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Smart Waste Management under Smart City Mission – Its Implementation and Ground Realities

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Abstract: ***This paper is looking the smart waste management under smart city mission. What are the objectives of smart waste management? Are people aware of it? Also try to understand the implementation of waste management from small town to the metropolitan city by the local government, NGO's of that city as well as peoples of that city. Metropolitan cities like Delhi, Mumbai, Chennai, Pune, Indore, Mysore, Bangalore, etc. As we are seeing facing a lot of issues for the implementation of waste management. Therefore from this paper, I want to see what are the new solutions smart ideas are setting up those cities municipalities for waste management which is one of the neglected topic as well as issue.***

Smart waste management concept nowadays emerges a new phenomenon and it is mostly applied in the Metropolitan cities where the production of the waste is high and management of waste and awareness about the waste management in between the people is very low. Smart waste management helps to reduce the waste, create waste to energy source also it helps to keep the environment clean and neat. All the city's urban local bodies depending upon the available technology have to spend the money and innovate the new concept of waste management that is the main purpose of smart waste management.

This paper is based on the secondary as well as primary data. Secondary data took from the newspaper, article, etc. And primary data based on the observation and survey that did in 2016 and recent in Mumbai. At the end in the discussion try to show the difference between small-town waste management and Metropolitan cities challenges and how to manage it and then gave the recommendation for solid waste management improvement.

Keywords: Healthy environment, Local Government, Metropolitan Cities, Smart city, Waste management.

I. INTRODUCTION

India is a fast rapid, growing urbanizing country, where people shifted their employment from agriculture to industrial services oriented base. According to 2011 census in India around 31.2% population staying in urban areas. More than 377 million urban people are staying in town/cities. India is a very diverse country is divided into 29 states and 7 Union territories (UTs).In India previously there are 3 megacities that are Greater Mumbai, Delhi, Kolkata where population found more than 10 million, 53 cities where population found more than 1 million and 415 cities where population found 100000 or more than that.

Table I: Population in metropolitan cities

Cities	Population
Greater Mumbai UA	18.4 Millions
Delhi UA	16.3 Millions
Kolkata UA	14.1 Millions
Chennai UA	8.7 Millions
Bangalore UA	8.5 Millions

Source: *censusindia.gov.in/2011-Documents/UAs-Cities-Rv.ppt*

India is a fast rapid growing, urbanization country every day lots of people migrate from rural to urban areas for the employment purpose because of that a load of the population is increasing in the urban area. And also people not only migrate for employment but for a better lifestyle and because of that they mostly attracted to the metropolitan cities like Mumbai, Delhi, Bangalore Indore, etc. Therefore this increasing urbanization, creating a load on civic infrastructure facilities housing water, sanitation, and solid waste management. Therefore in this paper, discussing how this increasing urbanization creating a problem of solid waste in urban areas and because of that, it is difficult to handle the urban local bodies. For a small town, it is easy to manage the solid waste but for Metropolitan cities, it is difficult to manage then for that how to handle the solid waste of big metropolitan cities it is not only the responsibility of the municipalities of that city but an equal responsibility to the cities citizen of that city.

Municipal Solid Waste management is one of the serious matter in the direction of making our cities strong, healthy, sustainable, clean and neat. And this is only possible if we manage that solid waste properly by (RRR) method like reduce, reuse, recycle, by doing the segregation on the source like dry waste and wet waste, then the people who come to collect for them also it will become easy. Also making the waste to energy resource of wet waste is also one the best way of reduction of waste, but for doing all these we definitely have to do awareness in between society. Unmanaged waste effects on health, also it creates uncleanliness in the surroundings. Therefore for our good, healthy future everyone have to manage the waste properly.

Government of India on October 2, 2014, launched a mission regarding cleanliness, Open defecation free India that is Swachh Bharat Mission in English it is called as Clean India Movement. The aim of this campaign to clean and make an open defecation free India by October 2, 2019, on the 150th Birth anniversary of Mahatma Gandhi. This campaign is moved all over India's school, colleges, academic Institution to do awareness of cleanliness in people.

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A. Mission Objectives

Swachh Bharat Mission Objectives as follows:

1) The abstraction of Open defecation from India by doing the construction of toilets for individual, household level, public toilet, and community-based toilet.
2) Eradication of Manual Scavenging caste-based occupation
3) To do the Solid Waste management in a scientific way and also manage it by urban local bodies of that area.
4) Involvement of private sector participation for the improvement of Solid waste management –sanitation sector
5) To change the mentality of people towards the usage of toilet, waste, cleanliness by doing awareness

Therefore by seeing the Mission Objectives of Swachh Bharat Mission, we can see that the third objective of Swachh Bharat Mission focusing on the scientific municipal solid waste management.

