

ASERS

Journal of Environmental Management and Tourism

Quarterly

Volume XIII

Issue 5(61)

Fall 2022

ISSN 2068 – 7729

Journal DOI

<https://doi.org/10.14505/jemt>

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Journal DOI: <https://doi.org/10.14505/jemt>

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DOI: [https://doi.org/10.14505/jemt.13.5\(61\).13](https://doi.org/10.14505/jemt.13.5(61).13)

Municipality Solid Waste Management. A Case Study of Smart City Bhubaneswar, Odisha

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Suggested Citation:

Mohanty, S., Mishra, S., Mohanty, A. (2022). Municipality Solid Waste Management. A Case Study of Smart City Bhubaneswar, Odisha. *Journal of Environmental Management and Tourism*, (Volume XIII, Fall), 5(61): 1361 - 1373. DOI:[10.14505/jemt.v13.5\(61\).13](https://doi.org/10.14505/jemt.v13.5(61).13)

Article's History:

Received 9th of August 2021; Received in revised form 17th of September 2021; Accepted 2nd of February 2022; Published 2nd of September 2022. Copyright © 2022 by ASERS® Publishing. All rights reserved.

Abstract:

Waste Management has become a big problem in India as a result of rapid urbanization. The urban population is around 377 million spread over 7,935 cities and towns who generates 62 million tones municipal solid waste per year. Only 43 million tons (MT) of the waste is collected, 11.9 MT is treated, and 31 MT is dumped in landfill sites. One of the essential services provided by Municipal Corporation is Solid Waste Management in order to keep the urban area clean. Further, The COVID-19 pandemic-induced catastrophe has altered the dynamics of waste generation in practically every sector around the world, necessitating specific attention. Unpredictable changes in trash quantity and composition also put pressure on policymakers to react quickly. Nevertheless, almost all the solid waste is dumped within the city haphazardly. It is believed that India had an unsound system of waste disposal management. This study was carried out to find out the issues if any regarding the solid waste management practices undertaken by Bhubaneswar Municipal Corporation and suggest certain remedial measures to improve the system.

Keywords: Bhubaneswar Municipality Corporation; solid waste management; urban expansion; waste disposal system; landfills COVID 19.

JEL Classification: Q53; Q57; O44.

Introduction

In the developing nations, the solid waste management is a major issue. According to (Sunayana *et al.* 2021), in developed economy, there is every possibility of vast amount of non-organic waste due to high standard of living and availability of each and every commodity that is well packaged, for example, substantial waste in way of packaged products in a highly developed city like Sydney, Australia. Due to rapid growth of urban population, industrialization and enhancement of economic condition and activities the municipal solid waste quantity have increased manifold. Despite the fact that, the developing nations produce fewer waste per head in comparison to developed nations, accumulating, storing, transporting, processing and removal of solid waste is very ineffective which in turn have an adverse effect on the environment. It not only pollutes the water, air but also causes

occupational hazards and emits greenhouse gases. Due to which solid waste management has become an important issue. According to Beede and Bloom (1995) in 1990 about 1.3×10^9 t of municipal solid waste was produced globally. In words of Pokhrel and Viraraghavan (2005), the urban community in Asian Countries produce about around 760×10^3 t of MSW per day and may surge up to 1.8×10^6 t by 2025. According to 3iNetwork, (2006) presently, Indian cities produce approximately around 115 million metric tonnes of waste per day and 42 million metric tons yearly. In view of The Tata Energy Resources Institute (TERI) the production of waste will increase by 260 million tons per annum by 2047. As stated by Sharma and Jain 2019, the municipality corporation in Indian Cities are facing lot of problem with huge quantity of municipality waste produced each day eventually leaving a vast amount of solid waste untreated because of the reason viz financial problems and poor infrastructure. As confirmed by ASSOCHAM and PwC (2017), presently the way dumping of untreated municipality solid waste is practiced, by 2050 the country may need 88 sqkm capacity dump yard which is almost the size of New Delhi. According to Gupta and Arora (2016), the per capita MSW is increasing due to rising financial power of citizens. According to the report of Das and Bhattacharyya (2014) per capita trash output in Indian cities is increasing. According to ASSCHOM & PWC megacities are not only dealing with problems linked to untreated MSW dumping, but they are also increasingly vulnerable to untreated industrial hazardous waste (IHW), which is growing at a pace of 2% to 5% each year. According to Bhagat and Jones (2013); Kumar *et al.* (2017), the metro cities are the worst sufferer. According to Kawai and Tasaki (2016), the control system, such as monitoring per capita MSW generation in longitudinal way for understanding the criticality of environmental pressure and corrective action, is generally ineffective, at least for the most populated cities of developing nations. According to CPCB analysis from 2013, the situation in India is worse since only 12.5% of the total trash collected is technologically treated and the remainder is disposed in open dumps. The development of COVID-19 has resulted in unprecedented social and economic turmoil around the planet. This epidemic has exposed numerous flaws and inadequacies in the socio-economic, health, and environmental sectors across countries Sar kodie and Owusu (2020). The negative effects of increased solid waste generation and reduced efforts of recycling may have an average and lasting consequence, which is a matter for worry Zambrano-Monserrate *et al.* (2020). Managing municipal solid waste (MSW) has turn out to be one of the most difficult environmental issues throughout this pandemic The pandemic has altered the mechanics of trash generation, generating concern among sanitation workers and policymakers alike Mallapur (2020). In many developing nations, unsustainable waste management increases vulnerability to Covid 19 propagation through waste management techniques. Inappropriate collection techniques might potentially cause the virus to become infected with general MSW, posing a danger of transmission. As a result, waste processing and eventual disposition are key components of an effective disaster response Mallapur (2020). Collection, segregation, storage, transportation, treatment, and disposal of trash, as well as other related aspects such as employee training and safety, and the disinfection process, are all components of effective waste management (UNEP, 2020). Among the many devastating consequences of the COVID-19 epidemic, MSW management's actions are expected to generate more complaints over time Smart waste report European Union (2020). Coronavirus is most likely to spread in developing nations due to poor waste management, a lack of personal protective equipment, and other unfavourable situations Mol and Caldas, (2020). Improper SWM, *i.e.*, waste collectors, increases the risk of health issues in a specific informal worker group Cruvinel *et al.* (2019). According to intelligence Meh mood *et al.* (2017) Srinivasan, Rajesh, Saikalyan, Premsagar & Yadav (2019). The Internet of Things (IoT) has recently aided in the resolution of few of these issues. For instance, in IoT-based smart cities, physical gadgets communicate over the internet and give convenience to humans depending on their Because of a lack of resources, it is more difficult to implement new technology to improve the effectiveness of waste management activities in emergent nations than in wealthy countries. Abdel-Shafy and Mansour (2018) noticed adequate distribution of polythene sacks, rubbish containers, and other items.

