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Understanding the Municipal Solid Waste Management in Religious

Places of India: Case Study of Shirdi

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DECLARATION

I, Priyanka Mokale hereby declare that this dissertation titled 'Understanding the Municipal Solid Waste management in religious places of India: Case Study of Shirdi'-A study of process management of solid waste of SMC is the outcome of my own study undertaken under the guidance Dr. Sahil Gandhi Assistant professor centre for Urban Policy and school of Habitat Studies TISS Mumbai. It was not previously formed the basis for the reward of any degree, diploma or certificate of institute or of any other institute or university. I duly acknowledged by all the sources by me in the preparation of this dissertation.

Date: 14-03-2017 Priyanka Mokale

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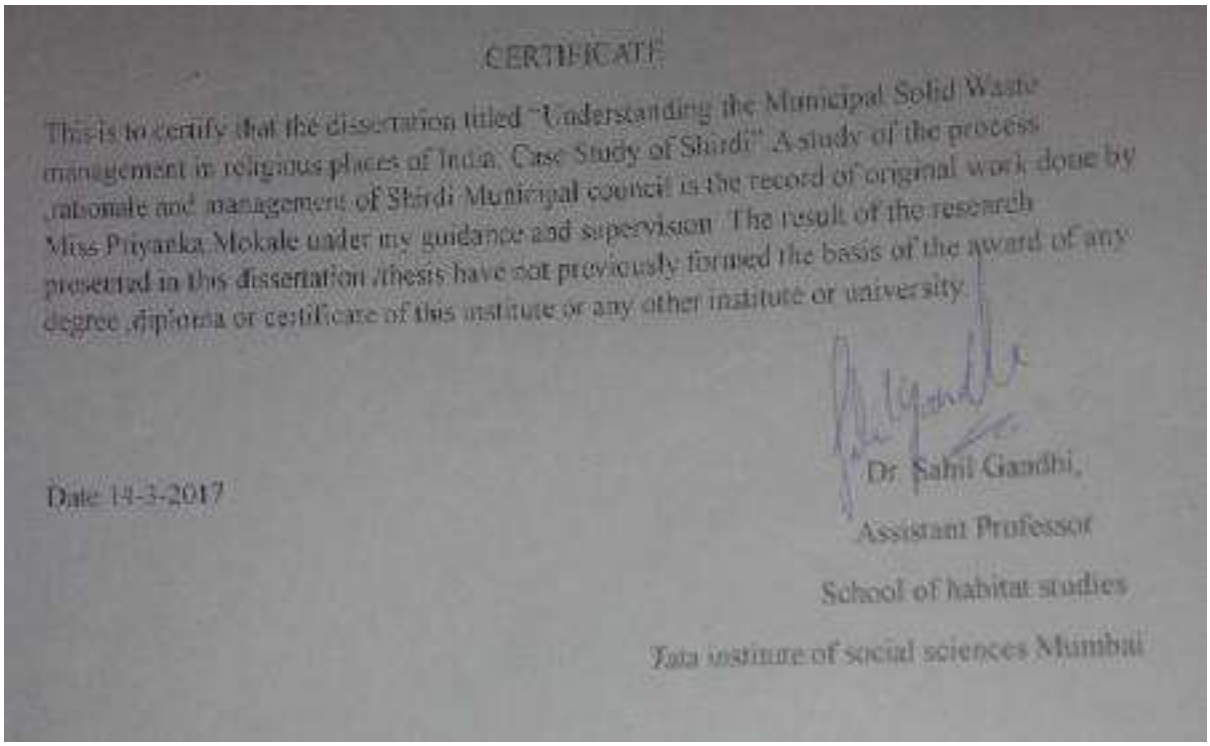
CERTIFICATE



CERTIFICATE

This is to certify that the dissertation titled "Understanding the Municipal Solid Waste management in religious places of India: Case Study of Shirdi" A study of the process ,rationale and management of Shirdi Municipal council is the record of original work done by Miss Priyanka Mokale under my guidance and supervision. The result of the research presented in this dissertation /thesis have not previously formed the basis of the award of any degree ,diploma or certificate of this institute or any other institute or university.