After Swachh Bharat mission, the Government of India launches the new policy it is called Smart Mission. This mission launched on 25th June 2015. The objective, aim behind the smart city mission is to create a city sustainable clean and liveable by all the infrastructure wise, so that citizens of that city will live happily in that city. Under the smart city mission Government of India keep the different smart solutions like 1) E-governance and citizen service 2) Smart Waste management 3)Smart Water Management 4) Energy Engagement 5)Urban Mobility and Others Therefore from one of them is smart waste management in that it focuses on the i) to convert the waste in fuel and energy resources ii) Convert the waste into compost iii)Wastewater which came from bathrooms, kitchens of hotels, houses it should have to be treated as properly iv) And we have to recycle and reduce the construction and demolished waste i.e. Debris which created from construction.

One of the challenges in Smart City projects in the planning and executing a comprehensive waste management program into connecting the various sectors like residential buildings, commercial & industrial establishments, hotels, healthcare institutes, transport sector, public places, tourist spots, and many others. Smart City consultants play a major role in evaluating and formulating a waste management strategy that can be incorporated into the development plan of a smart city. The challenges are less in Greenfield projects.

B. Growing Sprawl and Waste Management Issues:

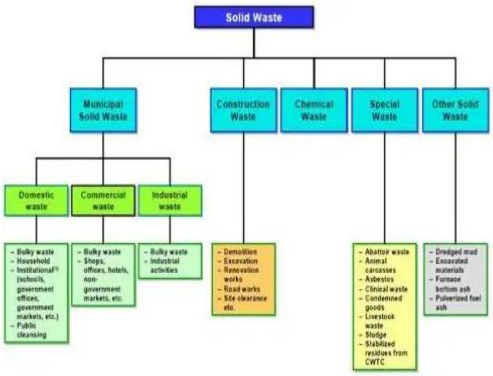
Cities are the centre of economic growth and development. And the bulk of these cities are located mostly in the developing Nations. Urban Planning and City management one of the burning issue of the development of cities and also one of the most neglected topic. In the cities people stay from varieties of background, culture, rich, poor, middle class all profiles. These all varieties profile people migrate in the cities daily for searching job, student comes for taking higher education, for a better lifestyle, facilities. Therefore we can see that cities are growing continuously and this continuous growth cause of waste production. And because of that, it creates a load on urban local bodies and therefore many ULB's are struggling to manage the waste of these cities.

There are lots of places that were we see do not have a garbage bin. And if there are no dustbins/garbage bins found then people start to burn that waste in that mostly non-biodegradable waste is found like plastics, wires etc. and after burning this non-biodegradable waste there is lots of pollution creates in the atmosphere and it creates different types of diseases like asthma, lung cancer, cardiovascular diseases In waste nearby 40-50% carbon is found and after burning that waste also carbon dioxide releases in the air and polluted air effects on our health. From the study, it was released that more than 40% of the world's garbage is burnt in open piles and contributing more in air pollution, emission, climate change issues.

For waste management, there is the main responsibility to have an urban local body. To tackle the problem of waste management different ULB's come up with new technologies. From one of them, IOT is the internet of things which reduces the human resource and also do a lot of work of managing the waste at a time.

II. THEORETICAL FRAMEWORK

In Figure 1. It is showing the different types of waste like Municipal waste means the waste which is collected by the municipality to the cities people. Like Domestic waste, commercial Waste, Industrial waste. Then what is construction waste when after the construction of the house, building, road whatever debris remains that is called construction waste. Chemical Waste mostly generated from industries, chemical companies, hospitals, etc. Then special waste in which mud, ash comes in this category.