In this paper, the municipality Solid Waste Management of Bhubaneswar city has been analyzed. According to Annual Report, Central Pollution Control Board, "There are total 114 ULBs responsible for implementation of the SWM Rules, 2016 in the State. The estimated waste generation in these ULBs is 2564.43 TPD, out of which 2255.32 TPD is collected. There is no sanitary landfill in the State and dumping of MSW is being practiced in open. 8 ULBs applied for authorization/renewal this year. 14 (including previous period) authorizations have been granted and 8 authorizations are under process. For implementation of Schedule-II, the Government took initiatives for compliance of the SWM Rules, 2016. Action plans based on ULBs, local requirements and size of the ULBs are under preparation. Practice like door-to-door collection has been initiated, however, segregation of waste at source is lacking". (Annual Report, Central Pollution Control Board) Ministry of Environment, Forest & Climate change, Govt. of India, 2019).

1. Literature Review

According to (Balakrishna, 2012), a smart city, is an enhanced infrastructure that includes Information Communication Technologies (ICT) where every device is networked and can communicate without interference. One of the most basic requirements in a smart city setting is that everything makes decisions intelligently and efficiently. With technological improvements, a smart city will require numerous applications to provide services to its citizens.

Many recommendations on smart systems have been made by researchers in recent years to address a variety of difficulties faced by cities around the world. According to Kamm, Gau, Schneider, & Vom Brocke, (2020) some suggestions have concentrated on smart garbage collection) and smart waste management systems. (Baldo, Mecocci, Parrino, Peruzzi & Pozzebon, 2021; Guerra, Bolea, Gamiz & Grau, 2020;Pardini et al., 2020;Rutqvist, Kleyko & Blomstedt, 2019).

Collection and transfer of solid waste to any intermediate site and/or disposal site, and recycling/treatment of solid waste are all part of the overall solid waste management system Beede D.N., Bloom D.E. (1995), M. Sharholy, K. Ahmad, G. Mahmood, R.C. Trivedi, Municipal solid waste (2008), L.A. Manaf, M.A.A. Samah, N.I.M. Zukki, (2009) and M. Sharholy, K. Ahmad, G. Mahmood, R.C. Trivedi, (2008) . The cost of collection and transportation is another major factor of solid waste management Z. Minghua, F. Xiumin, A. Rovetta, H. Qichang, F. Vicentini, L. Bingkai, A. Giusti, (2009) .With an ever-increasing population and a static budget for solid waste management, it's important to improve the system in order to cut total costs. Many academics have attempted in the past to reduce the cost of garbage management, V Sanjeevi, P Shahabudeen, (2016), , H. Asefi, S. Lim, (2017), S.T. Tan, C.T. Lee, H. Hashim, W.S. Ho, J.S. Lim, (2014), A. Mirdar Harijani, S. Mansour, B. Karimi, C.-G. Lee, (2017) With rising urbanisation, India faces an uphill battle in terms of solid waste management (SWM), with 377 million urban inhabitants living in 7935 towns and cities producing 85 million tonnes of municipal solid garbage per year, according to the estimates. 43 million tonnes (MT) were collected, 11.9 were treated, and 31 were disposed in landfills out of 85 million tonnes (MT) Lahiry Samar, (2018). In the emergent countries the major problem is one third to half of the solid waste produced remains uncollected in the cities. According to recent studies from many Indian cities, the waste management issue is growing unimaginably and is suffocating the efforts of numerous stakeholders Kumar et al., (2017). The available waste management strategy must be adopted and carried out in such a way that local governments are prepared to face any issues that may arise Shekdar, (2009).

