

Study on Current Scenario of Solid Waste Management and Dispose in Jaipur City

Naveen Lasiyal, Rupesh Sharma, Sandeep Kumar, Sameer Kumar Chaudhary, Sanjay Kumar Darji,
Department of Civil Engineering,
Poornima Group of Institutions, Jaipur
(Rajasthan), India

Abstract– Jaipur like other cities is facing with inadequate solid waste management system. Solid waste is seen in huge heaps on any open land, around buildings and in the open market places. The purpose of this research is to assess the existing state of MSW in Jaipur city with the aim of identifying the main difficulties to its efficiency and the prospects for improving the solid waste management system and dispose in the city and to examine the impact of rapid population growth due to uncontrolled and unplanned urbanization as it affects environmental degradation through solid waste generation in Jaipur Rajasthan, which has brought about the problem of solid waste management to city authorities. The results indicates that the dumping sites (designated and non-designated) on the major streets and many open spaces are not attended for long periods such that the rubbish heaps; encroach on the roads thereby limiting the road users access, generate serious air and water pollution issues, constitute significant nuisance which when blown over by winds, and disturbs the aesthetic view of the metropolis. The results also show that the composition of the wastes in the city is not homogeneous because it contains both biodegradable and non-biodegradable materials such as e-wastes, plastic, polythene, pathological wastes, and hair designer's wastes amongst others.

Keywords– Urbanization, nuisance, e-waste, polythene, pathological wastes, water pollution.

I. INTRODUCTION

Solid waste appears to be the most effective among the amplitude of problems existing in the fast urbanizing Jaipur city. Solid waste is seen in huge heaps on any piece of open land, around buildings and in the open market places. Living with solid waste spread around appears to be an acceptable way of life among the people in the metropolis in recent years. Solid wastes are generated from domestic agriculture, commercial and industrial activities in Jaipur. Wastes generated from agricultural and commercial activities are seen thrown and disposed off indiscriminately [1]. Investigation revealed that the residents having low monthly income, their low income is not able to meet their daily needs and they therefore avoid the facilities of the waste management agencies, hence they dispose off their solid waste indiscriminately in the city. Some people do not have proper dustbins facility near to their houses, and some have open spaces and disposal facilities far from their houses and they do not want make their surrounding so dirty and unusual. Governments applying different approaches in order to eradicate disposal problems. In last few decades solid waste appears to be the most prominent among the

multitude of problems existing in the fast urbanizing Jaipur metropolis. Solid waste is seen in huge heaps on any piece of unused land, around buildings and in the open market places. Living with solid waste littered around appears to be an acceptable way of life among the people in the metropolis in recent years. The study further revealed that the agencies responsible for waste management are unable to develop proper facility of managing the solid waste generated in the city. In fact they are faced with many of problems because of inadequate waste data and equipments, poor public attitude etc. When solid waste accumulates, residents piles up the waste in the mid of roads and set them on open fire without pollution control. A large proportion of the waste are dumped openly, around homes, market places, by the road side and on any piece of open land. These waste dumped indiscriminately find their way into drainage system and water streams. And this has resulted to serious community environmental pollution in the city. Hence, we stated that there are some salient problems in this solid waste management sector in the city that when addressed have the capacity to improvise its environmental conditions and improve the well-being of the inhabitant of Jaipur at large[3]. The work reported in this paper was therefore aimed at pointing out the problems that are constraints in the waste management sector in Jaipur using Jaipur city as a case study. Solid wastes are generated from domestic, commercial and industrial activities in Jaipur. The preliminary work of this study revealed that domestic and commercial solid waste Stream constitutes the most problematic in Jaipur metropolis. Wastes generated from domestic and commercial activities are seen thrown and disposed off randomly.