Figurure1. Types of Solid Waste

(*Source:* *https://gambiergigaflops.wordpress.com/2015/06/17/trash-trek-research***)**

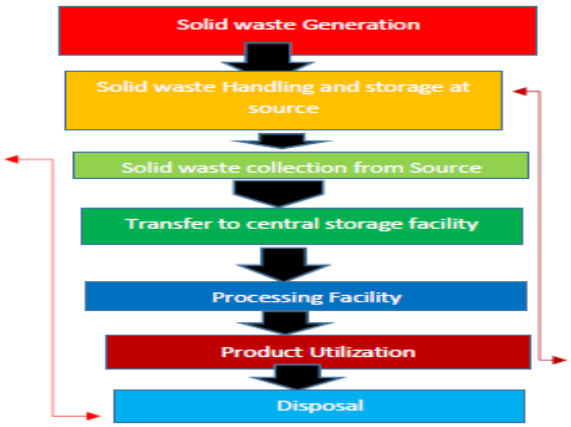


Figure 2. Steps for Solid Waste Management

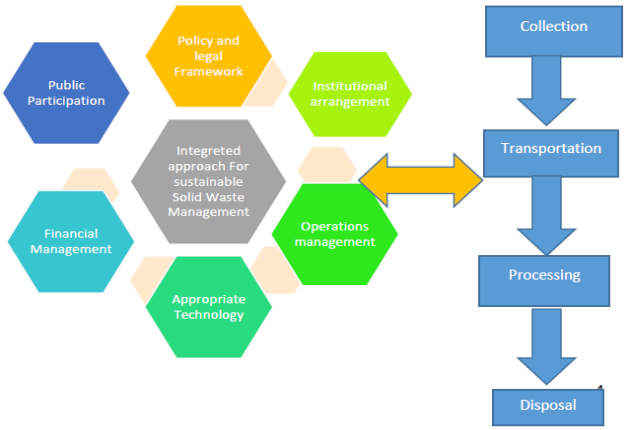


Figure 3. Integrated Approach for Sustainable Solid Waste management

In Figure No.3, it is found that the Integrated Approach for sustainable solid waste management in which the first step is 1) Proper policy formation and legal framework mean the formation of policy with a proper aim, objectives with the help of law are very important.

2) The institutional arrangement means the institutions like Municipality which urban local bodies those have given the autonomy after a 74th constitutional amendment to providing civic infrastructural facilities city's citizen. Implement the policy like swachh Bharat mission, under which solid waste management implementation also see the Municipality with the help of Ngo's a public-private partnership model not found everywhere strong (Means partnership with NGO's of urban local bodies).

3) Then Proper management of Municipalities for solid waste management is most important for ex: proper management of budget, then regular meeting, workshops for the citizen awareness about SWM.

4) Then in next for managing the solid waste appropriate technology is also needed.

5) Then from a total fund of the municipality, how much spending on the SWM its proper management must require and that is called financial management.

6) And at last the Solid waste management it is a process cannot be complete without the public participation, therefore, the public participation is really important.

Then after that, it is the responsibility of the municipality to do a collection, transportation, processing, and disposal of solid waste of the city.

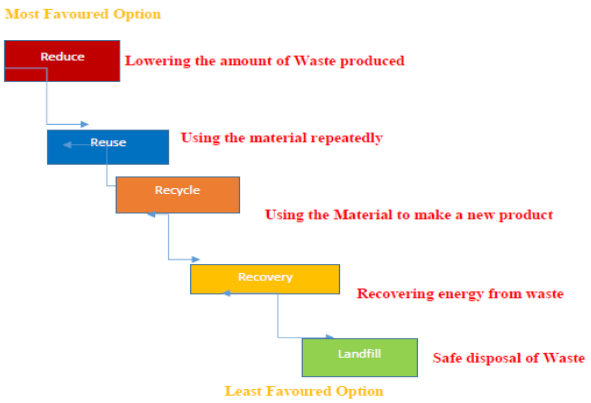


Figure 4. Most Efficient method of Managing the Solid Waste

From Figure No.4 it is found that the Most efficient method of waste management. The only thing is to do awareness between the people, cities citizen about this model is really important. Try to reduce the waste as possible as we can, like reduce plastic usage instead of plastic carry bags usage of the paper bag, banana leaves are really eco-friendly. And help to reduce waste. Then recycle of the material like plastic by recycling of the plastic we can again make a new product, then recovery means the conversion of non-recyclable waste materials into usable heat electricity or fuel through a variety of process like combustion, gasification. , anaerobic digestion and landfill gas recovery. And the last one is landfill disposal by safely, but it is a less favoured option.

