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Solid waste management scenario in selected disrict

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Abstract
Solid waste is the burning issue in the forthcoming days in both developed and developing countries at present. The generation of solid waste were the inevitable consequences of all processes wherever materials are used. Extraction of raw materials, manufacture of products, consumption and waste management were easily generating waste. The rate of materials was high in use today and such sorts of waste can exactly cause serious impact on the environment, quality of air and even human health. An alarming rate of solid waste generation trends could be seen parallel to industrialization, urbanization and economic development. The leading confront to the authorities of both small and large cities in the developing countries were the solid waste management issue. Because of the mushrooming growth of population, economic development and migration the situation becomes worst. Solid waste management is the fundamental necessary services offered by municipal authorities in the country to keep urban centres clean. Vermin composting were observed as a dirt-free, sustainable and complete zero waste approach which is to handle raw wastes but still there were several limitation in the popularization of vermin composting. Future research in the field of vermin composting needs more attention. The study is based on secondary data. The present study focused on Municipal solid waste generated and waste processed by the district in selected state.

Keywords: solid waste management, current scenario and role of government

Introduction

Waste generation rates have been endlessly accumulating in the world because of fast development in population and urbanization. According to the data 2.01 billion tonnes of solid waste was generated and 0.74 kilograms per person per day in the year 2016 and this would be 3.40 billion tonnes in the year 2050, World Bank, (2019). In low income countries the problem of solid waste is more severe due to poor practice of unregulated waste disposal, openly burned and over 90 per cent of the waste directly disposed in open space. Meanwhile the waste is unregulated and not treated; such waste creates various severe health impact to the public. The United States and Canada were the two countries in higher per capita municipal solid waste generators in the world, that is about 2.58 kilogram and 2.33 kilograms of waste has been disposed by the countries. Statista, (2019).The solid waste generation was based on the size of the urban population, density of population, economic development and consumption rate of commercial goods. India is the second largest nation in the world, with a population of 1.21 billion, accounting for nearly 18 per cent world's human population, but it does not have an adequate amount of resources or sufficient system in place to treat its solid wastes. Its urban population grew at a rate of 31.8 per cent during the last decade to 377 million, which is greater than the entire population of US, the third largest country in the world as per census 2011. India is facing a jagged disparity between its mounting urban population and existing services and resources. The management of MSW is disappearing through a critical phase, due to the insufficient of suitable amenities to treat and discharge of the overweight quantity of MSW generated by the metropolitan cities daily. India has a huge gap to fill, one such service called Solid Waste Management (SWM). Proper municipal solid waste disposal systems to address the mushrooming amount of wastes are absent.

According to OECD (Organisation for Economic Co-operation and Development) Municipal waste is collected and treated by, or for municipalities. It covers waste from households, together with large waste, similar waste from commerce and trade, workplace buildings, establishments and tiny businesses, yard and garden, street sweeping, contents of litter containers, and market clean up. Waste from municipal biodegradable pollution networks and treatment, still as municipal construction and demolition is excluded.

Statement of the problem

- Total population of Tamil Nadu was 72,147,030 of which male and female were 36,137,975 and 36,009,055, Census 2011. It is nearly about 48.40 per cent of people were be a resident of urban region in Tamil Nadu. The state is therefore, going to face a challenge of providing essential infrastructure in urban centres to keep pace with population growth.
- The current SWM services are unproductive, acquire heavy spending and are so low as to be a potential risk to the public health and environmental quality.
- Improper solid waste management weakens public health causes environmental pollution, accelerates natural

resources degradation, causes climate change and greatly impacts the quality of life of citizens.
- The generation of solid waste is predictable and which was unavoidable one.
- Municipal solid waste from urban centres mixing up with ground water courses creates potential risks to human health.
- Dumping and burning of solid waste sideways on the roads of the highways have several environmental and socio-economic impacts.
- Because of open dumping, the soils nearby water bodies, the plants and human health were significantly affected.
- The animals and micro-organisms were also affected.
- Continuous disposal of waste in land can carry the serious land degradation issue.