Date 14-3-2017

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LIST OF ABBREVIATIONS

SMC	Shirdi Municipal Council
MCGM	Municipal Council of Greater of Mumbai
CO	Chief Officer
SWM	Solid Waste Management.

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I am also grateful to my parents, siblings for helping me narrow down my research topic, my roommates Pooja & Sanghamitra always motivated me, CO of SMC who gave accommodation to me during the time of my research, motivated me for field work and distressed me in tie of need. Very importantly I must thank my classmates, friend Kasturika who took interest in my research gave me comments for improvements and heard me out when I was feeling stuck and motivated me to get back to work.

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ABSTRACT

My research is based on the Solid waste management of religious places. My research field is Shirdi. As like we see the SWM this issue is very neglected in the India from last decade. Because of rapid urbanization proper SWM is really need of time. Also as urban policy and governance point of view as like urban planning, urban governance, urban housing, urban water, sanitation Urban solid waste management is also an important aspect for the urban development. Reduction of garbage, reuse and recycle it is main motto of Solid waste management. In my research I am seeing the overall view or picture of Shirdi Solid waste management, how it's current situation. Also as governance aspect point of view I am seeing the work of SMC towards the implementation of solid waste management. What are the different method using to disposal of SW, awareness in between in between the people about the solid waste management. In my literature I focus on the health impacts because of poor solid waste management, and how is the other cities like tourist as well as religious cities managing their solid waste. As a tourist or religious place how is the solid waste is managed by those cities municipalities and by seeing that I do a comparison of those cities SWM situation with Shirdi SWM. According to SBM how much percentage of people have awareness in between people to implementation of solid waste management. How much important is the Solid waste management in the Municipal works that I am seeing through my research.

For understanding the solid waste management situation of Shirdi I use different kinds documents like Shirdi Budget (2016-17) also MCGM (Municipal Corporation of Greater Mumbai) Budget (2015-16,2016-17). Service level Benchmark (water, sanitation, Solid-waste management 2010-11).So By using this documents it is found that how and which way the condition of solid waste management in Shirdi.

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CHAPTER :- 1
INTRODUCTION

On October 2, 2014, Prime Minister Narendra Modi launched the Swachh Bharat Abhiyan, a mission to clean India's cities and villages. The campaign, inaugurated to coincide with Gandhi

Jayanti, aims to realise its vision of 'Clean India' by October 2, 2019, the 150th birth anniversary of Mahatma Gandhi. In the months after it was launched, the campaign gained momentum with many celebrities, politicians and academic institutions organising cleanliness drives across the country.

As a reminder of how seriously his government takes this mission, the prime minister brought up the issue during his Independence Day speech as well, talking about inadequate number of toilets.A total of 31.83 lakh toilets were built between April 2014 and January 2015 under this campaign, which is 25.4% of the target for 2014-15. Over the next 5 years, the government plans to invest nearly Rs 2 lakh crore to construct 12 crore toilets across India.

➢ *Mission Objectives*

The national campaign, which will run till October 2, 2019, aims to:

- Eliminate open defecation by constructing toilets for households, communities.
- Eradicate manual scavenging
- Introduce modern and scientific municipal solid waste management practices
- Enable private sector participation in the sanitation sector
- Change people's attitudes to sanitation and create awareness.

Therefore, according Swachh Bharat mission's 3rd objective as like Introduce modern and scientific municipal solid waste management practices. Therefore, to do awareness in between people about cleanliness and proper and modern way of solid waste management. Like if for example. Segregation of dry and wet garbage at source, from that wet garbage they can make composting. Which is useful for to grown the trees in the city become city green. Also to not throw the garbage at open space. Keep the city clean and also as per the objective number five that to change the attitudes of people to sanitation means sanitation is not only clean the our own house and throw the garbage here and there but also to keep the our surrounding also clean and tidy and do a proper disposal of garbage, means because of that disposal environment become pollution free. And people's live healthy in that area.