Municipal solid waste generation rates in different zones in Jaipur City:-

TABLE I. MUNICIPAL SOLID WASTE

S. No	Name of the zones	Municipal population	Municipal Solid Waste (MT)	Waste generation @350gm/ Capita
1.	Vidhyadhar nagar	728309	254908.15	57.855
2.	Civil Line	535568	187448.8	125.1985
3.	Hawa Mahal (East)	357710	125198.5	62.2713
4.	Hawa Mahal (West)	177918	62271.3	101.93785

5.	Motidungri	291251	101937.85	187.4488
6.	Mansarovar	365543	127940.05	254.90815
7.	Amer	165300	57855.0	148.5974
8.	Sanganer	424564	148597.4	127.94005

The values of solid waste and the municipal population according to the different localities.

I. METHODOLOGY

This study was divided down into two phases – A study of current waste management activities in Jaipur city.

The approach for the case study was qualitative. Information was gathered using a variety of methods to gain a better understanding of the situation, issues, and priorities. Data collection methods included document review, semi-structured interviews, and checklist and field observations. Audits carried out to achieve the study objectives are:-

Compliance audit to know whether the current waste management process is being carried out as per the legislation. Operational risk audit with pollution prevention audit; to check the frequency with which an environmental damage that occurs and its effects. The measures that have been taken against these possible environmental damages were verified, Resource management audit; to mark the optimal utilization of water, energy and other material resources, and Occupational risk audit; to identify the measures of occupational safety.

A Case Study - Environmental Audit of MSWM in JAIPUR City:-

It is positioned at an altitude of 1418 feet above the sea level. On three sides, the city is enclosed by the Aravalli hills and this is why, it is safeguarded from the rough desert. In the north, it is surrounded by Sikar and Mahendragarh district; in south by Tonk; in the east by Alwar, Dausa and Sawai Madhopur; and in the west by Nagaur and Ajmer district. Since 1980s, Jaipur has enjoyed the reputation of being one of the fastest growing cities in Asia. The total length of Jaipur extending from east to west is about 180 km whereas the width from north to south is about 110 km. However, with burgeoning population and increasing demands of the Information Technology (IT) sector for improved infrastructure, the local government are not being able to provide the necessary services like waste management, water supply to users, road maintenance, etc. to a satisfactory level. The government however have taken responsibilities and measures to achieve abidance with regulations and reduce complaints from citizens especially in the MSWM sector. The study would help to identify techniques which are suitable for the present scenario[4].

The Jaipur Nagar Nigam which has 91 wards within its municipal jurisdiction, has a population of 3,073,350. The amount of waste generated in Jaipur city varies from 1200 MT/day to 1400 MT/day and the composition of waste is given in Table 2. JNN is responsible for the waste management policy, setting up the targets.

A checklist was prepared prior to the visit, to check the presence or absence of methods and techniques used, safety measures adopted, compliance with regulatory measures and pollution prevention system which are adopted. Site survey was also done in two representative sample wards (Sevapura , Mathura daspura). The presence and absence of each was noticed in the checklist for techniques adopted, safety measures, compliance with regulatory measures and pollution prevention.

TABLE II. PHYSICAL CHARACTERISTICS OF JAIPUR MUNICIPAL SOLID WASTE

Organic waste (%)	55
Dust (%)	10
Paper (%)	10
Plastic (%)	15
Glass (%)	5
Metal (%)	1
Bio Medical Waste (%)	1
Card Board (%)	1
Rubber (%)	1
Miscellaneous (%)	1

Source: JNN

The above table displays the physical characteristics and the solid waste management criterion.

A. Collection

The most common method of waste collection from households in Jaipur city is door-to-door collection followed by community bin collection. Families pay about Rs. 40 per month to the waste collectors for their service Door to door collection of wastes is done by using Handcarts, which consists of 6 buckets which are used to store dry wastes and wet wastes separately and in some areas disposal bins having a storage capacity of ½ ton of waste are placed every 250 meters along streets .There are 4500 workers in charge of door to door collection, sweeping, emptying dustbins and clearing black spots. They come at a designated spot and pore into waste of truck. Trucks have a capacity of 4-5 tonnes capacity and are either open or covered with a wired mesh. The ratio of truck to ward is 4:20. Other collection systems consist tricycles, bullock carts etc. Collection of waste is sometimes difficult due to narrow roads and due to this reason waste is not picked on time causing unsuitable conditions. There are no transfer stations in Jaipur.

