Existing practices of solid waste management in Jhansi City (U.P.), India

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ABSTRACT

Several cities in Uttar Pradesh face different problems associated with increased population, industrialization, commercialization and changes in living style. Jhansi a prominent city of Bundelkhand region of UP state has grown over the years with population of 12,7365 in 1951 to 1,744,931 in the year 2001 with a growth rate of 27.72% (Census department, Jhansi). The city is situated between north longitudes $24^0$11′ and $25^0$57′ and east latitudes $78^0$10′ and $79^0$25′ with an average elevation of 935 feet. Due to the rapid population growth and urbanization in Jhansi (U.P.), the management of solid waste appears to be a problematic issue. A large quantity of municipal solid waste is allowed to decay on the roads, streets, drains etc. without proper disposal. The local municipal authority is unable to provide satisfactory solid waste management services to the people. With this background, the present study was undertaken to make an attempt to understand the existing practices of solid waste management in Jhansi City (U.P.), India. The study was carried out in two areas of Jhansi viz., Sahar, a residential area and Sadar bazaar which is a commercial hub. At the time of this study, out of total 118.84 tons/day solid waste generation, only 27.65 tons/day (23.26%) was carried to the dumping sites. About 91.19 tons/day (76.73%) solid waste was left un-attended. The present scenario once highlighted can be upgraded with changing pattern of the generation of the waste. Different land use types generate solid wastes which include Domestic waste 23.3 ± 3.2; Vegetable market waste 3.2 ± 0.6; Fruit market waste 2.5 ± 0.5; Hospital waste 0.2 ± 0.06; Hotel & Restaurant waste 0.7 ± 0.1; Market waste 1.5 ± 0.2; Meat market & Slaughter house waste 0.2 ± 0.05 and Building material waste 2.1 ± 0.5. The unit of the measurement is in quintals/day. The present studies carried are based on secondary data, interviews, field survey.

Keywords: Studies, municipal solid waste, jhansi, quantity, pattern.

INTRODUCTION

The generation of waste reflects a loss of materials and energy. It imposes economic and environmental threats to society because of lack of proper collection, treatment and disposal. Innumerable articles and commodities are used in daily life for convenience which become un-usable and thereforeresults in accumulation of solid waste (Austrian Federal Waste Management Plans, 1992). The solid waste generally includes glass, crockery, polythene and other packaging materials that are used and then thrown away as garbage. Besides, there are also items like automobile spares, metallic parts etc. that are thrown as junk. The wastes from building materials (during construction and demolition), dead animal skeletons, heaps of crop residues also contribute to solid waste. According to Simelane and Mohee (2012), proper handling and disposal of waste is an indicator of how successfully and effectively the local government system is working. Ecological phenomena such as water and air pollution have also been attributed to improper management of solid waste by Tchobanoglous, *et al.* (1993).

In Jhansi (Uttar Pradesh, India), very little has been done so far on the various aspects of municipal waste management. The people of the area are also unaware about the various techniques of proper waste management. As per the census 2001, Jhansi had a population of 1,744,931 of which males were 932,818 and remaining 812,113 were females. The available monetary resource allocation and techniques available to the Municipal Corporation for handling the wastes could not keep pace with rising amount of waste in the town. A total area of 162 km^2 of land comes under the jurisdiction of Municipal Corporation which has total administration over 91,150 houses with 60 municipal wards to which it supplies basic amenities. Due to rapid expansion of population added with the floating population from nearby villages, the quantum of solid waste generation increased considerably. The city has about 56 slum settlements with a population of 78,000 in the year 2001 and has increased during the years by 26.5%. Different land use types such as market places and settlement areas generate solid wastes which include Domestic waste, Vegetable market waste, Fruit market waste, Hospital waste, Hotel & Restaurant waste, Market waste, Meat market & Slaughter house waste and Building material waste etc. Hence, need was felt to study the practices of solid waste management in Jhansi City (U.P.), India.

MATERIALS AND METHODS

The Area of present study lies within the Municipal limits of Jhansi (U.P.) located between north longitudes $24^0 11'$ and $25^0 57'$ and east latitudes $78^0 10'$ and $79^0 25'$. The study has been conducted for a period of three (03) months.

1. Sahar, a residential area with about 2.5 lakh population was selected for the

present study has several garbage sites in different localities where people throw their garbage outside their houses which is not removed regularly. Their wastes mainly consist of food materials, vegetable trash, poly bags, paper and cloths etc.

2. Sadar bazaar market on the other hand generates mixed waste consisting of largely polythene, paper, plastics and other packaging materials (refer Percentage composition of solid waste). Here the municipal workers clean the roads early in the morning and clean the debris littered all around. There is separate vegetable market which produces biodegradable trash which is also cleaned every day before 9 am. The waste generated by meat and slaughter house is dumped into Nallah. Some meat material is also devoured by the dogs.

Questionnaires were developed for specific respondents and purposes to collect related information. Interview based method of information regarding the municipal solid waste was also carried out. The average waste generated was measured by weight method once in a month for a period of three months. During each sampling, the solid waste generated during 24 hours was collected in a polythene bag of capacity 10 kg and weighed with the help of digital balance. The data recorded represents the total bio-degradable and non-degradable municipal solid waste including bio-medical waste found in the dust bins, dumping sites and on the road sides.