My Research is based on Solid waste management. So basically what is meant by solid waste management. SWM (Solid waste management means the waste generated in the households, kitchen, schools, wholesale market, hospital, park, hotels, programmes (marriage, Birthday party) etc. is managed by the (the people who are living in that area, NGO's, Municipality as urban local body).

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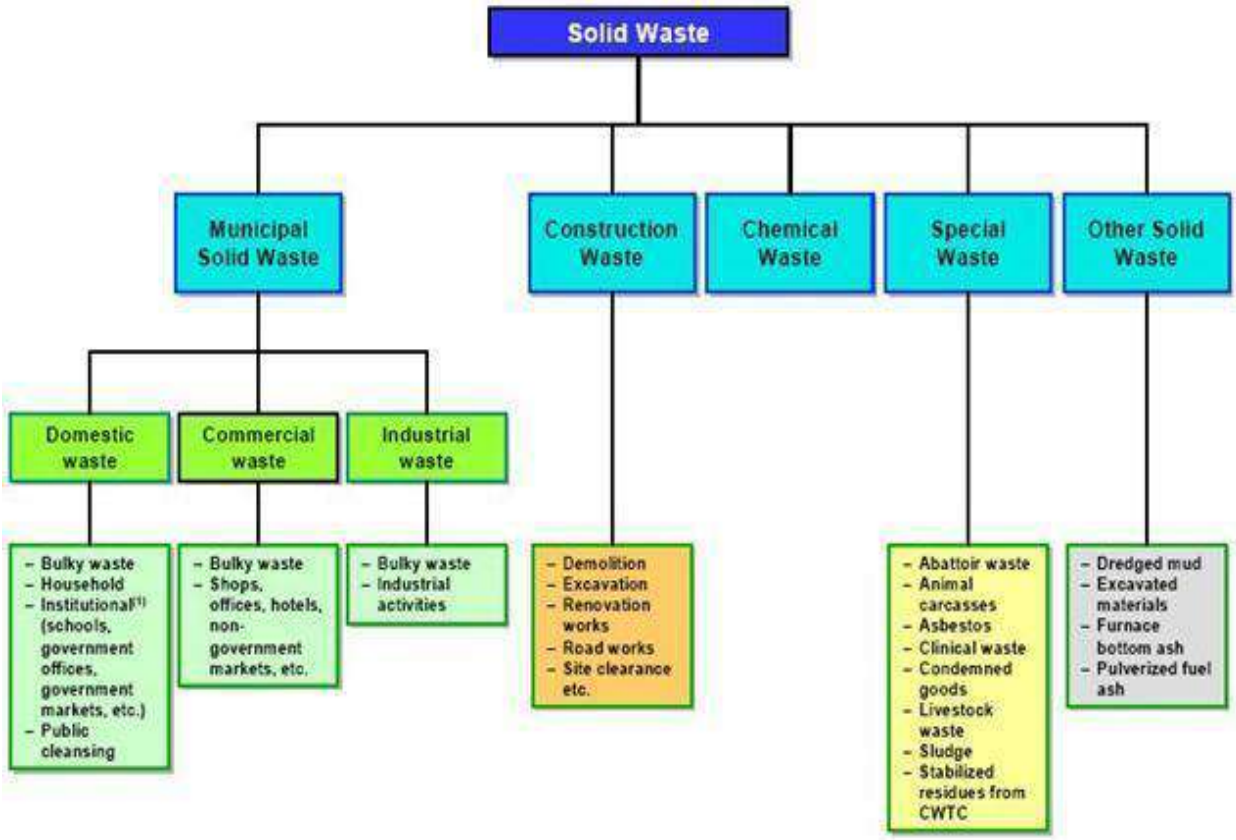