However, during site survey, it was marked that many of the wards still have community bins that are in a very disgusting state. A large quantity of organic waste is generated from commercial vegetable markets.

The waste collected in pushcarts from lanes is transferred to a truck at a interaction point which is called synchronization point. The truck arrives at the designated location at a specified time. The waste is transported to disposal site by means of a large capacity truck and lorries and in few wards by a small capacity truck or dumper placers. The truck is covered with a wired mesh and a polythene sheet to prevent scattering.

B. Processing of Wastes

In addition, the quality of the compost was poor due to existence of glass splinters and other non-biodegradable material due to the usage of crushing and grinding machines. In the 70's, Jaipur nagar nigam processed 200 metric tons of mixed waste per day. Currently, JNN handles 450 metric tonnes of raw garbage/day in the yard.

C. Disposal

In Jaipur, the waste collected from roads and bins is directly transported to the final disposal site; Mathuradaspura dump yard area 50-hectare situated 60 km away from Jaipur city. Where 700 hundred MT waste were dumped per day and other one is Sewapura area 45-hectare situated approx. 20 km away from Sikar road. Which contains 400 MT wastes from which 250 MT organic waste were used by Infrastructure leasing & financial services (IL&FS) for the manufacturing of vermin compost and remaining 150 MT is crude dump. one of the other company Ultra Tech Cement which are situated in Langariya was takes 100 MT inorganic waste for RDF (Refuse Devices Fuel) plant. There is the likelihood of soil and groundwater contamination due to this practice. Birds (scavengers), insects and animals are attracted to the open dump for feeding and breeding. Since many of these may act as cause of diseases, their presence may cause a potential health problem. Sometimes plastic are burnt, which may be hazardous to human health .dumping of wastes is practiced in Jaipur.

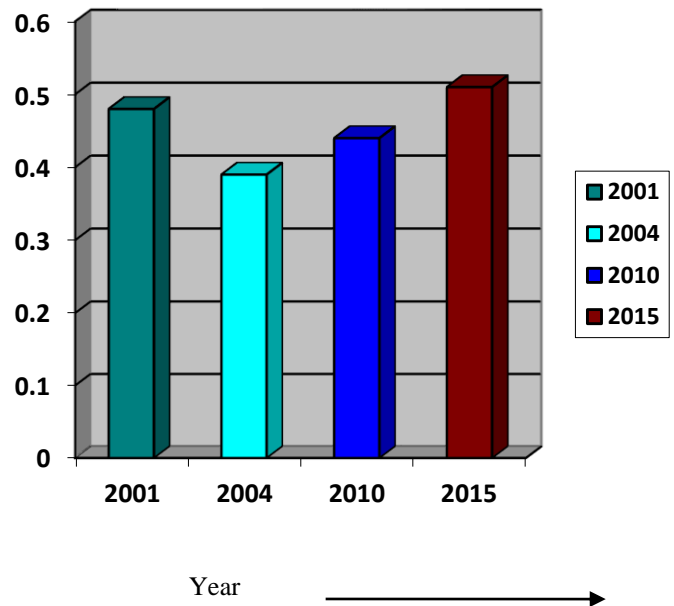
The waste is brought in by the municipal lorries. This waste is dumped in the yard in a form of a heap. There are Loaders in the dump yard for waste levelling. The waste is sprayed with EM (Effective Microorganisms) solution, covered with a 10-15 cm layer of debris and sprayed with water after levelling the waste. The solution used for spraying is prepared by mixing 4 -4.5 litres of EM solution with 8-10 kg of molasses or Jaggery and mixed with 150 litres of water. After mixing it is allowed to stay stable for 7-8 days after which pH reduces to 3.5. The EM stock solution consists of, photosynthetic bacteria, yeast, Lactic acid bacteria, which speeds up the degradation process and reduces the volume, flies and odour. The observations made on the site are:

A large number of rag pickers collect recyclable wastes from the dumping sites and pay a small amount to have access to the waste.