According to Ahluwalia and Patel (2018) and Joshi and Ahmed (2016), around 80% to 90% of municipal garbage is recycled, while the rest is disposed of in landfills without efficient management methods and open burning, resulting in contamination of air, water, and soil. Ngwabie et al., (2019), Li and Zhao,(2001). Ko et al., (2015), suggested that the potential hazard of MSW at landfill sites, which emits harmful greenhouse gases and eventually causes pollution, contaminates groundwater through creation of leachates.

Landfilling is a practise used by Western countries to reduce solid waste accumulation problems Jain et al., (2016). Today, western countries use landfilling as a method of reducing solid waste accumulation Jain et al., (2016). In emerging countries, municipal solid waste management is becoming a challenging problem. Even though the average generation rate in many industrialised countries is in the range of 0.8–1.4 kg/person/day, municipal solid waste management is efficient in developed countries Bundhoo, (2018).

The importance of public education and awareness in the proper implementation of SWM's strategic initiatives cannot be overstated Hasan, (2004). The public's awareness and attitudes regarding waste disposal have a direct impact on any SWM plan. Several experts concurred that public ignorance and lack of training are major factors in determining the outcome of any area's waste management strategy Desa et al., (2011). By informing the public on a large scale, local government entities should stimulate public education and involvement Sarker et al., (2013). According to Joshi & Ahmed, (2016) another concern with MSWM is the creation of hazardous chemical wastes by cities, such as hospitals and factories, which causes breathing issues and untimely deaths. In the views of Bauchner et al., (2020), there has been a significant change in the sort of waste generated, such as an increase in the number and amount of plastic trash for single use in PPE such as syringes, respirators, gloves, and masks, or food packaging. Each person must wear a face mask to prevent the virus from spreading via the air, which increases the waste burden. Cafes and restaurants prefer one-time packing materials; however, they do not allow personal or reusable containers to reduce virus transmission Naughton, (2020).

Solid waste problems lead to environmental problems. Furthermore, pollution in any form has been shown to have a deleterious impact on environmental health, as well as aesthetic and psychological well-being, C. Zurbrug. R. Ahmed (1999), Mohan (2019) said recently, India has emerged as an emerging recycling market;

nevertheless, recycling has not been carried out in accordance with the mandated guidelines. Similarly, (Tsai et al., 2021 and Azevedo et al., 2021) emphasized on two important things. One, three vital factors for achievement of sustainable MSW management in coastal regions viz., policy & legal frameworks, participation of stakeholders and policies of tourism and two, a good governance practices for attracting more investments towards the improvement of MSW management in developing economies. As per (Rathore and Sarmah, 2021), it is pertinent to separate biodegradable organic material from municipal waste and recycle it for sustained management of waste. In this regard, Cai et al., 2021 and Su et al., 2021 have highlighted the importance of implementing gasification and pyrolysis as an innovative technology. Guerrini et al., 2017 and Amaral et al., 2022 opined that the efficient waste management by the municipalities will have a positive effect such as reduced operating costs and improved operational and economic efficiency which in turn may lead to lowering of tariffs and improving in service quality. On the similar lines, (Foggia and Beccarello, 2018; Guoyan et al., 2022 and Struck and Boda, 2022) voiced their views from an environmental viewpoint by highlighting the importance of efficient MSW management that could add to an increased recycling of MSW and reduced waste that will ultimately boost the sustainability of the environment.

The media may play an important role in educating the public about environmental cleanliness Desa et al., (2012). Several studies have found that due to lack of awareness and proper training among municipal employees leads to ineffective and bad solid waste management Madrigal et al., (2018). Collection, segregation, dumping, recycling, and composting should all be covered in training sessions Ali and Kuroiwa, (2009). The perception and education of difficulties related with solid waste management were essential variables in the context of solid waste recycling programmes Suttibak and Nitivattananon, (2008).

After reviewing the literature, the hypothesis states that the denizen involvement, adequate capital, waste management strategy competence, citizen education and awareness, composting sector feasibility, leadership assistance, knowledge of regional programme and legislative laws, innovation in SWM, commitment and employee motivation, and societal participation directly or indirectly affect SWM in any area.

Objectives

1.To find out the issues related to Solid Waste Management practices of Bhubaneswar Municipal Corporation.

2.Suggested measures to improve the system.

Bhubaneswar City overview

Odisha's capital is Bhubaneswar. It has acquired the first position among 100 cities of India in the Smart City Challenge competition. The city was planned in the year 1946 by the German architect Otto Königsberger. It is the 2nd burgeoning city after Kolkata in Eastern India. As per United Nation World Population prospects, the present metro area population of Bhubaneswar in 2020 is 1,163,000 and projected to be 1,649,000 by 2035. The urban local body that governs the city is Bhubaneswar Municipal Corporation (BMC). It covers an area of 162.5 Sq.kms 67 wards and 51 revenue villages. The major function of BMC is to provide drinking water, drainage & sewerage, sanitation, management of solid waste, street light and building regulation. The city is considered to be an IT, Education and tourism hub attracting lot of economic activities to take place. Due to the reason, it generates huge number of municipal wastes. The daily average solid waste generation of BBSR is about 520 Tons. In the city, average solid waste constitutes about 61.81% biodegradables, 27.15% inert material, 7.8% plastic, leather, 1.25% metal and glass.