III. LITERATURE REVIEW

In the book of Waste of Nation and Garbage Growth in India Doron, Jeffery (2018) talking about how the garbage is increasing in urban cities according to time, place, and population**.** This book starts with the question that Why India is so filthy? Yes really always this question comes in mind but after reading this book we understand why this question raises on the country like India. Here the things like "Na man khud saaf karunga and jo kar raha hai usko sammanDunga" it is like this type of attitude we found in the Indians (I will not do cleaning of mine and someone else if doing I will not give respect to that person) In this book author is describing about experiences, conditions about the sanitation, solid waste management, local governance role, people's condition and NGO's involvement of various metropolitan cities like Delhi, Mumbai, Moradabad, Pune, Kolkata, Chennai, etc. Then they talking about the technological solution about the solid waste management and its imperfection because of people's are not capable to handle it also how because of lack of funding, management and limitations of local government there are issues happening in the implementation of SWM. And in last they talking about the occupation and its possibilities of waste management. In conclusion, they are saying that to clean India change the mentality of the people towards the cleanliness is really important.

Pamnani, Srinivasarao (2014) talking about Municipal solid waste management in India. How it is implementing in India's Metro cities, town, class I, class II cities. Then they explain the current scenario and future direction about SWM.In concluding remark they are saying the MSW generation depends on population, urbanization, climate, socio-economic criteria. Proper training is really required for the implementation of SWM. Lack of finance, training, leadership, lack of proper planning implementation of solid waste is found poor.

Talyan (et al. 2007) talking about the municipal solid waste management in Delhi, how it is implemented in Delhi, its current practices, by the local government. Then how in the solid waste management NGO's and community people are involved in Delhi that is mentioned in this article? Also mentioned the policy legislative framework of SWM in India. Then over the year how the composition and generation of SWM happened in India that is mentioned in this article, then it is mentioned the composition,

recycling, transportation how and which was happening in the Delhi and at last it explains the initiatives towards managing the best practices of MSWM (Municipal Solid waste management) by Delhi municipal corporation. In conclusion, they are explaining that the Municipal Corporation of Delhi has taken big steps to the improvement of SWM in Delhi also frame the guideline (2015-2021) as a masterplan.

Srivastava (et al .2004) in their article explain about municipal SWM in Lucknow Uttar Pradesh. For doing this study they use the SWOT analysis in their methodology. Strengths weaknesses opportunities and threats on the basis of that they explain how SWM practicing in Lucknow. Therefore on the basis of SWOT, they are saying that their Strength factor in the Lucknow about SWM is community involvement, community organizations, their enthusiasm, senior citizens involvement. Then talking about the Weakness factor then there is lack of awareness about the segregation of waste in the community, people wait for the government action, lack of information education, communication in the community and also lack of integrated approach of MSWM in the city and door to door collection of waste not found in the city. Then talking about opportunities then they are saying in Lucknow mobilization and capacity building at college's level is the key role of improvement of SWM. Also, those who are unemployed by making composting plant and how to make compost by giving the proper training to these people it will create a big opportunity for making waste to energy resource. Also sharing the ideas by the community and stakeholders for MSWM to municipality create big opportunities. Talking in threats then there is lack of coordination among stakeholders, lack of public-private partnership, diverse group in the stakeholders.

Kaushal (2012) talking about Municipal SWM in India current status and future challenges. Then explain how because of urbanization SWM increasing in India mainly cities like Delhi, Mumbai, Kolkata, Chennai, Bangalore. Then explain the MSW generation, collection, treatment, disposal by the states. Then according to population wise mention the waste generation per capita in kg, then explain the different methods of managing the SWM like composting, gasification, incineration, landfilling bioreactor landfilling, refused derived fuel plants. Then explaining the issues in MSWM like source segregation, treatment, and disposal, and resource generation issues, policy issues, technology issues, financing issues. Then explain the future challenges and opportunities for waste management.

Joseph (2002) explain the perspectives of solid waste management in India. He explains the waste generation, and characteristics in India, then he shows the waste generation in Metropolitan cities of India, then shows the characteristics of municipal solid waste generated by metro cities like paper textile leather, plastic, metal, glass, ash earth, and others how generating that explain. Then focuses on the legal and institutional framework of Municipal solid waste Management (MSWM). Then he wrote the present management and practices of MSWM and explain the national plan of MSWM. And in conclusion, he explained how because of populism SWM is increasing in metropolitan cities and how it is the effect on the public health and therefore improvement of SWM to do awareness in between community is very important.

