

Developing An Efficient Waste Management Strategies For Nasarapur Region.

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Abstract- Due to rapid increase in the production and consumption processes, societies generate as well as reject solid materials regularly from various sectors – agricultural, commercial, domestic, industrial and institutional. The considerable volume of wastes thus generated and rejected is called solid wastes. In this study we evaluate the current status and identify the major problems. Total Solid waste generated in Tons/day of select area would be proportionate to the population of specific region in that specific year. To develop sustainable management of solid waste that would be collected in selected area it includes manufacturing of paver block (plastic bottle pieces, steel pieces, coconut shell, metals) vermicomposting (biodegradable agriculture waste , food waste , domestic kitchen waste) and suggestions of incinerator for medical waste , and remaining waste that cannot be recyclable for example bubble wrap, plastic bags, ceramics , household glass mirror etc. that dispose through landfilling in road construction. The main objective of this study is to maximum use of waste to get sustainable outcomes.

Keywords- Waste Generation, Waste Handling, Waste Storage, Collection ,Resource Recovery & Processing , Disposal.

I. INTRODUCTION

Solid waste is a term that refers to a variety of waste materials that are discarded as unwanted and useless as a result of animal and human activity. Solid waste is generated in a given area by industrial, residential, and commercial activities and may be disposed of in various ways. As such, landfills are typically divided into sanitary, municipal, construction and demolition, and industrial waste sites.

Waste is classified according to its composition, including plastic, paper, glass, metal, and organic waste. Additionally, wastes may be classified according to their hazard potential, such as radioactive, flammable, infectious, toxic, or non-toxic wastes. Additionally, classifications may be made according to the source of the waste, industrial, domestic, commercial, institutional, or construction and demolition.

Solid waste must be managed consistently to ensure environmental best practices regardless of its origin,

composition, or potential for hazard. Due to the critical nature of solid waste management, environmental hygiene must be incorporated into environmental planning.

II. REVIEW OF LITERATURE

Overview

A literature review on solid waste management highlights the discipline focused on controlling the generation, storage, collection, transportation, processing, and disposal of solid waste, aiming to balance public health, economics, engineering, environmental considerations, and aesthetics, with key areas of focus including waste characterization, waste reduction strategies, recycling practices, composting, landfill management, and the impact of socio-economic factors on waste generation and disposal behaviors, particularly in different regions.

Arti Pamnan and Meka Srinivasarao [1] Municipal solid waste (MSW) was one of the major areas of concern all over the world. In developing country like India, there was rapid increase in municipal solid waste due to urbanization and population growth. Composition of waste varies with different factors like living standard, climatic condition, socio-economic factor etc. This paper gives current scenario of India with respect to municipal solid waste quantity, quality and its management. We have presented a brief overview of MSWM in Major cities medium scale towns and small-scale towns. We have also presented some interesting results on MSWM of small-scale towns and their surrounding villages.

Asoke Kumar [2] Vermicompost technology is emerging as a simple, easily adoptable and effective biotechnology for recycling all organic wastes all over India. It can be taken up in small scales at household levels or at large scale for commercial purposes. This technology is widely spread among farmers in states like Karnataka, Tamilnadu, Maharashtra, Gujrat, etc. Psychological constraints by considering the technology as less cost effective, more labour intensive and high input oriented. If constraints are dealt (a) by arranging proper locality based suitable training among the interested farmers and unemployed youths, (b) by providing

necessary financial support to them after training and (c) by creating proper marketing infrastructure to sell quality product under a dedicated Non-Government Organization using one brand name, then the technology will be popularized in Eastern India. The Organic farming as well as soil health will be improved. The technology, at present, remains as talk of the day among literates in city or in conference, but it has to be penetrated among rural masses irrespective of their literacy, financial status and demographic differences.