Need for study

The generation of solid waste were the inevitable consequences of all processes wherever materials are used. Extraction of raw materials, manufacture of products, consumption and waste management were easily generating waste. The rate of materials was high in use today and such sorts of waste can exactly cause serious impact on the environment, quality of air and even human health. Solid waste management consist of financial, engineering, planning, administrative, and legal functions. Waste management practice can differ from residential and industrial producers for urban and rural areas it is also vary from developed and developing nations. The administration of non – hazardous waste in metropolitan areas was the job of local government authorities. On the other hand, the management of hazardous waste materials is typically the responsibility of those who generate it, subject to local, national and international authorities. (Rick Leblanc, An introduction to waste management, 2019). Solid waste management were the major environmental burdens especially in megacities of many developed and developing Asian countries. An alarming rate of solid waste generation trends could be seen parallel to industrialization, urbanization and economic development. The leading confront to the authorities of both small and large cities in the developing countries were the solid waste management issue. This is primarily due to the escalating production of solid waste and the trouble posed on the municipal budget. So, studying solid waste and waste management plays an important role in both developed and developing countries at present.

Background of study

Solid waste is generally something unwanted. A material is believed as waste until it is considered as useful yet again. Thus, a solid material considered as solid waste in the eye of the producer when it loses its worth to them and is discarded. Solid waste management is a term that is used tom refers to the process of collecting and treating solid wastes. It also recommends solutions for recycling substance that do not belong to rubbish or litter. Rubbish or solid waste has been an issue as long as people have been living in settlements and residential areas. How solid waste can be transformed and used as a valuable resource is so called waste management. With hasty urbanisation, the country is facing substantial waste management challenge. Solid waste management is the fundamental necessary services offered by municipal authorities in the country to keep urban centres clean. On the other hand, more or less all municipal authorities put down solid waste at a dump yard within or outside the city randomly. It is noteworthy that waste management becomes challenging when segregation of the garbage is not performed and recyclables, organic waste and toxic are all dumped together. Escalating urbanisation is placing an additional stress on landfill sites positioned in urban areas. Waste management rules were notified more than a year ago, yet they are not put into practice. The Swatch Bharat Programme has focussed mainly on individual action to keep streets clean without pressure on state and municipal authorities for scientific management of the waste. Compost pits should be constructed in every locality to process organic waste. Community participation has a direct bearing on efficient waste management in an economy. As the part of government intricate in the management and handling of waste turn out to be challenging with several events of disaster and epidemic situations in the country, the rules and regulations related to the management of these wastes were revised, thus resulting in greater roles being played by the authorities. Consequently, to bring the effort and as a duty to look our countries welfare the private sector participation plays a vital role. Even though the role of private sector active participation was very less in the past decades, now a fruitful involvement is being taken care in managing the waste handling techniques. India is getting buried under mounds of garbage as the country has been generating more than 1.50 lakh metric tonne (MT) of solid waste every day. About 1, 35,000 MT per day of the total amount is collected waste. Nearly 15,000 MT of garbage remain exposed every day, resulting in almost 55 lakh MT of solid waste disposed in open areas each year, which leads to severe pollution level. Of the total composed waste, only 20 per cent (27,000 MT per day) is processed and the outstanding 80 per cent (1, 08,000 MT per day) is discarded in landfill sites. Tamil Nadu is the sixth most densely populated state in India as per both 2001 and 2011 Census. In Tamil Nadu, a total of 14,727 tonnes of municipal solid waste is generated per day, of which 57 per cent is generated by the 12 corporations, 23 per cent by the 123 municipalities and 20 per cent by the town Panchayat. The total MSW generated in the municipalities and the town Panchayat were 3207 and 2842 tons/day, respectively. Contribution of different sources to MSW generated was town Panchayat 20 per cent, municipalities 23 per cent and corporation's 57 percent (TNPCB Annual Report 2013-14). Coimbatore is a remarkable city in Tamil Nadu which is located on the banks of the Noyyal River, covered by the Western Ghats and it is the second leading city in the state after Chennai and also the sixteenth biggest urban agglomeration in India. The corporation generally produced about 1000 tonnes of daily waste in each zone.

The sanitary labours in the corporation for waste collection were about7000, in which 4,500 were permanent workers and the rest of them were temporary workers. Around five lakh million tonnes of waste accumulating over a year, dueto the practical difficulties on the segregate the waste and composting the solid waste forming bigger and because bigger mountains on the waste land. The waste has been landing at the dump, un-segregated. Efforts at processing it have not met with much success. The study is based on secondary data. The city corporation is likely to dispose the solid waste at Vellalore dump yard by employing bio-mining method.

