Research Paper

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Solid Waste Management Trendsand its Divisional Frames of GHMC Wards of Hyderabad City.

Management

KEYWORDS : Geographical Information System; Municipal wards; Greater Hyderabad Municipal Corporation.

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ABSTRACT

The aim of this study is to find out the sustainability scenario of solid waste management with respect to the rising population in the city of Hyderabad. The use of Geographical Information System (GIS) in classifying the city into sustainability classes based on the grouping of different circles and municipal wards based on the per capita waste generated by each. It is generally found out that a bigger percentage of the municipal wards are low in sustainable waste management. A considerably significant number of the wards were rated 'very good' in sustainable waste management. By this a proper and sustainable waste management can be achieved through proper collection, transportation and disposal of wastes.

1. INTRODUCTION

With the increase in population, urbanization and economic development, there has been a significant increase in municipal solid waste generation in Hyderabad making its management and disposal a problem. Urbanization is a worldwide phenomenon. The process of Urbanization is very rapid. The solid waste generated by the daily activities of the people needs is to be properly managed in such a way that it minimizes the risk to the environment and also human health (Amar M.R 2012). The main problem of urban waste management is worth noting not only due to the large quantities of waste produced and the spatial spread, but also the problems encountered in the setting up of the systems for collection, transportation and disposal of the wastes (Anand.G 2014)

2. OBJECTIVES

- To map the population density and solid waste characteristics of the municipal wards of Hyderabad
- To determine the main sources of waste generators and waste characteristics in Hyderabad
- To determine the sustainability ratings of municipal wards of Hyderabad and the expected future waste generation trends

3. STUDY AREA

The area under study is the city of Hyderabad Urban Agglomeration situated in the state of Telangana. Hyderabad is the capital city of Telangana and is the sixth largest city in India, closely behind Bangalore [6]. The city has been divided into five (5) zones namely North, South, East, West and Central zones with 18 circles and around 150 municipal wards.

4. MATERIALS AND METHODOLOGY

Use of spatial and non-spatial.obtained from SOI, NRSC and GHMC. The circles and ward boundaries are digitised from top sheet and updated from satellite imagery. The attribute data was used based on the size of this study area. The information acquired highlighted the status of waste management in Hyderabad city, discussed under sources and characteristics of the wastes, wastes collected and transported to disposal sites, availability of the number of sanitary workers, predicted future trends in waste production with respect to population density. Based on the per capita solid waste generation data of the wards in the city, GIS analysis was performed and the wards were categorized into different groups to show their sustainability.

(i) Population characteristics of municipal wards of Hyderabad

The city of Hyderabad is ranked the sixth largest urban agglomeration in the entire country. The population growth experienced (4.3 to 5.7 million) during the decade 2001-2011 is further expected to continue to increase by 13.64 million 2021 (Singh, 2010). Courtesy of the Greater Hyderabad Municipal Corporation (GHMC), the city is divided into five zones whose average population densities in persons per square kilometer are: East zone (7899.86), South zone (32777.42), Central (27257.28), West (6684.3) and North (16590.98) zones.

(ii) Solid waste in Hyderabad

Urban areas in the state of Telangana have generated solid waste more than 11.5 thousand tons/day which is a 9% of all solid waste generated in India. Every individual in Telangana generates solid waste on an average 570gm/day which is close to other states, such as, Tamil Nadu (630 g/day) and Jammu and Kashmir (600 g/day). Greater Hyderabad generates about 5,000 tonnes of waste per day (TPD), which accounts for 1.83 million tons per year (Bhambulkar A.V.2011). It is an appalling phenomenon how wastes in Hyderabad, just like in other cities, can be thrown from one's house without considering the long-term effect of the same. Much as there are waste containers provided by the GHMC, dumping wastes anyhow is not a concern to some people. One of the adverse effects is the loss of the natural attraction of River Musi which separates the old from the new city of Hyderabad(Huang.A 2006)

Table1: Solid waste generated and disposed by administrative division in Hyderabad.

Circle	Total waste generated per day in metric tonnes	No. of Vehicles	Total waste lifted per day	Waste left over per day
1	181	28	164	17
2	117	23	96	21
3	238	25	184	54
4	144	21	106	38
5	131	14	110	21
6	150	16	130	20
7	210	27	150	60
Total	1171	154	940	231

(Source: Snel, 1997)

Table.2 Solid waste generated in M.T in the year 1994 & 2011.