Deepam Das, Bijoy Kumar Majhi , Soumyajit Pal, Tushar Jash. [3] Estimation of methane emission from the landfills is very much required for fast urbanizing countries. Rapid growth in population and industrialization causes a direct impact on the environment. In this present study four models have been used to quantify the LFG emission estimation characteristics from MSW in six metropolitan cities covering different parts in India for a period of 30 years (1982 - 2012).

Dr .Y. Arundhathi [4] Protecting natural resources and environment is the basic requirement for a country like India. To address these two issues environmentally sustainable management programs are required. It is necessary to have a sustainable approach to waste management and to integrate strategies that will produce the best practicable option. Tirupati has a population more than 3,50,000 and receives more than 80,000 population per day. Rapid urbanisation is taking place at Tirupati. Our study focuses on the Municipal Solid Waste management of Tirupati town by estimating the per capita generation of solid waste at Tirupati and giving suggestions to convert solid waste in to energy.

Ganeshwaran and S. Deepa Shri [5] Municipal solid waste management (MSWM) is one of the major environmental problems of Indian cities. Improper management of municipal solid waste (MSW) causes hazards to inhabitants. . However, the services provided by the municipal authorities are outdated and very inefficient. Domestic, commercial, biomedical and variety of toxic and domestic hazardous wastes are generally disposed of by the citizens on the streets, drains, open spaces, water bodies, etc., causing serious problems of health and environment. Studies have revealed that waste generation rate varies from 0.12 to 0.60 kg per capita per day amounting to 115000MTs of waste per day i.e. 42 million tons annually in India.

Maheswari K [6] Management of municipal solid waste is a major challenge these days for the administrators, engineers and planners. Huge volumes of solid waste are generated and need to be collected, transported and finally disposed off. These operations have to be carried out speedily and efficiently without incurring excessive cost or damage to

environment. The generation of solid waste in our country is being collected in various forms and the volume of waste is minimized and finally it sent to dumping site. Solid wastes constitute a mounting problem and have increased expanded mindfulness over late years.

Mikwari Jean de Dieu and Mohan Priya[7] The measure of strong waste created on the planet was relentlessly expanding and no one cares about this problem. This paper present the study the solid waste generated in the delhi city and what are the major causes to generated by the help of government organizations. To trace the problem related to municipal solid waste management with some suggestion for better management. Delhi was the capital and having so much population in this area.

Monika Bhadauriya , Chirag Shah, Pankaj Sharma, Priyanka Gajabe , Nisha Rajput [8] Solid waste management was a major environmental issue in India. Due to rapid increase urbanization and industrialization and population, the generation rate of solid waste in Indian cities and towns was also increased. Improper management of solid waste causes hazards to inhabitants. . Various studies reveal that about 90% of solid waste is disposed of unscientifically in open dumps and landfills, creating problems to public health and the environment. In the present study, an attempt has been made to provide a comprehensive review of the characteristics, generation, collection and transportation, disposal and treatment technologies of solid waste practiced in India. The study pertaining to solid waste management.

Rajkumar Joshi and Sirajuddin Ahmed[9] The abysmal state of and challenges in municipal solid waste management (MSWM) in urban India was the motivation of the present study. Urbanization contributes enhanced municipal solid waste (MSW) generation and unscientific handling of MSW degrades the urban environment and causes health hazards. In this paper, an attempt is made to evaluate the major parameters of MSWM, in addition to a comprehensive review of MSW generation, its characterization, collection, and treatment options as practiced in India.

R. Rajput, G .Prasad and A .K. Chopra [10] A trend of significant increase in municipal solid waste generation has been recorded worldwide. This has been found due to over population growth rate, industrialization, urbanization and economic growth. Consumerism speed has been found very high covering around more then 50% of total population since last decade due to higher economic growth, which has ultimately resulted in increased solid waste generation. Municipal solid waste generation showed different trend and a