Figure 1.1 Types of Solid waste [17]

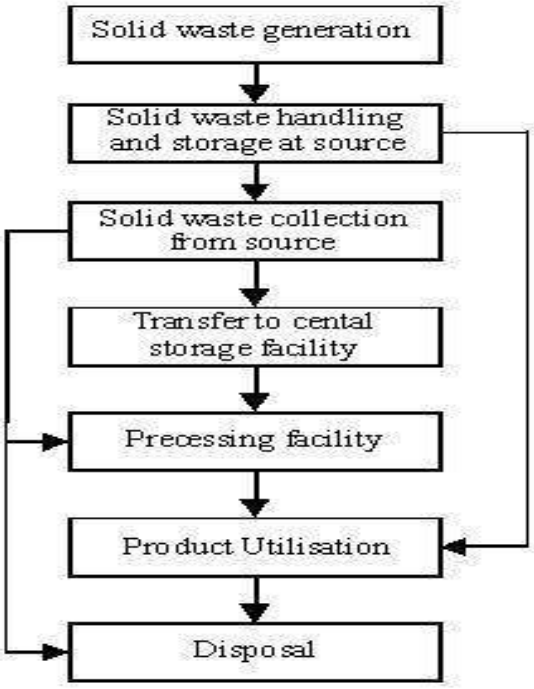

Figure 1.2 Steps of Solid Waste management:

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A. Reason Behind to do this research

As Social aspect point of view there are many issues related to solid waste management. So because of poor solid waste management various problems, health related, sanitation related problems are occurred, environment become more and more polluted. So indirectly it is affected on the health of the people. So As we see there is lots of population increasing intourist places as well as in religious places leading to lots of generation of Garbage (Shirdi, Amritsar, Puri, Goa, Agra, Darjeeling).

So lots of garbage generated on those places. Which is affect on the health of the people. Also in rainy season more number of drainage choke up is happening so because of that different types of diseases mostly like Malaria, jaundice, some water diseases are spread. And It directly affect on the health of the people. Also Because of huge number of Plastic garbage generation drainage choke up happened in rainy season. Also many times it is found that Floating Population is more than the Residential population in the tourist and Religion places so because of that more number of garbage is generated in those areas.

And it's affect on the environment of that places. More number of pollution occurs and it affect Health on the People who are living in those areas.

So I want to see the this huge number garbage which is generated in tourist as well as in Religious area how it is managed by that places municipality. Also Solid waste management is one of the most important and integral part of the Urban planning and development. But as like we see the other countries then development as well as importance to the solid waste management in those countries is giving more as compare to India. So Why this is happened in India, what are the Reasons behind that I want to see through my research.

I mainly focus on the Shirdi Municipal Council Role towards the implementation of solid waste managements. Like how the Process is going on, what and which type of imitative Shirdi MC has taken for the implementation of solid waste management, for cleanliness as a urban local body Also Understand the funding patterns and out of the total funding how much they spend on SWM.Understanding the SWM steps and how the steps by step implementation is doing the SMC that I am seeing through my Research. Like steps from collection of garbage to up to disposal.

So whatever key points that I mentioned above that I want to see through my research. And for my Literature Review I will use the different articles, research paper, journals based on the Solid management of different religious cities and tourist places. So I want to find out exactly the how Shirdi Municipality and this different cities municipality managing their Solid waste generation. Also how the PPP model is work. Also I want to see that what are different the private Ngo's, organisation involved for the implementation of the solid waste management in that cities. How are they doing the proper SWM, through my literature review as well as my research.

B. Overview of Shirdi

Shirdi is one of the religious place and small city town in Maharashtra, Ahmednagar District. At there the famous Saibaba's temple. So in current situation Shirdi is also become one big religious place as like many religious place. By seeing the data of Shirdi it is found that Shirdi has grown rapidly in recent years. Earlier it was small village having population engaged in agriculture and allied activities. With the increasing fame and popularity of Shri Saibaba Temple. So the commercial activities have now increased in town.