IV. METHODOLOGY AND RESULTS

The methodology is one of the important parts of writing in any paper, article or to do research this paper focuses on both secondary and primary data**.** This paper is based on secondary literature, data like, news reports, research paper, journal, etc. Also, research that I did in 2017 on the Solid Waste management in religious places of India: Case Study of Shirdi and also survey that I did in 2016 as a sanitation inspector of four municipalities of Maharashtra, Jalgaon, Vaijapur, Shirdi, and Rahuri. Also survey that did in Mumbai's Maharashtra Nagar, based on that observation and data that got this paper is writing.

Table II: Change in Composition of Solid waste with time (in %).

Year	Biodegradables	Paper	Plastic/rubber	Metal	Glass	Rags	Others	Inert
1996	42.21	3.63	0.60	0.49	0.60	-	-	45.13
2005	47.43	8.13	9.22	0.50	1.01	4.49	4.02	25.16
2011	42.51	9.63	10.11	0.63	0.96	-	-	17.00

Source: Planning Commission report

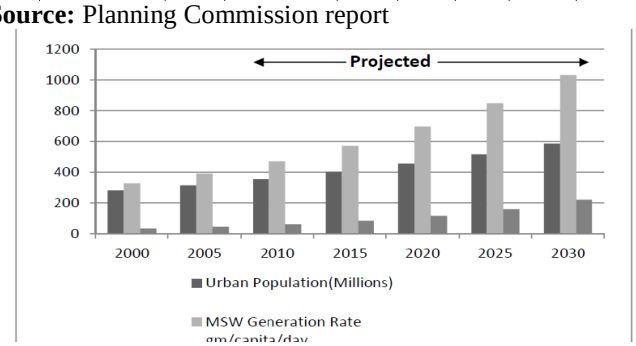


Figure 5.Projected Municipal Waste Generations for Urban Population in India Information from the web site of CPCB

Source: *Information from the web site of CPCB*

Table III: Municipal Solid Waste Management State wise

Source: *Times of India July 30, 2018 (https://timesofindia.indiatimes.com/india/75-of-municipal-garbage-in-india-dumped-without-processing/articleshow/65190477.cms)*

Table IV: Highest State Rank in Waste Generation

Rank*	State	Waste generation (mt/d)	Waste generation (In lakh mt/annum)
1	Maharashtra	22,570	82.38
2	Tamil Nadu	15,547	56.75
3	Uttar Pradesh	15,500	56.58
4	NCT of Delhi	10,500	38.33
5	Gujarat	10,145	37.03

***Source**: As of November 2017.Ministry of new and Renewable energy*

By seeing the above data and by doing analysis it is found that how the solid waste is increasing over a period of time year after year and according to state wise. Then how because of urbanization over a period of time increasing solid waste in the cities. How the waste is increasing in the state wise and Maharashtra is in the highest number. Also in waste management which states are in the bottom and top according to the year 2017 and 2018.

Figure 6: Waste Generation

***Source**: http://damwest.com/hazardous-waste-disposal-agreement/hazardous-waste-disposal-agreement-luxury-waste-smart-cities/*

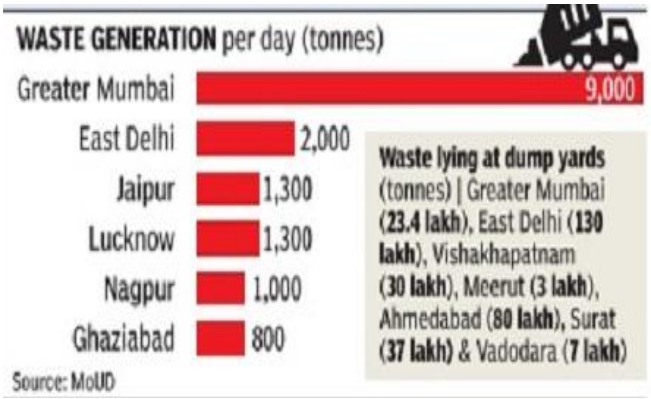


Figure 7: Highest waste generated in Metropolitan cities

***Source**: The waste generated every day in some cities in 2016: in tonnes The Times of India*

Picture 1: Segregation wise City's Rank

***Source**: From: 'my city could be one of Delhi's wards', June 8, 2018: The Times of India*

4 out of 20 cities assessed in 2017-18 by CSE (Centre For science and Environment) have a segregation % higher than 90. From the above the data it is found that which metropolitan cities are generating the highest number of waste.