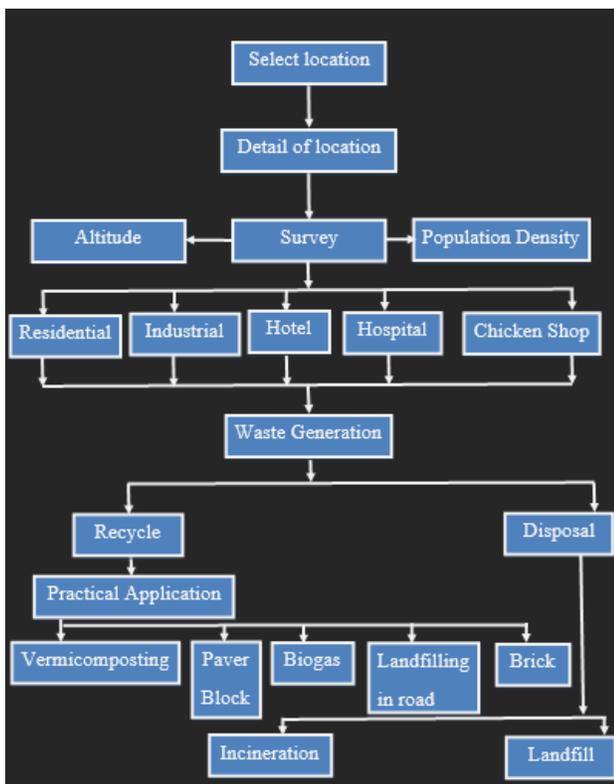
positive correlation with economic development in term of kg/capita/day solid waste generation at world scale.

Shaoli De, Biswajit Debnath [11] Multiple factors like population density with high degree of commercialization and rapid urbanization has resulted in problems of solid waste disposal which produce 120,000 tones of solid waste per day in India (2014) and its detrimental consequences. But separate studies on the health hazards associated with waste disposal in the localities of Kolkata are scanty. The aim of this study is to explore the adverse health effects prevalent in the community associated with the solid waste disposal system in a specific locality (i.e. Garia) of Kolkata.

OBJECTIVES

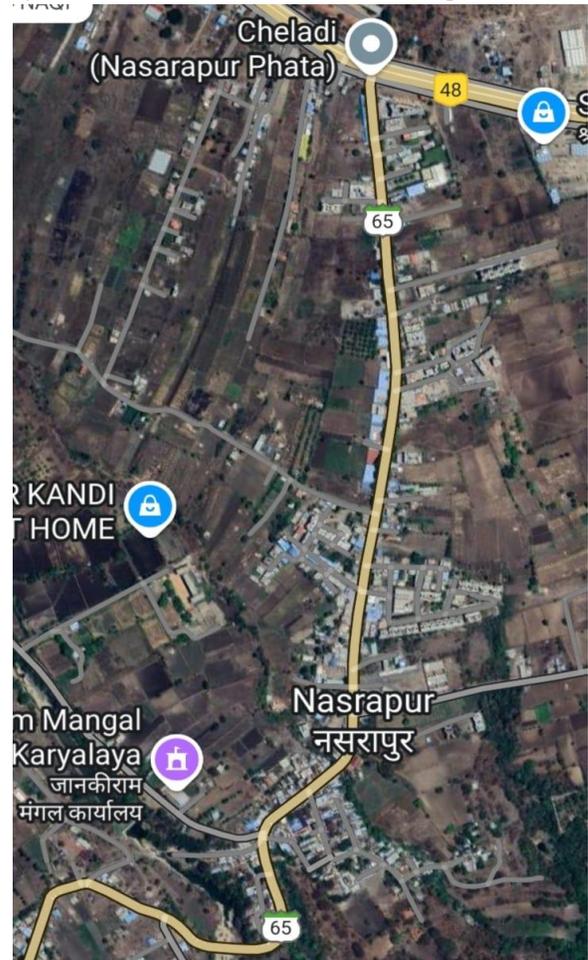
1. To analysed present state of solid waste in Nasarapur .
2. To calculate production rate of solid waste per day per capita .
3. To segregate the waste based on 7R principles.
4. To suggest the method of efficient solid waste management for region .
5. To give simple and practical applications to daily waste management to individual.