The Shirdi MC come into existence on 10th Jan 1990.Prior to this all the civic administration and planning was looked by Shirdi Gram panchayat in which not have any technical staff and hence and there was quite a bit of haphazard development without any planning and considerations take place in Shirdi.

Also by seeing the following table it is found that the residential population is less than floating population. It is found that the waste generated in Shirdi by floating population is more than their residential population.

So whatever waste generated by the Shirdi residential population, floating population and Temple. How that waste managed by Shirdi MC as well as the Sai Sansthan (Private organisation) that I want to see through my research.

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Year	Numberof. Population
1951	2950
1961	5239
1971	6369
1981	8806
1991	15129
2001	26169
2011	36,004

Table 1.4.1 Residential Population of Shirdi

Source: (Census of India and development plan report of Shirdi)

Occasion	Floating Population
Weekday	15,000-20,000
Thursday and weekends	20,000-25000
Ramnavi	1.5 lakh-lakh
Gurupornima	1 lakh-2lakh
Dussera	2.5 lakh-3lakh
School Vacations	5000-1lakh

Table 1.4.2. Floating Population in Shirdi

Source: (Discussion with Sai Sans than officers and Shirdi Nagar panchayat by researcher)

By seeing the above table it is found that how the population of Shirdi is increasing year after year from small village it becomes an city town of Ahmednagar district. And also because of that more and more development is also happened in Shirdi in terms of people's living condition, houses, education, employment and local governance structure. Like if I talk about the local governance then from Shirdi Gram panchayat, it's become Shirdi Nagarpanchayat.

Also because of famous religious place how the daily population is increased around 15000-20000, its impact directly goes on the people's who are living in the Shirdi.

Impact in terms of health, cleanliness amenities, services etc. So From the health, cleanliness point view I am as a researcher seeing the how and which way the Shirdi Municipal council doing the work to become the city clean ,tidy and pollution free. What are the different method, activities it is arranging for that, Solid waste management is an integral part of cleanliness how and which way it is managing that I want to see through my research.

As a seeing the history of the Shirdi it is found that Shirdi is growing from village to town city. As like we are seeing in the above table then it is found that how the residential is grown year by year like from 1951 census to 2011 census is growing from 2950 to 36,004 from grampanchayat it become Municipal Council in Shirdi after population grown up, because of that obviously civic amenities facilities water, sanitation, drainage, solid waste management, roads is also need to increase and need to improve.

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Map1.4.3: Place of Shirdi in India

Source: Shirdi 2011 report

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Map:1.4.4 Place of Shirdi in Maharashtra

Source: Shirdi 2011 Report

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CHAPTER :- 2
LITERATURE REVIEW

2.1 Overview of literature Review:

In my literature review I am focusing on the Solid waste management. So in the chapter 2.2

I am focusing on the Impact of urbanization on SWM, how the because of urbanization problem of solid waste is occurring that I have seen through this chapter. Then I moving in chapter 2.3 in that I am focusing on the what is the solid waste definition according to different organization and according to different authors. Then in Chapter 2.4 I am focusing on the What is mean by the Solid waste management according to different articles, what are the various steps are using for the implementation of solid waste management. Then chapter 2.5 I am focusing on the health Impacts on the workers at the time of managing the solid waste, how because of that different diseases are occurred that I am focusing in this chapter. Then in the chapter 2.6 I am focusing on the Municipal SWM situation in different religious and tourist cities, how the Muncipality of those cities like Shimla, Goa, Ujjain, Ooty etc. managing the solid waste .And in the last chapter I am seeing the economics of Solid waste, how the solid waste make the economically sustainable if we see towards the solid waste as a wealth, below there is detail description about above return chapters.

