solid waste are produced annually in India. However, 95% of solid waste is disposed of on land without any treatment, and just 5% is composted. The collection and disposal of each ton of solid trash costs between Rs. 2000 to Rs. 5000. It is still estimated that 30% of solid garbage goes uncollected due to the government's and municipalities' insufficient capacity to offer services.

1.4 Type of Sources of solid waste

- Natural Sources
- Industries Sources
- domestic
- Hospitals
- Intermitted and Poorly defined Sources

1.5 Literature Review

Sources of solid waste within a community

Sources	Typical facilities, activities or location	Type of solid waste
Residential	Single-family and multi-family detached dwellings, low, medium, and high-rise apartments, etc.	Food waste, paper, cardboard, plastic, leather, yard waste, wood, glass, ashes, Street leaves, special waste
Commercial	Store, restaurant, market, office building, and hotels	Paper, health waste, cardboard, plastic, wood, food waste, glass, metal, etc
Institutional	Hospital, government building, office etc	Paper, cardboard, plastic, wood, food waste, glass, metal, etc
Municipal	Street cleaning, basin cleaning, parks, and beaches	wood, steel, and concrete, etc
Treatment plant	Treatment process	Sludge and others
Industrial	Construction, fabrication, light and heavy manufacturing, refineries, etc	Industrial process waste, scrap materials, and non-industrial waste, including food waste and hazardous waste.
Agricultural	Field and row crops	Agricultural solid waste

2. FUNCTIONAL ELEMENTS

The tasks related to handling solid waste from when it is first created until it is finally disposed of have been organized into six main areas. By looking at each of these areas, you can figure out the key parts and connections within each one, which helps in comparing, analyzing,

and evaluating different engineering options.The

separation of functional elements is important because it allows the development of a framework, to evaluate the impact of proposed changes and future technological advancements. Solid waste management mainly involves the management of activities associated with the following:

1) Generation

2) Storage

3) Collection

4) Transfer and Transport

5) Processing

6) Disposal

2.1 Generation

The amount and condition of waste produced depend on many different factors. Things that affect how m uch waste is made include where people live,
the time of year,
how often waste is collected, people's daily habits, their income level, recycling efforts, laws in place, and what people think about waste. All of these things are important when planning how
to manage solid waste. This will have a marked effect on the selection of the method of collection, processing, and disposal. Methods often used to measure the average amount of solid waste generated per person include 1) load-count analysis, 2) weight-volume analysis, and 3) materials-balance analysis. However,
when trying to predict how much waste residential a reas produce,
the results usually don't show the real rate. This is because
there are many other factors that affect the actual am ount, like storing waste on-site or using different disposal methods. As
a result, most of
the waste generation rates found in studies are actual ly the amounts collected, not
the actual amount generated. Data on the per capita MSW quantity in Indian cities are given in Table: 2.11

Table 2.11 Per Capita Generation of MSW

City	Generation rate (kg/capita/day)
Ahmedabad	0.59
Bangalore	0.48
Bhopal	0.51
Chennai	0.66
Delhi	0.48
Hyderabad	0.40
Kanpur	0.64

2.2 Storage

During the period between generation and collection, the solid waste must be stored properly. Storage can have a big impact on public health,
how well the system works, and
what people think about how
it operates. When storing solid waste on-site,
it's important to think about
the kind of containers to use, where to place them, how they affect public health and appearance, and the methods used to collect the waste.

Municipal solid waste is stored in community storage bins, which are placed at certain street corner of the city.

The location of containers at existing commercial and industrial facilities depends on both the location of available space and service-access conditions. In the study area, waste is stored by households themselves in a small plastic or metal container. Every morning tricycle rickshaw collected the waste from each house and empty into the tubs.

2.3 Collection

Collecting solid waste in urban areas is hard and complicated because
the waste is created in many different places. People generate it at home, in apartments, and in offices and factories. It also shows up on streets, in parks, and even in empty spaces in every neighborhood. The rapid growth of suburbs across
the country has made this waste collection even more difficult.

In India, the community bin system is used, and it's the responsibility of the house owner to deposit the waste in the community bin located at street corners. Different types of trucks and handcrafts are used by the municipality from the collection of waste storage bins and specific commercial areas.