III. METHODOLOGY



SELECTION OF STUDY AREA - NASARAPUR

Nasarapur is a village located 13 kilometres from Bhor Taluka in the Pune District of Maharashtra, India. It is located 36 kilometres south of Pune, the district headquarters, and 160 kilometres from the state capital, Mumbai. Major nearby cities are Sasvad, Pune, Wai, and Pimpri-Chinchwad.



DETAILS OF LOCATION

According to Census 2011 information the location code or village code of Nasarapur village is 556695. Nasarapur village is located in Bhor tehsil of Pune district in Maharashtra, India. It is situated 20km away from sub-district headquarter Bhor (tehsildar office) and 34km away from district headquarter Pune. As per 2009 stats, Nasarapur village is also a gram panchayat.

The total geographical area of village is 328 hectares. Nasarapur has a total population of 3,812 peoples, out of which male population is 1,998 while female population is 1,814. Literacy rate of nasarapur village is 76.36% out of which 79.58% males and 72.82% females are literate. There are about 822 houses in nasarapur village. Pincode of nasarapur village locality is 412213. Bhor is nearest town to

nasarapur village for all major economic activities, which is approximately 20km away.

3 CURRENT CONDITION

I) Inadequate Collection Services

There is a lack of organized waste collection, leading to piles of waste accumulating in public areas. Residents often dispose of waste in open areas or water bodies, contributing to pollution and health hazards.



II) Lack of Segregation

Waste is not segregated at the source, resulting in a mixed waste stream that complicates recycling and proper disposal. Organic waste, plastics, and hazardous materials are often combined, leading to environmental concerns.

III) Insufficient Infrastructure

The village lacks proper waste disposal facilities such as landfills or composting sites. Available waste bins are either insufficient in number or poorly maintained, leading to overflow and littering.

IV) Health Risks

The accumulation of waste attracts pests and rodents, posing health risks to residents. Open burning of waste is common, contributing to air pollution and respiratory issues.

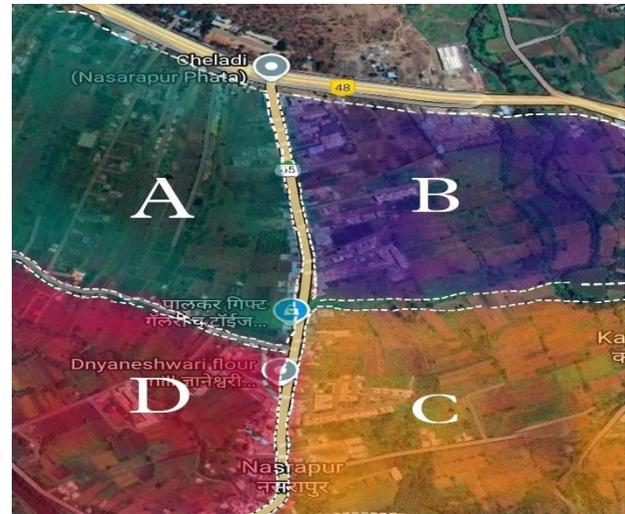
V) Public Awareness and Participation

There is minimal awareness among residents regarding proper waste management practices. Community involvement in waste management initiatives is low, limiting the effectiveness of any existing programs.

VI) Issues Identified

Environmental Degradation: Contaminated soil and water sources due to improper waste disposal. **Health Hazards:**

4 DETAILS OF SURVEY



DETAILS OF REGION WISE RESIDENTIAL SURVEY

Region A :



No. of families	No. of members in family	Waste generation per day of family (in Kg)	Waste generation per/capita/day(in Kg)
1	4	1.5	0.375
2	3	1.1	0.360
3	5	1.6	0.320
4	6	2	0.330
5	3	1.1	0.360
6	4	1.2	0.300
7	2	0.7	0.350
8	4	1.6	0.400
9	5	2	0.400
10	4	1.5	0.375
			Avg= 0.360

Region B :