Research gap

The present study focussed on the problems and growth of solid waste generation in India. Further it concentrates on the Municipal solid waste generated and waste processed by the cities in selected states. The study was also putting the major efforts to analyse the scenario of solid waste and waste management methods adopted in Coimbatore city. The present study has the limitation that it would not focus on the areas about challenges faced by municipal authorities in waste segregation level, public private participation and NGO contribution towards solid waste management in the city, further this gives the way to the researchers to concentrate on these key areas with this background the following specific objectives of the study were

1. To observe the Growth of Solid waste generation in India.
2. To understand the Municipal solid waste generated and waste processed by the cities in selected states.
3. To study the scenario of Solid waste in Coimbatore city.
4. To analyse the waste management in Coimbatore city

Review of literature

Vaibhav Srivatsava, Barka Vaish and Rajiv Pratap Singh (2020) [7] founded that Varanasi, India's historic cultural capital, struggles with inefficient waste management practices. In this study it is analysed that inefficient waste managing practice will impacts environment and human well-being. Finally, the study helps in designing a successful waste management plan for Varanasi and other cities with similar waste characteristics.

Balamurugan Rajendran, Arun Arumugan and Sudagar Subramaniam, (2020) [8] identified that solid waste management has becoming a serious issues now a days. Municipal solid waste management workers are facing various difficulties due to an immeasurable stage and improper handling techniques. Urbanization is playing a most significant role in solid waste generation at present. The present study evaluates composting of municipal solid waste and also identifies the source of waste generation, with extensive use of waste collection techniques, treatment method and handling of all the districts of Tamil Nadu. The evaluation contains public private partnership harnessing benefits challenges and unrecognized role of rag-pickers. The present study found that creating decentralized solid waste treatment units in all districts and also encourages waste recycling industry.

Geetika Mishra and Mitali Yadav (2019) [9] spotted that the developing countries like India the rate of municipal solid waste generation has increased due to rapid migration of people from rural to urban areas. Door to door collection is not generally practiced. Disposal of sewage, waste and open defecation from such areas need appropriate attention. There should be community mobilization to sensitize them towards their contribution in waste management, increase in the better infrastructure for the MSW management, sanitary and monitored landfill sites and also waste to energy technologies to be promoted. Awareness among people about the significance of source segregation at generation sites as biodegradables, inert and recyclable material and change in habits to store, segregate and dispose of waste was to be taken care and it is significant to follow the direction of municipal council for effective waste management practices.

Table 1: Evolution of Solid Waste Generation in India (Metropolitan Cities)

S. No	City	Population	Waste Generation (TPD)			
			1999-2000	2004- 2005	2010-2011	2015- 2016
1	Mumbai	12,442,373	5355	5320	6500	11,000
2	Delhi	11,034,555	400	5922	6800	8700
3.	Bangalore	8,443,675	200	1669	3700	3700
4.	Chennai	7,088,000	3124	3036	4500	5000
5.	Hyderabad	6,731,790	1566	2187	4200	4000
6.	Kolkata	4,496,694	3692	2653	3670	4000
7.	Surat	4,467,797	900	1000	1200	1680
8.	Pune	3,124,458	700	1175	1300	1600
9.	Kanpur	2,765,348	1200	1100	1600	1500
10.	Visakhapatnam	2,035,922	300	584	334	350

Source: International Journal of Home Science (2019)

The generation of Municipal solid waste in the major metropolitan cities in India are portraits here from the year 1999–2016. The above data depicts that there is an increase in the waste generation in all the cities especially in Mumbai, Delhi and Chennai. As per the data given above the most populated and excessive waste generation city is Mumbai followed by Delhi, Chennai, Bangalore and so on.

The important fact behind this increase in waste generation could be popularity for migration for the reasons like employment, rapid development and infrastructure, betterment in higher education, etc.

Municipal Solid Waste in Tamil Nadu

Tamil Nadu has recorded the population of 7.21 Crores, an increase from figure of 6.24 Crore in 2001 census. In 2001, total population was 62,405,679 in which males were 31,400,909 and females were recorded 31,004,770. According to 2011 census the total population of Tamil Nadu was 72,147,030 of which male and female were 36,137,975 and 36,009,055 respectively. It is nearly about 48.40 per cent of people were residing in urban region of Tamil Nadu. The state is therefore, going to face a challenge of providing essential infrastructure in urban centres to keep pace with population growth.