2.2 Impact of urbanization on SWM

Panning for urban solid waste management requires an assessment of many complex interactions among transportation systems, land use patterns, urban growth and development, and public health consideration (Clark and James Gillean 2017)

Solid waste management is a challenge for the cities' authorities in developing countries mainly due to the increasing generation of waste, the burden posed on the municipal budget as a result of the high costs associated to its management, the lack of understanding over a diversity of factors that affect the different stages of waste management and linkages necessary to enable the entire handling system functioning. Waste management is also affected by the aspects or enabling factors that facilitate the performance of the system. They are: technical, environmental, financial, socio-cultural, institutional and legal. Human activities have always generated waste. This was not a major issue when the human population was relatively small and nomadic, but became a serious problem with urbanisation and the growth of large conurbations. Poor management of waste led to contamination of water, soil and atmosphere and to a major impact on public health. In medieval times, epidemics associated with water contaminated with pathogens decimated the population of Europe and even more recently (19th century), cholera was a common occurrence. Some of the direct health impacts of the mismanagement of waste are well known and can be observed especially in developing countries. (Giusti 2009).

2.3 What is solid waste?

So according to different author's article, organization there are different definition of solid waste.

What are solid wastes? In addition to garbage and municipal refuse, solid wastes include wastes from commercial, industrial, agricultural, and demolition sources. The composition of solid wastes has been changing dramatically over time, and volume has been continuously solid waste" more generally. Moreover, a surprising amount of recyclable materials may prove hazardous if subjected to EPA's broad leaching test for measuring "toxicity." For instance, this test may capture used printed circuit boards as well as portions of automobiles and computers if such are deemed "solid wastes" once used and destined for recycling (Smith 2017) .

The United Nations Statistics Division (UNSD): Wastes are materials that are not prime products (that is products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded.

Waste according to the Basel convention: Wastes are substances or objects which are disposed or are intended to be disposed or are required to be disposed of by the provisions of national laws.

UNEP Wastes are substances or objects, which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law (UNEP 1989).

The European Court of Justice has stated that the term 'waste', in European Union legislation, implies 'discard'. The Environmental Public Health Act (EPHA) defines waste as 'any substance which constitutes a scrap material or an effluent or other unwanted surplus substance arising from the application of any process; and any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled, and anything which is discarded or otherwise dealt with as if it were waste shall be presumed to be waste unless the contrary is proved.

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According to Lown, the statutory definition of solid waste differs from the regulatory definition in the United States. Congress defined solid waste as: 'Any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

Defining waste in South Africa: moving beyond the age of 'waste' So in this article author tells about the definition of waste according to different countries. And how and which way the solid waste managed in South Africa. What are there goal for implementation of solid waste management. To reduce the solid waste what the South African government is doing, types of solid waste that all things I read through this article.

Waste was then described as an unwanted, but not avoided output, hence its creation was not avoided either because it was not possible, or because one failed to avoid it (Pongr 1998).

What is waste? (Webster's and Cassell dictionaries)- Therefore, to formalise the classification of waste by the reason of its creation, the author of this thesis has chosen the PSSP (Purpose, Structure, state performance)3 modelling language as an effective tool to present waste classes with semantic clarity. When translated to the PSSP language, there is an evident pattern, and these entries can then be organised into four distinctive classes. Hence, in the next section a description of the framework of the PSSP language is introduced. Lexical entry Definition Waste (verb) to consume, to spend, to use up unnecessarily carelessly or lavishly; to fail to use to advantage; to wear away gradually; to devastate.

Waste (adjective) something superfluous, left over as useless or valueless; desolate, desert, unoccupied, uncultivated, devastated, barren; having served or fulfilled a purpose, no longer of use.

Waste (noun) the act or instance of wasting of throwing away; gradual diminution of substance, strength, value; material, food, etc. rejected as superfluous, useless or valueless; material produced by a process as a useless by-product; an unusable product of metabolism; anything unused, unproductive, or not properly utilised; anything left over as excess material; by-products not in use for the work at hand; that which is of no value; worthless remnants; refuse, damaged, defective, or superfluous material; material rejected during a manufacturing process; an unwanted by-product of a manufacturing process, chemical laboratory, or nuclear reactor; refuse from places of human or animal habitation. (Docent Markus Olin Professor Phillips OULU 2002).