RESULTS & DISCUSSION

The ever increasing population in Jhansi (Uttar Pradesh) and the development of infrastructure, industries and institutions has increased the quantum of generation of solid waste. Vijay & Pandit (2013) also opined that increase in population leads to generation of more solid waste.

Overall it is recorded that the places under study are producing 831.9 tons/week (118.84 tons/day) of solid waste (Municipal authority Jhansi, 2008). Out of 118.84 tons/day solid waste generation, only 27.65 tons/day (23.26%) was carried to the dumping sites. About 91.19 tons/day solid waste (76.73%) is un-attended.

The average solid waste generation of 23.3 ± 3.2 quintals/day as the domestic waste in Sahar was calculated by taking 15 samples of solid waste from the residential areas for a period of three months. Similarly the average solid waste generation from vegetable market is 3.2 ± 0.6; Fruit market waste 2.5 ± 0.5; Hospital waste 0.2 ± 0.06; Hotel & Restaurant waste 0.7 ± 0.1; Market waste (mixture)is 1.5 ± 0.2; Meat market & Slaughter house waste 0.2 ± 0.05 and Building material waste is 2.1 ± 0.5 respectively.

Sahar being densely populated residential area generates more waste (23.3 ± 3.2) as compared to place like Sadar bazar which is a commercial market. This bazar remains full of activity and generates waste from fruit shops, restaurants, hotels and building material etc. In addition 1.5 ± 0.2 (mixture) designated as market waste is also generated which is unidentifiable based on its composition.

The Sadar bazar is provided with good number of dustbins and is regularly monitored by Municipal authority as compared to Sahar. It is recorded that 110 dust bins are placed in the Sadar bazaar area. The people of Sadar bazar use their own dustbins and also engage safaikaramcharis to dispose off their wastes while as peopleof Sahar don't practice the same in their area. The waste which is dumped does not decompose very quickly. The nature of the waste being dumped and the time it takes to decompose poses a serious threat to the human health. The Sahar is a newly developed locality devoid of municipal sweepers. The people find it convenient to dump their garbage at any open space. The material which is collected there is carried once in one or two months and sometimes more when the municipal authority is approached to get it cleaned from the localities. It has been observed that there has been lack of civic sense among the people of Sahar and also lack of facilities on the part of municipality in solid waste disposal. Therefore, the Sadar bazar is comparatively cleaner than Sahar. The committee constituted by the Hon'ble Supreme Court of India in 1999, reported that the inefficient institutional arrangement and inappropriate technology for solid waste has led to ugliness of the environment.

Regarding the daily waste collection to be implemented, 68% of surveyed respondents in Sahar area favoured door to door collection system. About 30% of the people favoured landfill method of disposal and only 2% favoured other scientific disposal of their waste.

The present study reveals that different kinds of devices are available to the municipal corporation of Jhansi,among these two are manually operated devices namely wheeled burrowers and trailer (Table I). It is also recorded that 110 dust bins are placed in the municipality area of Sadar bazaar area while as these facilities are lacking in Sahar. About 1002 individuals are working at various capacities in managing the MSW in the Jhansi town except Sahar which is lacking in local sweeping. It is seen that manual workers play an important role in waste management till it is send to the dumping sites which is observed at Sadar bazar.

The analysis of the survey regarding the awareness about waste disposal in two areas viz. Sahar and Sadar bazar, that the respondents in the latter make use of dust bins for solid waste disposal as compared to the prior where people dispose off their waste in open spaces including vacant plots, unused land, roadside, grounds etc.

A large proportion of people living in Sahar area are not fully aware about the proper disposal of their wastes.

As per the records available, 25,090 kgs of municipal solid waste is transported to the dumping sites by various types of vehicles (Table I). Out of 27.65tons/day (23.26%), only 25.90 tons/day reaches to the dumping sites, thereby meaning that 2.56 tons/day (2560kg's) is added to the actual solid waste which remains scattered in the study areas on the road sides, open spaces and drains. It was also seen that solid waste is carried by open vehicles that scatter waste on their way to dumping sites and rarely any enclosed system is observed.

Besides this, hospital waste is dumped along-with the municipal waste. Bio-medical waste generated (0.2±0.06) by few hospitals/nursing homes is not treated separately anywhere after a thorough survey of the areas. The biomedical waste generated by each hospital/nursing home under study is given in (Table III). It has been observed that untreated bio-medical waste is being directly discarded with municipal waste as was also reported by Kumar *et al*. (2015).