No. of families	No. of members in family	Waste generation per day of family (in Kg)	Waste generation per/capita/day(in Kg)
1	3	1.1	0.360
2	4	1.5	0.375
3	6	2	0.330
4	5	1.6	0.320
5	4	1.5	0.375
6	2	0.7	0.350
7	5	1.6	0.320
8	3	1.1	0.360
9	5	1.6	0.320
10	4	1.5	0.375
			Avg= 0.350

Region C :



No. of families	No. of members in family	Waste generation per day of family (in Kg)	Waste generation per/capita/day (in Kg)
1	4	1.7	0.425
2	5	1.8	0.360
3	7	2.3	0.330
4	3	1.4	0.460
5	6	1.7	0.280
6	4	1.7	0.425
7	2	1.5	0.750
8	3	1.4	0.460
9	8	2.8	0.350
10	5	1.8	0.360
			Avg.= 0.420

Region D :



No. of families	No. of members in family	Waste generation per day of family (in Kg)	Waste generation per/capita/day (in Kg)
1	5	2.2	0.440
2	4	1.4	0.350
3	6	1.8	0.300
4	3	1.3	0.430
5	8	2.8	0.350
6	5	2.6	0.520
7	4	2	0.500
8	2	1.1	0.550
9	3	1.5	0.500
10	4	2	0.500
			Avg= 0.390

DETAILS OF REGION WISE CHICKEN SHOP SURVEY

Region A :

No. of Shops	Waste Generation per day (in Kg)
1	8
2	14
3	16

Region C :

No. of Shops	Waste Generation per day (in Kg)
1	9
2	13
3	17
4	18

Region D :

No. of Shops	Waste Generation per day (in Kg)
1	8
2	10
3	10
4	11

DETAILS OF REGION WISE HOTELS

Region A :

No. of Hotels	Waste Generation per day (in Kg)
1	8
2	12

Region B :

No. of Hotels	Waste Generation per day (in Kg)
1	8
2	9.5
3	10

Region C :

No. of Hotels	Waste Generation per day (in Kg)
1	5
2	11
3	14

Region D :

No. of Hotels	Waste Generation per day(in Kg)
1	10
2	10.5
3	15



3 DETAILS OF REGION WISE HOSPITAL

Region A :

No. of Hospital	Waste Generation per day (in Kg/Bed/Day)
1	1.5

Sr.No	Material
1	Domestic Kitchen Waste
2	Food Waste
3	Waste from Agro-industries
4	Dry Leaves & Dry Grass Clippings
5	Hotel Refuse

Region B :

No. of Hospital	Waste Generation per day (in Kg/Bed/Day)
1	1.2
2	1.6
3	2



Region C :

No. of Hospital	Waste Generation per day (in Kg/Bed/Day)
1	1.2
2	1.3
3	1.5

Material	Weight of Material (in gm)	Percentage (%)
Metal Pieces	87.5	35
Coconut Shell	87.5	35
Plastic Pieces	75	30
Total	250	100

Region D :

No. of Hospital	Waste Generation per day (in Kg/Bed/Day)
1	1.1

IV. RESULT AND DISCUSSION

To develop sustainable management of solid waste that would be collected in selected area it includes manufacturing of paver block (plastic bottle pieces, steel pieces, coconut shell, metals) vermicomposting (biodegradable agriculture waste , food waste , domestic kitchen waste) and suggestions of incinerator for medical waste , and remaining waste that cannot be recyclable for example bubble wrap, plastic bags, ceramics , household glass mirror etc. that dispose through landfilling in road construction.

V. CONCLUSION

1. From observation and study we concluded that the maximum quantity of plastic material is collected
2. About 20-25% of the waste collected was used for making of paver block after segregation of waste.
3. The vegetables , kitchen waste , hotel waste , agro-industry near about 40% the total waste generated can be use for vermicomposting pits.
4. About 65-75% of total solid waste can be used in road embankment as a landfill.

5. From one vermicomposting pits of size 12 x 4 x 2ft we can get 300-500kg of the fertilizer.

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