There is a recycling dealer in the dump yard itself who buys the recyclable material from the rag pickers and there is one dealer on the way to the dump yard that buys the recyclable waste from the lorry driver. Levelling of MSW after dumping is not carried out properly due to less number of front end loaders. The foul odour was too strong and could be inhaled from long distances due to large number of flies, birds and stray dogs. There is emission of methane gas from the dumping site because of which the waste can be easily set on fire. There is always a queue of at least 5-12 vehicles waiting to unload at site ; this is due to the lack of number of front-end loaders to level the SW. This dump yard has no fencing, weighing bridge and no proper approach roads.

TABLE III. WASTE GENERATION RATE (KG/C/DAY)

S. No	Year	Waste generation rate (kg/c/day)	Source
1	2001	.48	JNN
2	2004	.39	JNN
3	2010	.44	JNN
4	2015	.51	JNN



II. RESULTS AND DISCUSSION

The shortcomings while adopting the new methods have been identified in all selected wards. Door to door collection is adopted in this ward, which has resulted in effective collection of waste, and reduction of waste, foul odour and in aesthetic appearance of dustbins. While, in commercial areas due to the absence of community bins, wastes generated in odd hours, is dumped by traders in the street. Few waste heaps were seen on the roadsides in the city. All the trucks that are used for transportation of waste have meshes that prevent littering of waste, but 30 % of the trucks have partial polythene cover and 25 % have no polythene cover that results in scattering of waste and foul odour during transport. The recycling process is carried out by the informal area that has resulted in high efficiency of recovery of recyclable waste. There are no other methods carried out preminent to the entire waste being disposed. There is a large quantity of waste that is produced in this ward, including organic waste generated in a market. The waste is disposed in the Mathuradaspura dump yard, causing foul odour, scattering, leachate formation, and air get pollution from burning and methane emission from decomposing organic waste.

III. CONCLUSION

The audit shows the key issues that need immediate attention that pose major hindrance in the further process of the system. In collection 20% of the commercial areas have

community bins and 40% of the residential areas have adopted the door-to-door method, with these methods of collection only 5% of waste segregation has been achieved. There are no transfer stations present and out of the trucks present only 40% have polythene covering. Recycling is carried out mainly by the informal sector achieving a high level of efficiency. 20% of the total waste generated is recycled by this sector in the city. 3 % of waste reduction is achieved through composting and 80% of the waste is disposed in dump yards. The waste disposal needs immediate attention and monitoring. The setting up of sanitary landfill sites needs to be given top priority. The number of waste processing plants has to be increased to manage total quantity of waste generated. Many new techniques have been introduced for storage, collection and transportation. These techniques have brought about many positive or improved changes and have enhanced the efficiency of the MSWM system. However, segregation of waste at each step is not being carried out. The segregation of waste while storage, collection and transportation has to be set in place for the proper running of the waste processing like composting, landfilling. Proper training and education needs to be provided to the workers and public awareness programs should be conducted publically and regularly. The occupational health and safety measures taken by the authorities are not enough. Health and safety programs has to be conducted regularly to check the health condition of the workers in the various areas of MSWM and they should be educated on the health hazards related to their work and the importance of wearing the safety gears.

MSWM in Jaipur has definitely improved in areas of collection and transportation however, waste processing and disposal is still a problem faced eventually. The informal network is very active in the areas of recycling as it constitutes their only livelihood. However, there are various issues or constraints that have to be managed to achieve significant changes in waste management.

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