There are four authorized dumping sites presently used by the municipal corporation for dumping collected wastes. All types of wastes, both decomposable and non-decomposable is dumped at these dumping sites itself very close to the populace. The Aligoll is the largest waste dumping site with an area of 7 acre. This dumping site is located within the city very close to human habitation. Kallan Shah which is one of the four authorized dumping site in use has an area of 5 acre. The rest two dumping sites i.e. outside bara Gaon gate and Rash Bahar are within a distance of 2.3 and 1.5 kms from the urban area (main city) respectively. All the dumping sites are not properly equipped besides frequent trespassing by stray dogs, domestic animals, human beings for collecting poly wastes which adds another problem. There is no comprehensive scientific disposal of the waste. There is a potential risk of spreading diseases from these dumping sites. Besides the above four authorized dumping sites, there are many unauthorized dumping sites in different parts of the town without any scientific disposal of the solid waste. Roadside heaps of garbage and the stinking smell are common sights in most parts of Jhansi. Thus the study conducted in Jhansi presents a grim situation of collection of waste by the municipal authority. The staff meant for sweeping in Sahar is also lacking. There is lack of civic sense among the people of Sahar which needs to be looked into.

CONCLUSIONS

It has been observed that there has been lack of civic sense among the people of Sahar and also lack of determination on the part of Municipality and Government in respect of Solid Waste Management. Therefore, there is an urgent need

to organize mass awareness campaign in Sahar. Municipality authorities should pay due attention towards Solid Waste Management in the studied areas and other areas, otherwise problem is likely to become acute with the present rate of increase in Solid Waste generation with increasing population growth.The number of storage bins should be increased to avoid over-spilling and dumpingin open areas. Wastes should be collected frequently in order to avoid accumulation, which leads to degradation of environmental and aesthetic quality. The Solid Waste from hospitals should be disposed off separately, preferably byincineration and specialized land-filling. Municipality should provide covered vehicles for transport of waste. Municipality should start sanitary land-filling system and install compost treatmentplant for the Management of Solid Waste. Services of ragpickers should be utilized by Municipality for collection of wastefrom door to door and segregation of waste into recyclable and non-recyclable. Segregation of waste at Household's level should be encouraged. Solid Waste from Vegetable Market should be segregated and processed separately. Street food vendors should be directed to have their own storage bins to store thewaste generated during their activities. Government should enact the **"Polluter Pays Principle".**

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Table I: Devices used in carrying municipal solid waste in Jhansi (2008)

S. No.	Devices Uses	Total No.	Total No. of round per day	Total waste carrying capacity of each vehicle kgs	Average waste transported by vehicles (Total No. x Total Weight Carrying Capacity)kgs
Manually Operated					
1.	Wheel burrower	30	1	20	600
2.	Trailer	50	1	45	2250
Mechanically Operated					
1.	Three wheeler	03	1 or 2	80	240
2.	Tractor	16	1 or 2	500	8000
3.	JCB	01	1	Carrier	Carrier
4.	Dumper Placer	05	1	1200	6000
5.	Dumper tipper	02	1	4000	8000
Total Average w aste transported by vehicles					**25,090 kgs**

Table II: Authorized Dumping sites working in Jhansi (2008)

S.No.	Dumping sites	No. of sites	Area (acre)	Number of individuals engaged for carrying solid wastes	Average distance from the city (km)
1.	Outside Bara Gaon Gate	1	2	14	2.3
2.	Rash Bahar (Sipari bazaar)	1	3	12	1.5
3.	Aligoll (Kihdlkey)	1	7	20	3.5
4.	Kallan Shah	1	5	20	2.0

Table III: Biomedical solid waste generated in few hospitals of Jhansi

Name of hospital/nursing home	*No. of beds*	*Waste generated per day kg*	*Waste generated per bed/.day/kg*
XX1 Hospital	25	5	0.5
XX2 Hospital	25	10	0.4
XX3 Hospital	20	10	0.5
YY1 NURSING HOME	15	5	0.3
YY2 NURSING HOME	12	5	0.4
Name of hospital/nursing home has been kept secret			

S.No.	Waste material	Percentage composition of solid waste	
		Sahar	Sadar bazaar
1.	Paper	3.0	3.0
2.	Glass	0.7	0.7
3.	Biodegradable material	55	54
4.	Non-biodegradable material	4	10.0
5.	Construction material	22	20
6.	Mixed material etc.	15.3	12.3

REFERENCES

Austrian Federal Waste Management Plans (1992). BundesministeriumfürUmwelt, Jugend und Familie, Bundesab fall wirtschaftsplan. Vienna.

Kumar V, Birtharey S, Gupta N, Yadav KK, Vishwakarma S.K.(2015) Study of Biomedical Waste Generation and Management by Government and Private Hospitals in Jhansi City(U.P.), India. *J. Pharm Biomed Sci;* **05**(02): 122-125

Methodology for the Analysis of solid waste (2004): European Commission Project. Solid waste Analysis-Tool. (pp. 1-57)

Recommendations For The Modernization Of Solid Waste Management In Class I Cities

In India (1999): By Report Of The Committee Constituted By The Hon'ble Supreme Court of India.

Simelane, T. and Mohee, R. (2012): Future directions of municipal solid waste management in Africa. Policy Brief. Africa Institute of South Africa. Briefing No.81.

Tachobanoglous, G., Theisen, H., and Vigil, S. (1993): Integrated solid waste management's, MC Graw Hill, New York.

Vijay Kumar & R. K. Pandit (2013): Problems of Solid Waste Management in Indian Cities. International Journal of Scientific and Research Publications, Volume **3**, Issue 3.