2. Municipal Solid Waste Generation and Processed in India and Odisha from 2017-2021

Table 1

Quantum of Municipality Solid Waste Generation & Processed in India & Odisha						
(In Tonne per Day)						
State	2017		2018		2019	
	Total Waste Generated	Total Waste Processed	Total Waste Generated	Total Waste Processed	Total Waste Generated	Total Waste Processed
Odisha	2460	27.85	2720	326.40	2721	1169.87
India	161504	43783.77	145687	73120.62	148945	89367.26
State	2020		2021			
	Total Waste Generated	Total Waste Processed	Total Waste Generated	Total Waste Processed	Total Waste Generated	Total Waste Processed
Odisha	3256	939.26	3759			1187.02
India	179238	72648.54	196472			78532.43

Source: Lok Sabha Unstirred Question No. 3271as on 13.3.2020, Envi Stats, India 2021

Table 1 represents the Quantam Solid Waste Generation & Processed in India & Odisha from 2017 -2021. It is revealed from the secondary data that, the total Solid Waste generated in India in the year 2017 was 161504 and in Odisha was 2460 tonne /day. In 2018 it was 145687 in India and 2720 in Odisha. Similarly, in 2019 total Solid Waste generated in India was 148945, in Odisha it was 2721. In 2020 it was 179238 in India and 3256 in Odisha. In 2021 it was 196472 in India and 3759 in Odisha. There is a huge increase in Municipality solid Waste generation in 2022-21 due to COVID -19 which include mostly medical waste.

As per the data on Total Solid Waste Processed in India in 2017 was 43783.77 and Odisha was 27.85 tonne/day. In 2018 it was 72648.54 in India and 939.29 in Odisha. In 2019 it was 89367.26 in India and 1169.87 in Odisha. In 2020 it was 72648.54 in India and 939.26 in Odisha. In 2021 it was 78532 in India and 1187.43 in Odisha. The processing was hampered in the year 2020-21 due to COVID - 19 lockdown and shutdown.

Table 2. Total Municipal Solid Waste generated in India 2017-2021(Tonne/ Day)

2017	2018	2019	2020	2021	Amount Change	% Change
161504	145687	148945	179238	196472	34968	0.21

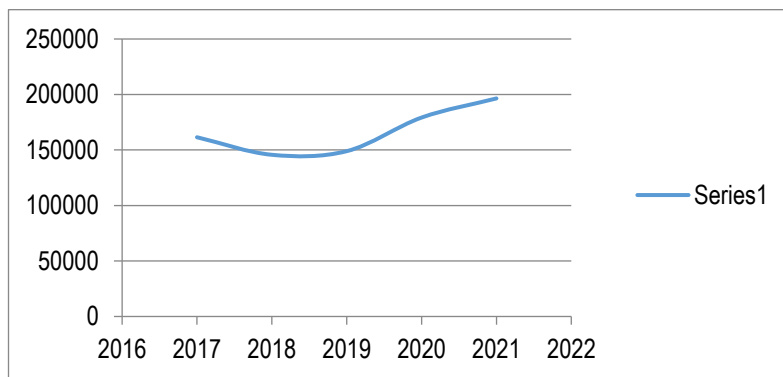


Table 2 represents the Total Municipal Solid Waste Generated in India from 2017-2021. It was observed from the trend analysis that, in the year 2017 the Solid waste generation was more, in 2018, it showed a slight decrease and again in 2019 it showed an increasing trend. In 2020-21 due to pandemic the solid waste generation increased as the usage of mask, PP kit, sanitizers, medical waste increased. Similarly, in case of waste processing, it is shown there is an increase trend from 2017 to 2019, but due to lockdown collection and processing of solid waste was hampered.

Table 3. Total Municipal Solid Waste Generated in Odisha from 2017-2021 (In Tonne per Day)

2017	2018	2019	2020	2021	Amount Change	% Change
2460	2720	2721	3256	3759	1299	0.52

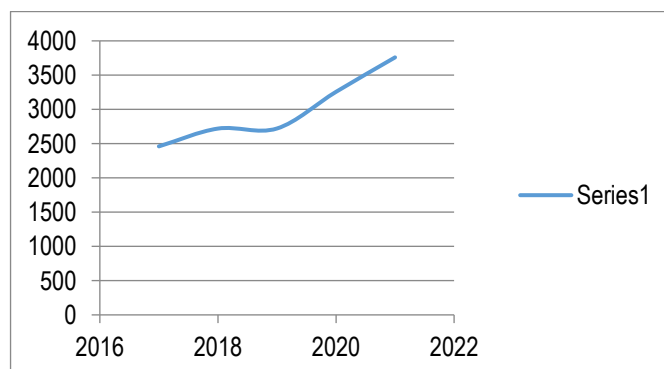


Table 3 represents the Total Municipal Solid Waste Generated in Odisha from 2017-2021. It was observed from the trend analysis that there is an increasing trend.