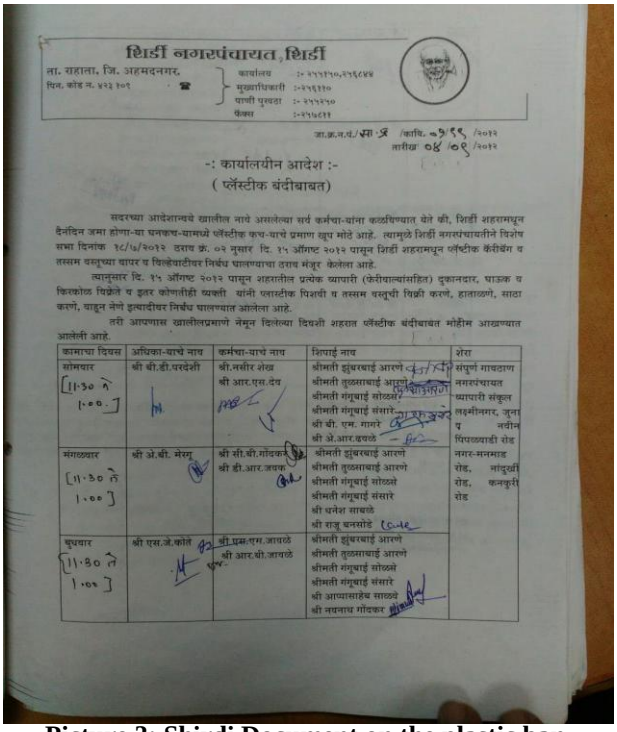
V. RESULT AND DISCUSSION

Talking about the urban local bodies' Waste management then it is fact that to manage the waste in a small town for the municipal council as compare to big cities, Metropolitan cities Municipal Corporation like Mumbai, Delhi it is difficult. After doing a survey of the small town of Maharashtra State like Shirdi which is come to Ahmednagar District, Vaijapur in Aurangabad district Chalisgaon in Jalgaon district, Rahuri and Devali Pravara come in Ahmednagar district of Maharashtra in 2016 it is found that these town's municipality managing solid waste in very well manner. After seeing the small town's waste management understand that how small town managing the solid waste in a very good way because of less population therefore easy to do awareness in between people, less burden, less waste generation and it is easy to convert waste into energy, instead dump the waste on to landfill sites. After visiting those each town's municipalities then it is found that every municipality managing their waste by different methods like in Chalisgaon town it is found that the Municipal Council of Chalisgaon managing wet waste by doing Vermicomposting. Then in Vaijapur town, it is found that municipality of Vaijapur doing composting with the help of organic mixture not only by municipalities but also in small colonies/housing societies of Vaijapur people doing the composting pit where they have free space.

Picture 2: Composting pit at Vaijapur Municipality for managing the wet waste

Source: Self-observation during Inspection in 2016

Then in Shirdi also how by wet waste make a composting with the help of a machine and also heard from the CO (Chief Officer) of the municipality that how this organic natural compost helpful to the farmers farming. Also, the remaining wet waste used for making biogas plant this is the use of making food of Sai Sansthan canteen. Shirdi Municipality banned the Plastic carry bags. Also, there is recent new innovation did in Shirdi they started making incense sticks from flowers wastages because of that it creates employment of the areas female, as well as reduction of waste, also happened in well manner. Around 400 women get employment. Till now 45 lakhs incense stick sold and it has got 10% profit to Temple trust of Shirdi.Therefore from this example we can understand how from waste we can make money if we manage it properly.



शिर्डी नगरपंचायत, शिर्डी

ता. राहाता, जि. अहमदनगर.

-: कार्यालयीन आदेश :-

(प्लॅस्टीक बंदीबाबत)

Picture 3: Shirdi Document on the plastic ban

Source: By Shirdi Municipality

Picture 4: Before cleanliness awareness and after cleanliness picture of Saibaba English School Nagar, Manmad road

Source: *Greeny Pune based NGO survey report*

Picture 5: Composting Machine at Shirdi Municipality

Source: *By self-observation*

Then in Rahuri town municipality, they make not only the composting but also the biogas plant. And by using this compost Rahuri municipality made a garden and with the help of biogas, they are providing light/electricity to the nearby student hostels at night.

Picture 6: Biogas Processing Machine at Rahuri Municipal Council

Source*: During Inspection in 2016 by self*

In Devali Prava Municipal Council for the wet waste they also do a composting of wet waste with the help of a machine and for dry waste mostly plastic carry bags, bottles they made storage and after that, they gave it to the company who recycle it in every month. Also awareness between people about dry and wet waste also found in good proportion.