Solid Waste as defined under Resource Conservation and Recovery Act, is any solid, semi-solid, liquid or contained gaseous materials, discarded from industrial, commercial, mining or agricultural operations and from community activities. It includes garbage, construction debris, commercial refuse, sludge from water supply or waste treatment plants or air pollution control facilities and other discarded materials. It consists of all the waste in the solid or semi solid form and is either biodegradable, no biodegradable or recyclable. Biodegradable or compostable waste comprises of organic waste which can be reduced or biodegraded into useful or less polluting products by action of microorganisms and animals like earthworms and final product is used as organic manure. (Limbu June 2014).

Solid waste may be defined as generation of undesirable substances which is left after they are used once. They cannot be reused directly by the society for its welfare because some of them may be hazardous for human health. Covering of various vegetables, fruits and cooked material facilitate proliferation of various group of microbial flora, which may be pathogens (Shivashankara 2005 & Macwan 2003).

MSW is defined through the Solid Waste-Resource Management Regulations (1996) which state that MSW ". includes garbage, refuse, sludge, rubbish, tailings, debris, litter and other discarded materials resulting from residential, commercial, institutional and industrial activities which are commonly accepted at a municipal solid waste management facility, but excludes wastes from industrial activities regulated by an approval issued under the Nova Scotia Environment Act" (SWRMR, 1996).

2.4 Solid waste management:

Waste management is the collection, transport, processing or disposal of waste materials, usually ones produced by human activity, in an effort to reduce their effect on human health or local aesthetics or amenity. Waste management practices differ for developed and developing nations, for urban and rural areas and for residential, industrial and commercial producers. Waste management for non-hazardous residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non hazardous commercial and industrial waste is the responsibility of the generator. The municipality is given the responsibility off the solid waste management in the town. Municipalities additionally address urban environment issues related to solid waste management. Public concern and sensitivity to environmental issues is driving this expanded agenda. These include.

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- Health and environmental impacts of accumulated uncollected waste and clandestine disposal sites.
- Health and environmental impacts of solid waste facilities including transfer, composting and landfill facilities.
- Air emissions from waste collection and transfer vehicles.
- Special handling and disposal of hazardous wastes including healthcare and industrial hazardous waste. (Dewki Limbu June 2014).

So in this article author talks about the solid waste management of Darjeeling, how the Municipality of Darjeeling managed it. What are they are facing at the implementation time. How and which way the Environment pollution is occurred because of solid waste is not managed properly. Also as a tourist place what are the problems Darjeeling is facing that all things author is mentioned through this article, impact of bio-medical waste on people's health. Also he mentioned about the lack of deficiencies in the municipal services for the implementation of solid waste.

Solid waste management is an integral part of urban and environmental management, like areas, most of other infrastructural services has come under great stress, consider low priority , solid waste management was never taken up seriously either by public or by concerned agency or authorities and now the piled up waste is threatening our health, environment and well-being (Chouhan and Reddy 1996, Mazumdar 1994 & Yadav 2009) So in this article author want to talk about the how important is the solid waste management for the city development. Also He want to tell us like as like other things like, housing ,water treatment plan, planning and development, urban governance for solid waste management does not give them that much importance. The subject of SWM is always neglected.

To implement proper waste management, various aspects have to be considered such as: Source reduction, Onsite storage, Collection & transfer, Processing, and Disposal (Rajput. 2009). So According this definition of Author want tells about how and which way the solid waste management is managed, properly with proper steps. Solid waste management is a worldwide phenomenon. Improper management of solid waste (SW) causes hazards to inhabitants. It is a big challenge all over the world for human beings. (Upadhyay, Jethoo, Poonia March 2012).