Table 4 represents the Total Municipal Solid Waste Processed in India from 2017-2021. It was observed from the trend analysis that there is an increasing trend until 2019, but from 2020 due to pandemic and imposition of lockdown collection and processing was hampered.

Table 4. Total Municipal Solid Waste Processed in India from 2017-2021 (In Tonne per Day)

2017	2018	2019	2020	2021	Amount Change	% Change
43783.77	73120.62	89367.26	72648.54	78532.43	34,748.66	0.79

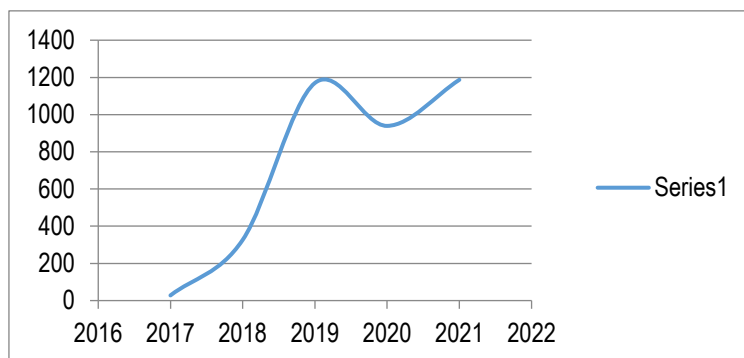


Table 5. Total Municipal Solid Waste Processed in Odisha from 2017-2021 (In Tonne per Day)

2017	2018	2019	2020	2021	Amount Change	% Change
27.85	326.40	1169.87	939.26	1187.02	1,142.20	41.01

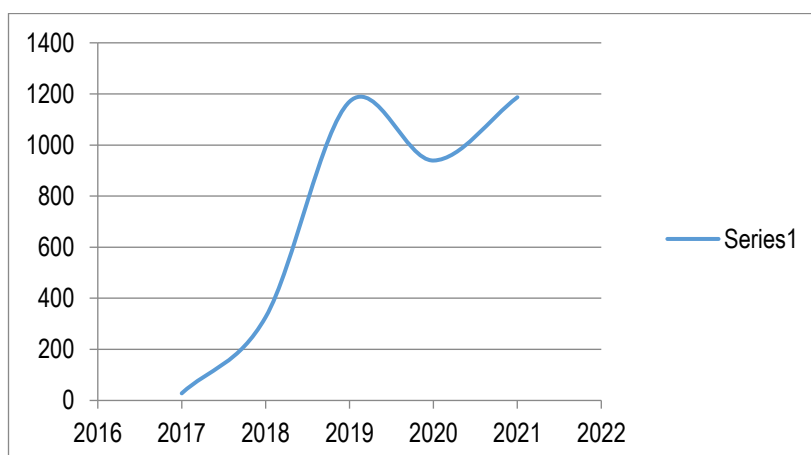


Table 5 represents the Total Municipal Solid Waste Processed in Odisha from 2017-2021. It was observed from the trend analysis that there is an increasing trend until 2019, but in 2020, the collection & processing was disturbed due to lockdown, in 2021 there is slight improvement in the processing.

The unusable solid substance produced from household, commercial and industrial activities are called solid waste. Effective management of solid waste will reduce the negative impact on the environment and public health and aid economic development and enhanced quality of life. The management of municipality solid waste process includes segregated at source, collection from door-to-door, and collection from community bins, transportation, processing, recycling and disposal.

1. **Residential Waste:** They are thrown either on the roads or on the municipality dustbin provided by the department. Then they are collected by the municipality sweeper & taken to the dump yard or stored in a collection point, later on transported to the dump yard.

2. **Market & Commercial waste:** the waste generated from food, vegetable, fruits vander etc. are thrown in the municipality dustbin or on the street, later on collected by the corporation. Similarly, the commercial wastes are collected in a collection point and then the municipality department later transports them.