Picture 7: Wet waste Composting Machine and Dry waste (Plastic carry bags, Bottles storage)at Devali Pravara Municipal Council

***Source**: During Inspection in 2016 by self*

Also recent survey in Jan 2019 that did in Mumbai's Maharashtra Nagar slum area then it is found that the condition of sanitation as well as solid waste management is very poor in this area. After talking to the residents of that area it is found that the garbage collection vehicle from the municipality come in their area once while in a week. And sweeper for cleaning the area never come. When the vehicle in this area come once while in a week then the garbage is also increased a lot on the dustbin and because of that huge garbage storage it is impacting on the residence health, there is no awareness any cleaning in this area just because it is a slum area.

The worse situation in Mumbai is that it is a coastal area and here more than 50,000 tonnes of plastic found Mumbai's mangroves forest across 14 locations it is found. Also the highest quantity of plastic scattered in fishing grounds all over India's 7,516 –km coastline with 131.85kg plastic per sq.km. According to Central Marine Fisheries Research Institute, they found plastics in 4 fishes stomach such as tuna, Mahi Mahi, threadfins(was), croaker(Thoma)and 2 shark species spade nose and hammerhead.

According to Maharashtra Pollution control Board Mumbai Municipal Corporation is very careless in the environmental issues. Joint director of MPCB YB Sontakke said municipal corporations need to realize their responsibilities and also give assurance to every citizen that they will access clean air and water. And this only possible by proper training, and awareness and by proper usage of fund.

Picture 8: Mumbai's Maharashtra Nagar area

***Source:** Photos clicked at Maharashtra Nagar Mumbai which is declared the smart city in 2019 during the survey.*

It is always said that small town managing waste better than Metropolitan cities but the current Indian express article on April 3, 2019, under the title 'How a city cleans up'. Ahluwalia is the chairperson of the Indian Council for Research on International Economic Relations (ICRIER). Patel is member, Supreme Court committee on solid waste management explained how, Vellore city in Tamil Nadu, with a population of five lakh, has been a trailblazer in decentralized management of solid waste and sending no waste to landfills. More recently, it has earned the remarkable distinction of getting all its residents to separate their wet waste from dry waste, which makes the task of solid waste management so much easier for the municipal corporation.

Vellore generates 160 tonnes of solid waste per day, excluding waste from bulk generators. It all began with a PIL in the National Green Tribunal in 2015 seeking closure of the eight-acre dumpsite on a tank bund in Saduperi, a few kilometres away from Vellore. The site had been used for dumping mixed waste since 1991.

Not only medium level city but metropolitan cities those also add in the smart city's list like Indore, Bangalore which is the real, current example in front of us, which make massive implementation in the solid waste management field. From these cities implementation, it is found that the SWM can possible in metropolitan cities also in a good manner only the governance of that city's local government should be strong well managed.).Therefore after seeing the Bangalore, Indore like city's example it is found that these cities are doing well only because of the city's urban body's management is very strong and also public-private partnership model in these cities is very successful and awareness in between citizens of the city is also very strong.

VI. ISSUES FOR MANAGING SOLID WASTE

A) To do awareness about improvement in segregation:

To do awareness between the citizens about the dry waste and wet waste by doing the workshop, the program is very important, because of that the segregation of solid waste will happen on the source only. In India current now very few people know the difference between wet waste and dry waste. And these people mostly belong from urban elite's society, people from the slum areas don't know about the segregation, in fact, there is very less attention of urban local bodies found in such areas towards cleanliness. Therefore to do the awareness about the cleanliness, segregation of waste in every citizen of society, the city is very important. The situation that we are seeing in the urban slum areas current now by seeing that we must have to awareness in between people. We as an educated student, by NGO's, by urban local bodies help. Therefore a load of segregation will definitely reduce.

.B) Classification of municipal solid waste:

India is always from an ancient era known as a diverse country by culturally, by language and also by climate, geographically and because of that the need for policies implementation of different areas is also have to do differently. But the current situation we are seeing that the policymakers rely only on very less information, data for making implementing the policies, therefore, there need to do the classification of Municipal solid waste by region wise.