Table 2: Municipal solid waste generated and processed in selected states

S. No	States	Daily waste generated (MT)	Waste processed (%)	
1	Arunachal Pradesh	181	0	Low Percentage of waste processing states
2	D & H Haveli	35	0	
3	Jammu and Kashmir	1374	1	
4	Jharkhand	2327	2	
5	Odisha	2650	2	
6	Bihar	1318	3	
7	Puducheery	350	3	
8	Mizoram	201	4	
9	West Bengal	7700	5	
10	Haryana	4514	6	
11	Chhattisgarh	1680	74	Top states in waste processed
12	Telangana	7371	67	
13	Sikkim	89	66	
14	Goa	260	62	
15	Meghalaya	268	58	
16	Tripura	420	57	
17	Delhi	10500	55	
18	Manipur	176	50	
19	Kerala	1463	45	
20	Maharashtra	22,570	39	
	All states	1,43,558	24.8%	

Source: Times of India (2018)

The above table (2) shortened that Municipal solid waste generated and waste processed by the cities in selected states. It is clearly stated that Maharashtra has recorded the highest 22,570 metric tonnes of daily waste generated in this 39 percent of waste was going for processing purpose. Next to Maharashtra, Delhi has recorded about 10,500metric tonnes of daily waste generated, in this about 55 percent is transformed to waste processing. Similarly, West Bengal and Haryana has noted 7,700 and 4,514 metric tonnes of daily waste generated but waste processing percent is about 5 and 6 which is very minimum compared to other states.

Fig 1

The scenario of solid waste in Coimbatore

Coimbatore is a noteworthy city in Tamil Nadu. Situated on the banks of the Noyyal River, encompassed by the Western Ghats, it is the second biggest city in the state after Chennai and the sixteenth biggest urban agglomeration in India. It is controlled by the Coimbatore Municipal Corporation and is the authoritative capital of Coimbatore area.

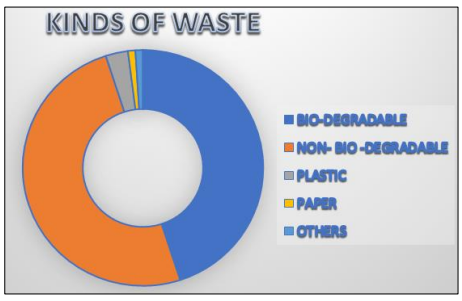
It is one of the quickest developing level II urban cities in the country and a noteworthy center point for textiles, commercial ventures, business, education in Tamil Nadu. The waste estimated by the Coimbatore Corporation from 1999 to 2018 is represented under with the year wise break up.

Table 3: Growth of population and solid waste in Coimbatore

S. No	Years	Growth of population (lakhs)	Solid waste (tpd)
1	1999-2000	-	350
2	2004-2005	-	530
3	2010-2011	16.01	700
4	2015-2016	18.5	850
5	2017-2018	19.2	1000

Source: CPCB

It is evidently showing that there is direct relationship between population and solid waste increase in Coimbatore. It is estimated that in the year 2010-2011 the growth of population in the district was 16.01 lakhs and generated solid waste was 700 tonnes per day. This is tremendously resulted in increasing trend in the year 2017-2018 that is about 1000 tonnes per day. The increase in solid waste is due to development of industries, growth in prosperity and movement of people from rural to urban and so on.



Source: JNNURM, Coimbatore Corporation (2019)

Fig 2: Types of solid waste in Coimbatore

Municipal solid waste of Coimbatore is generated from households, offices, hotels, shops, schools and other institutions were portrayed in categories as Bio- degradable, Non- bio degradable, Plastic, Paper and others. Generation rates for MSW vary from city to city and from season to season which have a strong correlation with levels of economic development and activity. It is estimated that 50 per cent of Non –bio degradable waste such as inorganic waste which cannot be decompose or degrade were maximum in amount compared to Bio-degradable. Bio-degradable waste were organic waste which contains fruit waste, vegetable waste and waste from plants has recorded 45 per cent and plastic waste were 3 percent, paper and other waste were 1 percent respectively.

Door to Door, collection of segregated solid waste is practiced for primary collections with the help of 16 lakhs vehicles. Road sweeping and mopping is also carried out, road sweeping flipper machines are used to clean the roads. The usage of bullock carts is slowly being phased out.