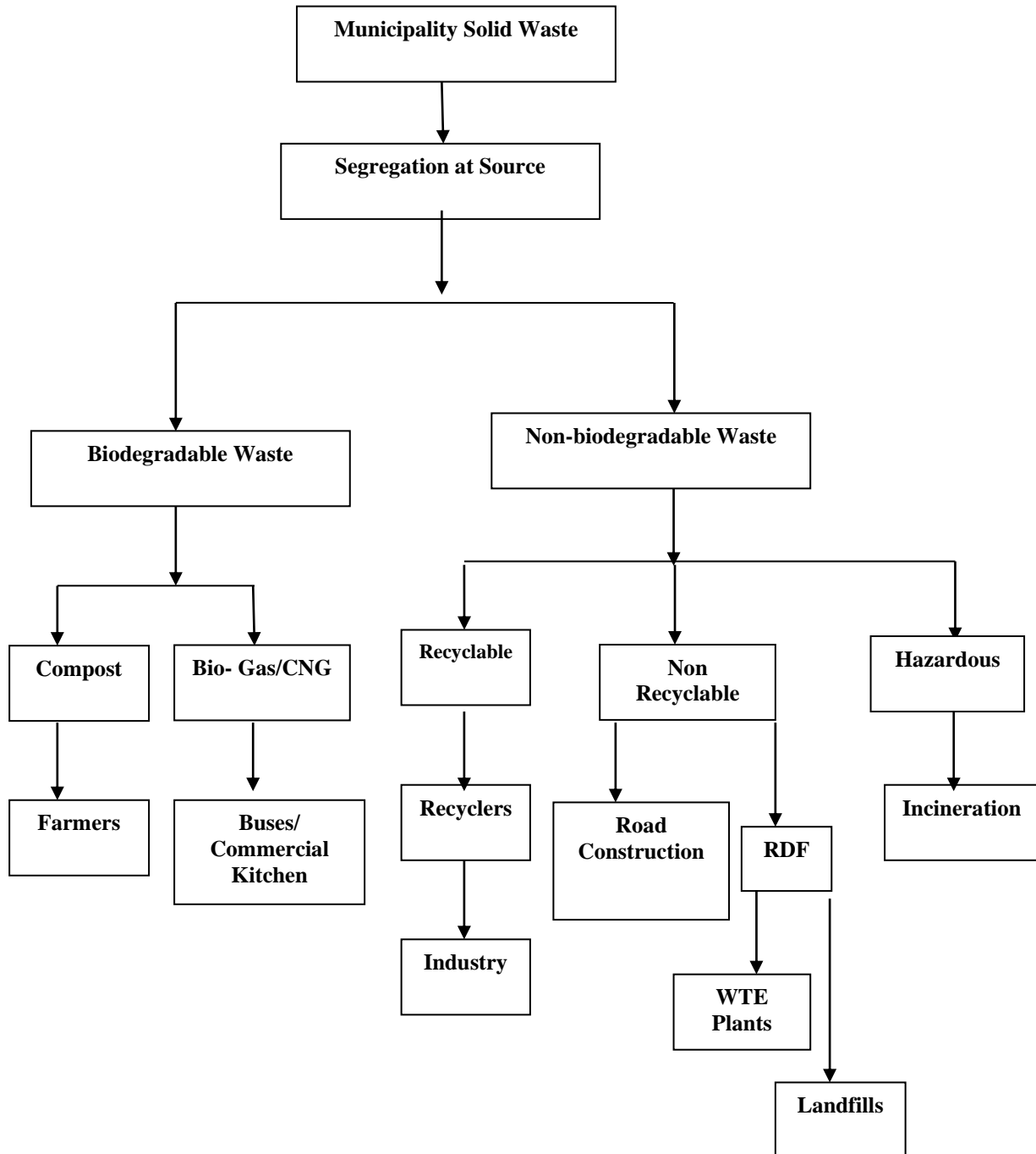
3. **Bio- Medical waste:** Odisha pollution control board have authorized to collect, treat and process the bio medical waste in processing facility.

4. **Institutional Waste:** The wastes generated by the institutes are thrown in municipality dustbin and later the municipality sweepers collect them.

5. **Road clearing & Public places:** these wastes are collected by the municipality crew, stored in a depot, and later on transported to the dumping site.

6. **Construction waste:** Due to construction lot of debris from the construction site are left unattended by the contractors. Sometimes they collect on payment basis. It doesn't happen in a regular interval.

Figure 1. Sources of Municipality Solid Wastes



Source: Guidelines for Swachh Bharat Mission (urban) 2.0, 2021

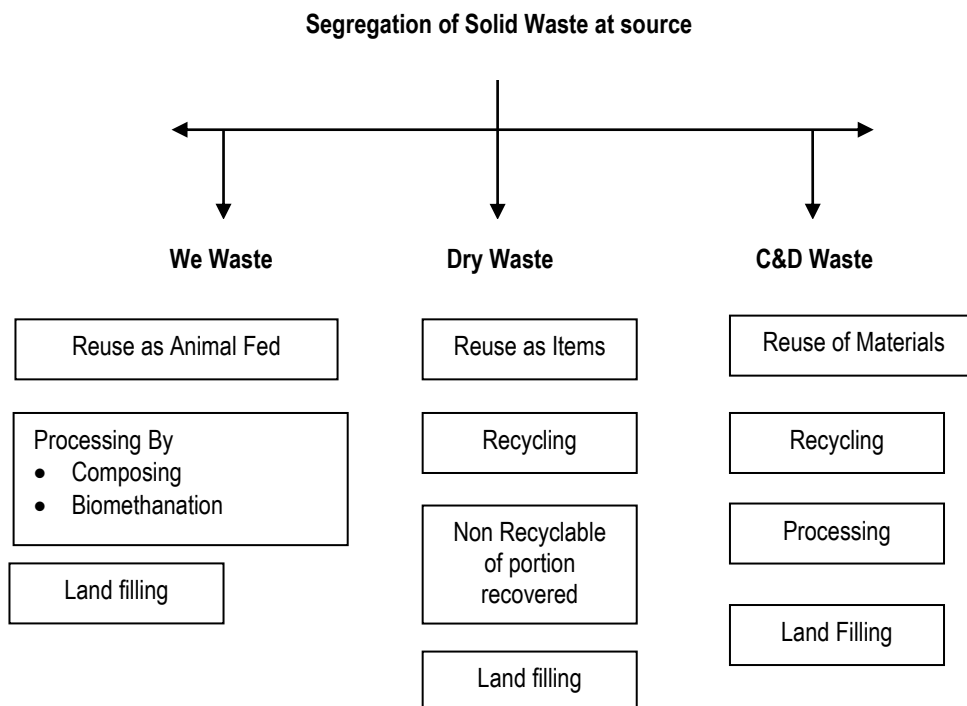
3. Collection of Municipality Solid Waste