Sl.No	Solid waste generated (M.T/day)in 1994	Solid waste generated in (M.T/day) in 2001
1	181	370
2	117	372
3	238	234
4	144	206
5	131	402
6	150	48
7	210	590

Total	1171	2222

Table.3 Number of circles was increased and rearranged from '7' to '18':

Sl. No	Erst while Circle No.s	Rearrangement of Circles into 150 Wards/divisions	New proposals of circles into 200 Wards/Divisions
1		KAPRA	With reference to the Hyderabad Edition of Sakshi news paper on 15th April, 2015, The GHMC Commissioner, Special Officer was stated that as per the 2011 statistical details from the census department the GHMC population was 67,31,790. As per the rules of GHMC it was required to divide the wards into 200 wards/ divisions instead of 150 wards / divisions.The total amount of solid waste generated is 3,800 M.T/Day for the GHMC Premesis
2		UPPAL KALAN	
3		L. B. NAGAR / GADDIANNARAM	
4	Circle-1	AREAS UNDER MOOSARAMBAGH, SAIDABAD, SAROORNAGAR, BARKAS, MOGHALPURA,CHADERGHAT ETC.)	
5	Circle-2	AREAS UNDER FALAKNUMA, ZOO PARK, PURANAPUL, BEGUM BAZAR, SHALI BANDA ETC.,	
6		RAJENDRA NAGAR	
7	Circle-4	COVERS AREAS UNDER GOLCONDA, MILLITARY AREA, HAKIMPETMEHDIPATNAMLANGURHOUSE ETC.,	
8	Circle-6	COVERS AREAS UNDER ISAMIA BAZAR, AGHAPURA, GUNFOUNDRY ETC.,	
9	Circle-3	AREAS UNDERE AMBERPET, KACHIGUDA, HIMAYATHNAGAR, BOLAKPUR, NALLAKUNTA ETC.,	
10	Circle-5	AREAS UNDER JUBLIHILLS, BANJARAHILLS, YOUSUFGUDA, SANATH NAGAR, KHAIRTHABAD ETC.,,)	
11		SERILINGAMPALLY NORTH	
12		SERILINGAMPALLY SOUTH	
13		RAMACHANDRAPURAM AND PATANCHERUVU	
14		KUKATPALLY AREA	
15		COVERS UNDER QUTU-BULLAPUR AREA.	
16		COVERS ALWAL AREA.	
17		COVERS MALKAJGIRI AREA.	
18	Circle-7	COVERS SECUNDERABAD DIVISION	

(iii) Solid waste generation and Management patterns in Hyderabad

The solid waste generation pattern is categorized under the social aspects of municipal solid waste management, which also include the handling of households, waste management at the community level and the social conditions of the sanitary workers. In Hyderabad, the main determinants of the waste generation pattern are people's attitudes and the social orientation of the sanitary workers.

(iv) Sustainability of wards

It is the responsibility of the urban local bodies to take care of the waste management in the respective municipal wards due to the public and the local nature of the service(Karadimas N.V 2008). Total solid waste management (SWM) can be achieved through the effective implantation of the Municipal Solid Wastes (Management and Handling) Rules, 2000. Schedule – II (Rule 6 (1) and (3), 7 (1) takes care of the collection, segregation, storage, transportation, processing and disposal of municipal solid waste.

Most of the waste is dumped on land in an uncontrolled manner, and the disposal situation is expected to deteriorate due to rapid urbanization. Waste disposal sites are subject to rising opposition and it is deemed complicated to get new sites that meet public approval and are situated away from the collection area(Kaushal R.K 2012). The urban challenge is that poor, inaccessible and marginal municipal wards suffer from insufficient service and infrastructure which in turn worsens poverty, ill health and social marginalization. In this regard, many of the waste sources are inaccessible and reached only by roads or alleys which are unsuited for certain methods of transport. This is because of their width, congestion, slope or surface. In terms of manpower, that is, the sanitary workers, the number is quite low compared to the large quantities of solid wastes generated

5. RESULTS AND DISCUSSION

(i) Waste generation and management

The waste management involves proper channels of waste collection, transportation and disposal (Murali Krishna .G 2014). In order to understand waste generation and management, the number of sanitary workers (both public and private) was taken as a measure against the total waste being generated in different regions of the Hyderabad. It is evident that the central zone stands better in terms of sustainable waste management owing to the high number of workers compared to the other zones. The

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other regions may need to invest more on workers who will see to improved waste management.