Table 4: solid waste management in Coimbatore corporation primary collection

S. No	Particulars	details
1	Solid Waste Per Day	1100 Tonnes
2	Total Vehicles Used	16 Lakhs
3	Permanent Workers	4500
4	Temporary Workers	2500
Health and hygeinic		
5	Safety- Gadgets	Two Pairs per Labour
6	Cloves	Two Pairs per Labour
7	Mask	One Pair per Labour
8	Regular Medical Camp	Monthly Wise
9	NGO	RAAC
10	Dumping Yard	One (646 Acres)
11	Total Dustbins	5000 (5 Zones)

Sources: JNNURM, Coimbatore Corporation (2019)

The above depicted table (4) gives the crucial importance about the details of solid waste in Coimbatore Corporation. The corporation generally produced about 1000 tonnes of daily waste in each zone. The sanitary labours in the corporation for waste collection was about 7000, in which 4,500 were permanent workers and the rest of them were temporary workers. One dumping yard with 5000 dumping containers were used by the corporation for the waste collection. Types of waste which is discharged by the corporation were Bio-Degradable, Non- Bio Degradable, Paper, plastic and others.

Fig 3: vermi composting in Coimbatore

Vermicomposting may be a straightforward biotechnological method of composting, within which Earthworms area unit accustomed enhance the method of waste conversion and manufacture a more robust ending. Vermin composting were thought to be a clean, property and nil waste approach to manage organic wastes however still there have been some constraints within the popularization of vermicomposting. Rather than increasing analysis within the field of vermicomposting desires additional attention. Vermicomposting on an outsized scale needed to unravel the difficulty of waste disposal effectively on a worldwide level.

Fig 4

One of the major constraints is the lack of consciousness and appropriate information concerning the use of vermicomposting. The Coimbatore Corporation has vermicomposting at its Vellalore manure yard to deal with the ever-increasing quantity of wastes. Close 1000 tonnes of waste were generated and taken to the dump yard at Vellalore spread over 680 acres.

Findings

- The significant statement which was behind the increase in waste generation could be popularity for migration for the reasons like employment, rapid development and infrastructure, betterment in higher education, etc.
- It is evidently identified that Maharashtra has recorded the maximum 22,570 metric tonnes of daily waste generated in this about 39 percent of waste was going for processing purpose.
- It is evidently showing that there is direct relationship between population and solid waste increase in Coimbatore.
- In 2010-2011 the growth of population in the Coimbatore district was 16.01 lakhs and solid waste was 700 tonnes per day. This was enormously resulted in increasing trend in the year 2017-2018 that is about 1000 tonnes per day.
- The Coimbatore Corporation was commonly produced about 1000 tonnes of daily waste in each zone.

Conclusion

The study is found that with the increase in global population and the rising demand for essential products and services, there has been a rise in the amount of solid waste throughout the world. Waste that is not properly managed will obviously generate a serious environmental and health impact to the society on the whole. Municipal solid waste of Coimbatore is generated from

households, offices, hotels, shops, schools and other institutions were portrayed in categories as Bio-degradable, Non- bio degradable, Plastic, Paper and others. Waste management techniques are followed by the corporation, but still there was an issue. Vermin composting were regarded as a clean, sustainable and zero waste approach to manage organic wastes but still there were some constraints in the popularization of vermicomposting in the city. Still there is a need for reuse, reduce and recycling the waste materials.

Suggestions

- Segregation of waste as degradable and non- degradable by household itself plays a vital role in collection process.
- Regular monitoring of supervisors and health officers in most polluted areas.
- Public awareness programmes must be given by the corporation at least monthly once.
- Implement of 3R's (reuse, reduce and recycling) concept in waste management practices with proper observation.

Reference

1. World Bank Report, 2019.
2. TNPCB, Annual Reports
3. Reports of CPCB
4. JNNURM, Coimbatore Corporation
5. Solid Waste Management Reports, 2018-19.
6. Waste Management Reports Down to Earth, 2019
7. Vaibhav Srivatsava, Barka Vaish, Rajiv Pratap Singh. "An insight to municipal solid waste management of Varanasi city, India, and appraisal of vermi composting as its efficient management approach", Environmental Science and pollution Research, Springer link, 2020, 191.
8. Balamurugan Rajendran, Arun Arumugan, Sudagar Subramaniam. "Challenges in municipal solid waste management: a key", International Journal of Ambient Energy, Accepted author version posted online: 17 Jun 2020, Published online, 2020.
9. Geetika Mishra, Mitali Yadav. "Study on municipal solid waste management and challenges faced in Indian metropolitan cities", International Journal of Home Science. 2019; 5(2):200-205.
10. International Journal of Home Science, 2019.