The Health Department of BMC monitors the collection of primary wastes and headed by Chief Health Officer. Sanitary officers are responsible for various zones, and they report to Chief Health Officer. Each Zamadars are allocated with different wards and the municipality sweeper report them and the Zamadar in turn reports to Sanitary officer. For storage of waste containers of different size are used. The Bhubaneswar Municipality department has provided concrete containers as waste bins. Besides that, they also have provided with dustbins

on roadsides from which the wastes are carried for discard. Every ward had large bins for collection of waste materials. At present, there are around 348 collection points in Bhubaneswar city. The department has one truck mounted sweeping machine for the roads. The secondary collection and disposal of waste is under the purview of sanitation department under Municipality Corporation. The department has engaged various vehicles like trucks, mini trucks, hook loader lorries as well as mechanized and manual partitioned vehicle for solid and wet waste for transportation of waste to the disposal sites.

As published in the “**THE NEW INDIAN EXPRESS**” on 4th September 2019, “a Standard Operating procedure was issued by the State Government and the urban local bodied were asked to engage Swachh Sathis in their respective Wards. Swachh Sathis will act as change agents to bring about collective behavioural changes at the household level for door-to-door collection of segregated waste and ensure decentralised composting of wet waste and collection of dry waste. Each of them will get an honorarium of Rs 4,000 for 600 households per month. ULBs will organise orientation sessions for Swachh Sathis to make them aware of different components of solid waste management. The ULBs have been asked to prepare an action plan indicating vehicle number, time of waste collection, delivery of wet waste at micro composting centres, time and location of unloading saleable and non-saleable dry waste, supervision of mechanism to ensure zero discharge to the landfill sites. “The Swachh Sathis will also engage supervisors selected from local women self help groups. They will be paid `8,000 per month for 2,400 households. An OSD (sanitation) will also be designated among the existing ULB staff to oversee the whole process and logistics,” said an official of Housing and Urban Development department. The civic bodies have also been provided with technical details for constructing Micro composting centres (MCC) and on-site composting centres (OCC) besides segregating and processing the waste. Basing on the land available, an MCC/OCC with 14 tubs and processing capacity of five tonne waste per day can be built in an area of 600 sq metre while a minimum 1.5-tonne capacity centre can be developed on an area of 200 sq metre. It can process waste from 2,220 households. The ULBs have been directed to develop a suitable mechanism in consultation with district Collectors and other stakeholders for timely and proper selling of the compost generated from these centres”.

Figure 2. Components of Municipal Solid Waste Management



Source: Guidelines for Swachh Bharat Mission (urban) 2.0, 2021

Processing & Treatment

Bhubaneswar Municipality Corporation neither has any processing facility nor have treatment facility of solid waste. Very few waste processing is undertaken for recyclables like paper, glass, metal plastics etc through informal recyclers in the city.

Disposal

Bhubaneswar city have two designated waste dumpsites at Tulasadeipur and Salia Sahi but the sanitary wastes are left open without covering with soil. The study reveal that most of the solid wastes are disposed unscientifically. It is observed often the residents as well as the municipality crew burn the wastes in the roadside also.

Issues faced by BMC in managing Solid Waste

According to the news published in “**THE NEW INDIAN EXPRESS**” dated 22nd August,2020, a survey was conducted and has shed light on “the city’s need to improve its solid waste management system, prevent open defecation and comply to various parameters of Open Defecation Free (ODF) status. Of a total of 1,500 marks in Garbage Free City (GFC) and ODF category, the civic body has received less than 300. It has secured less than 400 marks in Swachh Survekshan league and service level progress category where the total mark is 1500. Sources said the city lost the marks to lack of adequate facility for solid waste management. After the Bhubaneswar Municipal Corporation (BMC) plan to construct a waste-to-energy treatment plant at Bhuasuni on the city outskirts failed last year, the civic body decided for bio-mining the waste. The work, however, is yet to start. Besides, for better management of solid waste, it planned 43 Micro Composting Centres(MCC) in different locations covering the entire city last year. Not a single MCC has been made operational, though the civic body had planned to set up at least 17 MCCs in the first phase by March.”

Figure 3



Suggestions:

- The Covid 19 pandemic has exponentially increased the medical waste which includes mask, PPE kits, gloves etc. If they are not properly disposed, it may lead to environmental pollution as well as transmitting to human. So, the hospitals should use color coded covered dustbins for the wastes. It should be sanitized & stored separately till it is incinerated. Proper training should be imparted to the employees who are handling them.
- The citizens of Bhubaneswar should be sensitized on the significance of segregation of waste through various educational campaigns. Separate colour coded dustbins for biodegradable and non- biodegradable should be provided in different wards further, the wastes should be segregated at source.
- As finance is an issue with BMC, the Corporation should levy nominal fees for the user, so that the Corporation can meet the expenses and be self-reliant.
- Collection of solid waste should be streamlined. Community based regular house-to-house collection should be encouraged.
- Immediate attention should be given for creating adequate Solid Waste Management facility.
- Public- private community partnership should be encouraged.
- The citizen as well as the authority should comply with the rules of Solid Waste Management for which media & NGOs may be involved for creating awareness on environmental program.
- Decentralised organic waste composting is recommended.