(ii) Sources of waste: In order to properly manage the MSW being generated in Hyderabad, it is noticed that the source of wastes is mainly the domestic households (60 to 65%), both for the Hyderabad Municipal Corporation (HMC) and the Urban Local Boards (ULBs), which generates the MSW of 1482 and 690 tons per day. The next source of waste is streets and drains, followed by hotels and restaurants, markets, commercial establishments, industrial etc. Hospitals, clinics and construction sites are noticed as the least waste generation sources.

(iii) Waste disposal: At present, a total of 3063 tons per day (TPD) of municipal solid waste (MSW) is being collected, transported and disposed by the GHMC on a daily basis. The waste is being dumped at various disposable sites located mainly at Jawahar Nagar, Shamshiguda, the BHEL site near BDL and Fathullaguda. Jawahar Nagar site is the major dumping ground in Hyderabad which receives a total MSW of 2,618 tons/day from different transfer stations in the city.

Apart from that Jawahar Nagar dumping yard also receives another 200 tons/day MSW from other 4 circles of the Hyderabad directly. In addition to that other dumping sites, such as, Shamshiguda, BHEL site and Fathullaguda disposable sites receive a volume of 100, 45 and 100 MSW tons/day, respectively.

(iv) Physical and chemical characteristics of the MSW

The physical characteristics of wastes are categorized into biomedical, biodegradable, recyclable and inert wastes, whereas, the chemical attributes are into pH, total moisture, fixed carbon, volatile matter and the calorific value. Transfer stations save on labour and operating costs and also reduce the number of vehicular trips to and from disposal sites.

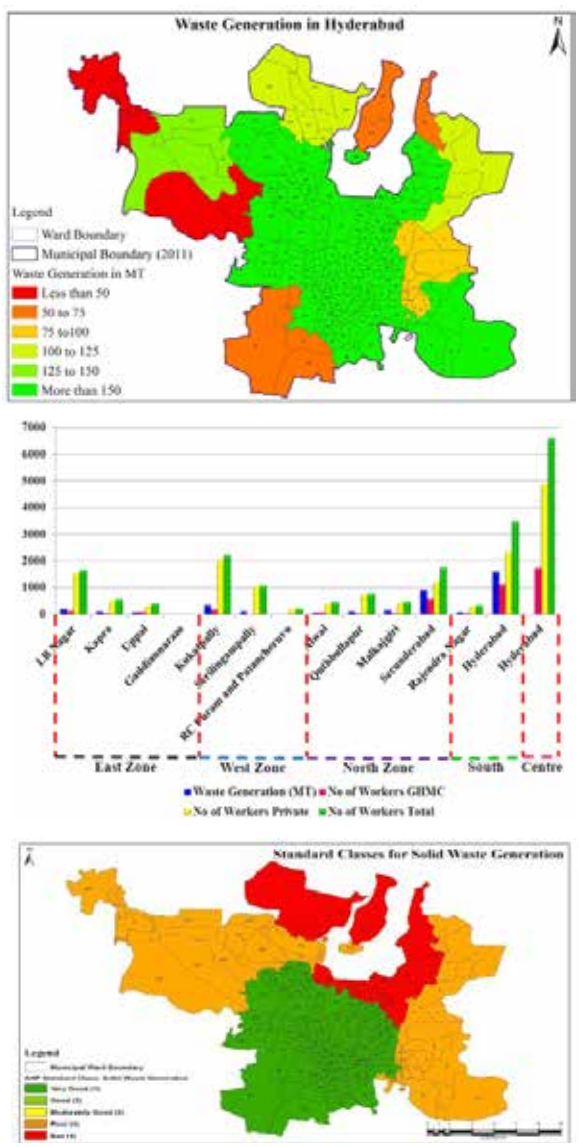
In order to identify, rate and categorize the municipal wards of the Hyderabad on the basis of their sustainability levels with respect to solid waste generation, an analysis is carried out using GIS. Total per capita waste generated by the ward was taken as the basis for rating and categorizing the wards into five different groups indicating their sustainability levels.