C) Increasing Urbanization and shortage of funding:
Everyday urbanization of the country like India is increasing and because of that, the load on the civic infrastructural thing like water, sanitation, housing, solid waste management is also increasing. Therefore to provide the infrastructural facilities in good manner to each every citizens of the society it is responsibility of the urban local body means municipal corporations of that city and as we found that there is a lack fund is getting to municipalities and also not proper management of funding because of that the issue of solid waste management is increasing more in the urban areas.

D) Implementation of rules at ground level
It is found the policy, act, rules under the policy act only written on the paper when its implementation time come at ground level then there is not at all implementation found, because in the municipal corporation employees not get proper training also we found that the very fewer officers of ULBs do their work dedicatedly, therefore, dedication, proper training, finding the lacunas in the implementation of the policy is really important to implement the Municipal Solid waste rules.

E) Resistance for notification of new landfill site: Selection for new landfill site to the Municipalities is very difficult because no one wants the garbage site near their house. Therefore there always resistance have to face the municipalities from the people to choose the site for landfills.

F) Improper coordination between Centre and State*:*
There is always a lack of communication, coordination found in between centre, state and urban local bodies, for providing funding and because of that, it impacts on the policy implementation.

G) Appropriate technological solution, Outsourcing, and PPP:
New appropriate technological solutions are really important for the implementation of solid waste management. Like composting, biogas plant, vermicomposting then usage IOT based solution. And for adopting such technologies to municipalities definitely need the help of industries, NGO's and therefore public-private partnership is really important to implement it, that we found very less in the current situation.

H) Unsuccessful waste to energy products:
A country like India is still struggling for making the waste into an energy source and the reason behind only lack of awareness, lack of funding, lack of finance, lack of technical education and its training, carelessness of urban local bodies, therefore, to focus on all this aspect is really important**.**

I) Involvement of the organized sector:
For proper implementation of solid waste management the involvement of citizens of that city also we see that the rag picker who collect the wastes from the dustbins of the cities they don't get any respect, they don't have any social security, therefore, to organize the rag picker to give the proper training is very important**.**

VII. RECOMMENDATIONS

1) For the implementation of SW, community participation is really important. Therefore to participate in the community by workshops, program on the occasion of Ambedkar Jayanti, Santa Gadge Maharaj Jayanti, and Mahatma Gandhi Jayanti and give them a message about the cleanliness is really important. Also by arranging swachtta meetings.
2) To understand the segregation of waste people should be require educated, therefore to give the proper education is really important.
3) Sustainable, well planned composting plants should have to build up to reduce the waste. Zone-wise decentralized composting have to build up. For large unit composting there is community participation is really important.
4) Also should have to keep the solid waste management subject in the universities, schools syllabus Therefore to do awareness between people by the help of students become very easy. For that, the government should have to take initiative to put the waste management in universities curriculum.
5) The waste should have to be treated as a resource, therefore, to make it as resource become easy. To understand which the biodegradable and non-biodegradable waste is really important. Also organized the rag picker sector is really important.
6) Manufacturing, recycling of plastic bags, bottles are really important and that plastic which comes in the non-biodegradable category which we cannot dispose of therefore to recycle it is really important.
7) Also to follow the Municipal Solid waste rules 2000 from the municipal level to the citizens of that city is really important.
) Public-Private partnership at local governance Institutional level also creates a strong implementation of the SWM. Means involvement of private sector, stakeholders, and NGO's make strong.
I) To make policy strong and implementation of policy like Swachh Bharat with the involvement of people is necessary. I can make Solid waste management strong.
J) Proper Financial management and Funding to the urban local bodies should get in a proper manner, so there will be no issues occurs in the SWM implementation.

VIII. CONCLUSION

Components of waste management are not just with respect to waste collected from the household, commercial establishments, etc. Waste is more of a serious concern which impacts the health and sanitation factor of every citizen of the city. Cleanliness is directly related to waste management and sanitation both. So it is not just the Smart cities which have become the enablers for Solid Waste Management but several other schemes like Swachh Bharat Mission have also played a vital and significant role in bringing public awareness on health factor related to waste. Therefore successful implementation only happened of such policies when not only the city's local government but also the city's citizen involve to make their city clean, healthy smart and for that strong bonding in between cities citizen and Urban local bodies of that cities must be important.

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AUTHORS PROFILE

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- Paper Presented in International Research Conference 2019 of Jamanlal Bajaj Institute of Management Studies, Mumbai on Smart City Mission and Published paper in JBIMS spectrum
- Presented Paper in INFRACON 2019,At Symbiosis ,Pune International conference 2019 on Smart waste management