Conclusion

Due to industrialization lot of people are migrating from villages to Bhubaneswar which leads to rapid growth of population and that produces quantum of MSW every day. The current pandemic crisis is expected to last well beyond 2025 (Tripathi *et al.* 2020). As a result, the development of a long-term solid waste management strategy is becoming more important. Improper waste collection system, inappropriate equipment, shortage of carrying vehicles, dearth of efficient manpower, poor financial status of the Corporation, improper planning of route, no night service, uncovered vehicles carrying waste and no proper plan of action are responsible for poor state of affair. These results in poor health conditions. Waste Management is not about collecting, transporting and processing the waste but it is imperative to minimize generation of waste. Creating awareness among the citizen is very important. The Bhubaneswar Municipal Corporation should adopt a more practical and state-of-art technology to mitigate the issue.

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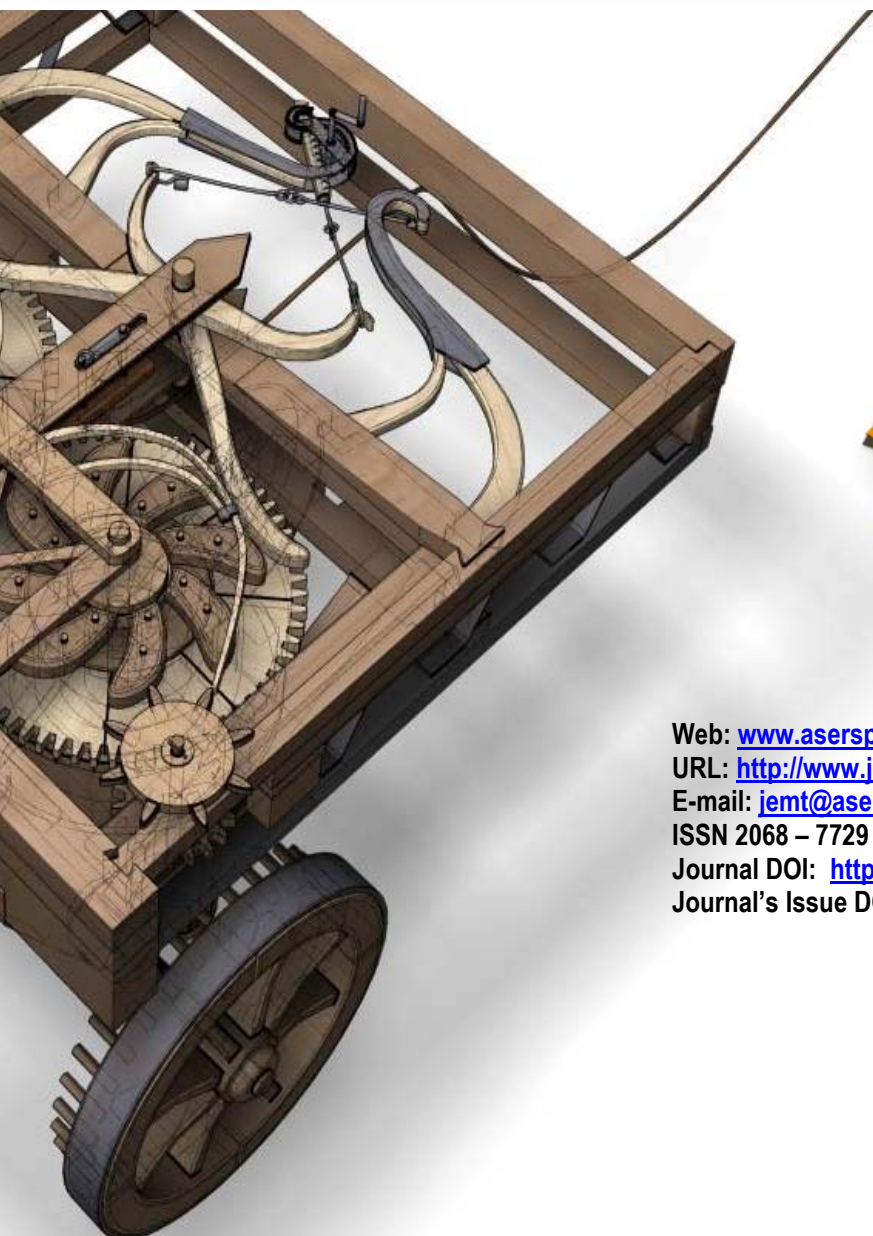
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ISSN 2068 – 7729

Journal DOI: <https://doi.org/10.14505/jemt>

Journal's Issue DOI: [https://doi.org/10.14505/jemt.v13.5\(61\).00](https://doi.org/10.14505/jemt.v13.5(61).00)