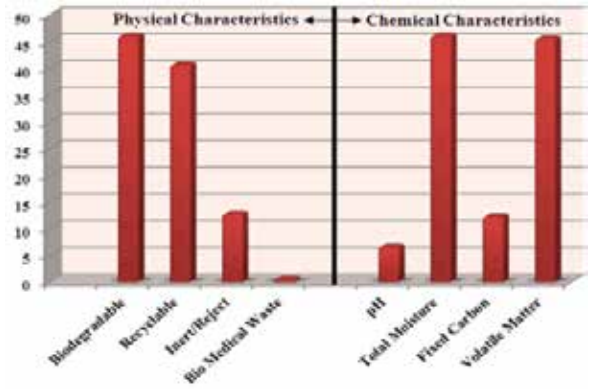
From the map generated through GIS analysis, it is found that a large percentage of the wards are rated poor in sustainable waste management. Some of these areas include Gachibowli, Patancheruvu and Hayathnagar. Some of the areas rated 'bad' in waste management include Suraram Colony, Alwal and Old Malkajgiri. This also means that the areas need remarkable improvement in terms of waste collection, disposal and infrastructure development. The areas rated 'very good' include Gunfoundry, I.S. Sadan, Kishanbagh, and Attapur. Much as these areas are rated 'very good', the status must be maintained and improved further for sustainable waste management.

6. CONCLUSION AND RECOMMENDATIONS

- The issue of waste generation and management needs to be taken with weight due to the health hazard that wastes pose to human, animals and plants.
- The city of Hyderabad, increase in population has in turn increased the quantities of wastes generated, a phenomenon that needs to be taken care of by increasing the number of workers and the systems of collection, transportation and disposal of the wastes.
- The main sources of waste are domestic households while least amount is produced at the hospitals, clinics and construction sites. Collected wastes are taken to transfer stations then to disposal sites such as in Jawahar Nagar, which is one of the largest sites.
- The future trends of waste generation are expected to rise just as the population trends are raising. Measures should be put in place for sustainable waste management (SWM). So far, SWM has been rated 'very good' in wards such as I.S. Sadan, Kishanbagh and Lalithabagh, while wards such as Defence Colony and Old Malkajgiri have been rated 'bad' due to the observed poor waste management.
- For the future SWM it would be recommended that disposal sites be located at a reasonable distance from the collection areas in order to check the financial issues related to high transfer costs and additional investment in road infrastructure.
- The Adequate waste disposal can be taken care of by compliance with guidelines for the siting, design and operation of especially the new landfills.
- The Existing dump sites need to be upgraded through the establishment of sanitary landfills. There also needs well-trained sanitary personnel for waste management and the provision of adequate financial and physical support for a rational operational standard.

Figure 1: Showing the waste generation and standard class maps including pie charts with solid waste dumping site photos.





REFERENCE

1. Amar, MR. And Katkar, A. "Improvement of solid waste collection by using optimization Technique",Vol 2, Issue 4, April 2012, 298-307. | 2. Anand, G., Deepika. G and Vijaya, B. "GIS & GPS in micro-spatial location analysis of solid waste disposal sites",Co-ordinates, Feb 2014, 1-9. | 3. Bhambulkar, A.V. and Isha Kedikar, P. "Municipal Solid Waste (MSW) Collection Route for Laxmi Nagar by Geographical Information System (GIS)", International Journal of Advanced Technolgy, Vol II, Issue IV, 2011, 48-53. | 4. Huang, Q., Wang, Q., Dong,L., Xi, B. And Zhou, B. "The current situation of Solid Waste Management in China",8,2006, 63-69. | 5. Karadimas, N. V., Doukas, N., Maria, K. And Gerasimoula, D, " Routing optimization Heuristics Algorithm for urban solid waste Transportation Management", Wseas Transactions on Environment and Development, Vol 7, Issue 12, Dec 2008, 2022-2031. | 6. Kaushal, R.K, Verghese, G.K. and Chabukhdara, M. (2012) "Municipal Solid waste management in India-current state and future challenges: A Review", International Journal of Engineering Science and Technology, 4: 1473-1489 | 7. Murali Krishna, G., Lakshmana Deekshatulu, B. and Nooka Ratnam, K." An appraisal of sustainability scenario of solid waste management: A GIS study on Municipal Wards of Hyderabad, India", Geology & Geosciences, Vol 3, Issue 2, 2014, 1-4. | 8. Padmaja, V., Asadi, S.S and Anji Reddy, M, "Solid Waste Disposal Site Selection using Analytical Hierarchy Process and Geographical Information System", Enviromedia, 25, 1, 2006, 73-76. | 9. Snel, M., Formal and informal sector of solid waste management in India, 23rd WEDC conference paper held in Durban, 1-5 september, 1997. | 10. http://hyderabad-india-online.com/2009/12/ghmc-zones-circles-and-wards. | 11. www.sakshi.com, (Local Edition, Page No. 5), 5th April, 2015. | 12. www.sakshi.com, (Local Edition, Page No. 2), 26th June, 2015.