In house to house collection system, waste is collected from each house and ultimately by moving tricycle rickshaws. Street cleaning is carried out manually by workers working in groups who are assigned a specific area and create a heap at convenient points. It is then transferred using a rickshaw or handcrafted by other workers.
The short-handled brooms suffer from a number of drawbacks, and long-handled brooms are recommended. Two and three-wheeled handicrafts and tricycle rickshaws are commonly used as collection vehicles.

2.4 Transportation

Waste is transported into two stages. In the first stage waste transported from dustbin to transfer station. In second stage waste is transported from transfer station to disposal site. Transfer of waste from bin to transfer vehicle is carried out manually by labours. Majority of vehicles now equipped with tipping gear and hence these workers need not travel with vehicle. Municipal authority normally owns vehicles used for transportation of refuse. Though different vehicles ranging from bullock carts to compactor vehicles are used in Indian cities. Vehicles used are trucks, trolley and big refuse collector with compactor units and small refuse collector. Recently, a number of vehicles such as container carrier system and Dumper placer have been introduced.

Collection of solid waste from Indians Cities is normally carried out by municipal agencies. The cities are mostly modern outgrowths of old urban centers having narrow winding roads. Orderly and well-planned roads are rarely encountered. After collecting waste from dustbins, vehicles take it directly to disposal site (often without any processing), the vehicles move along different roads and collect refuse from various collection point, till they are full, when they go to disposal site. After unloading, they return to the collection areas and continue the process of collection. As the routes taken by these vehicles are arbitrarily fixed. It is important to create a good method for planning th e best paths for garbage trucks so that the total distance they travel is as short as possible, and also to figure out how many trucks (with a certain carrying capacity) are needed to collect all the waste in a day

2.5 Male and Liebman (1978)

developed an algorithm to solve the vehicle routing problem in a collection area with 80 nodes and 153 links (streets) for an undirected network, one collection depot and a node for entry & exit from collection areas. Chinese postman problem is formulated to reverse each and every link at least once so as to avoid re-traveling along some of the links. This algorithm was modified by **Chiplunkar and Khanna (1981).** The collection network was converted into unicursal network by integer programming and unicursal network was divided into a number of sub networks and all the constraints were formulated. The best distance for the collection vehicles to travel each day and how many vehicles are needed were figured out.

3. CONCLUSION

Municipal solid waste management falls under the purview of the municipal authorities. Because of inadequate funding, maintenance, infrastructure, and untrained personnel, municipal authorities are found to be ineffective in terms of environmental and health quality. No significant action has been taken by the municipal authority to lessen the pollution. An NGO can assist in increasing the solid waste management system's effectiveness. In the areas of raising public awareness and fostering public engagement, as well as in the door-to-door collection of household, business, and hospital garbage, NGO/private participation can be promoted.

These activities are not feasible for urban local bodies. Additionally, the establishment, management, and upkeep of composting plants, other treatment plants, and shared disposal facilities may be promoted to the private sector.

Waste storage is a crucial component of solid waste management and a determining factor in waste collection and transportation decisions. The lack of route optimization by the community bin system leads to high transportation costs. For the appropriate collection and transfer of waste, temporary storage bins work incredibly well. Transportation and collection are both essential and economical components of managing municipal solid waste.

Time and money are saved by designing the best possible path for the collection and transfer of vehicles. By implementing a house-to-house collecting system with specifically made

containerized tricycle rickshaws, these components must be cost-effective and energy-efficient. Volume decrease in subsequent phases is unquestionably a result of properly segregating garbage at the source and collecting it separately.

Disposal of waste by composting or sanitary landfill is best suited for the Indian conditions.

When compared to the local body's system, the solid waste management system implemented by the NGO in a separate ward for the research region is more effective. It is both technically possible and cost-effective. The organization gathered trash from homes, businesses, and public locations.

One of the most efficient aspects of the SWM system is the daily sweeping and collecting of waste from inner and main highways. The lack of an appropriate disposal facility makes it hard to properly collect and separate garbage at the source.

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