So in this article Author talks about the Solid Waste Collection and Segregation: A Case Study of MNIT Campus, Jaipur in which he tells about the how and which way the solid waste management is occurred, which type of waste is occurred in more percentage. How the transportation is worked for the solid waste. Composition of Solid Waste Generated In Hostels of MNIT per Day, Composition of Solid Waste Generated in MNIT Academic Area per Day. And after doing analysis it is conclude that the present system of SWM in MNIT is not satisfactory Solid Waste Management.

Many waste management frameworks seek to incorporate the three R's in some capacity. In the UK, North America, throughout Europe and in parts of Asia, waste hierarchies are being incorporated which promote the adoption and use of "reduce, reuse and recycle" Initiatives. (Allwood 2010).

Zero waste refers to waste management and planning approaches which emphasize waste prevention as opposed to end of pipe waste management (Snow & Dickinson, 2001; Spiegelman, 2006). Zero waste encompasses more than eliminating waste through recycling and reuse; it focuses on restructuring production and distribution systems.(Young 2010). Municipal Solid Waste Management (MSWM) is one of the crucial urban basic services which influence the public health and environment of a town.

The SWM of Pahalgam which is also called as mini Switzerland. This is one of the hill station. In which he explains as hill station what are the problems Pahalgam Municipality is facing for the implementation of SWM.

While hill towns in India are already facing tremendous pressure due to lack of infrastructure, unfavourable climatic condition, difficult terrain, and public apathy towards waste management Tourism induced challenges further aggravate the issue. Although in case of hill towns, tourism has a profound impact on the economy of the town, it comes with new challenges in terms of waste generation resulting into negative impacts on the sensitive hill environment. It is in this context, an effort has been made in this paper to examine the current issues and challenges in MSWM practice in Pahalgam, a small hill town located in the state of J&K, commonly known as "Mini Switzerland", with special reference to impact of tourism on overall solid waste management. So through this research the researcher mentioned the issues and how because of tourism place what are the barriers of Pahalagam Municipality is Facing for the implementation of Solid waste management.

Also How the unscientific way of disposal is happened in the Pahalgam, no awareness in between people. By study it is found that, in Pahalgam, tourism sector is the major generator of solid waste, Religious-touristic activities during the peak season. The study also finds crucial issues related to lack of capacity of the local body and the issues related to lack availability of plain land, improper location of waste collection infrastructure due to undulated terrain and inadequate collection capacity. The study also finds very strong

correlation between unscientific disposal of MSW and degrading surface water quality and increasing occurrence of water borne diseases in the downstream during the peak tourist season. (Bashir, Goswami 2015).

SWM is part of public health and sanitation, and according to the Indian Constitution, it falls under the state list. Since the activity is non-exclusive, non-rivalled, and essential, the responsibility for providing the service lies within the public domain. As this activity is of local nature, it is entrusted to the ULBs (Department of Economic Affairs Ministry of Finance Government of India, November 2009).

2.5 Health Impacts on the workers at the time of managing the solid waste:

Indirect health effects due to the contribution of greenhouse gases from waste disposal activities could be significant. Rising temperatures (and low level ozone levels) due to climate change would affect old people with cardiovascular problems and both old and young people with respiratory problems such as asthma. On the positive side, fewer people would die from cold-related illnesses. Diseases (e.g. malaria) that are spread by vectors such as mosquitoes could become more common (L. Giusti 2009).

So in this article author talks about the because of disposal of solid waste, how it is affected on the health of workers, Citizen, young people, how and which types of diseases are spread because of Solid waste disposal/improper solid waste management.

A number of serious and highly publicised pollution incidents associated with incorrect waste management practices, led to public concern about lack of controls, inadequate legislation, environmental and human health impact. This in turn forced many national and federal governments to introduce new regulatory frameworks to deal with hazardous and unsustainable waste management operations. A waste management hierarchy based on the most environmentally sound criteria favours waste prevention/ minimisation, waste re-use, recycling, and composting. In many countries, a large percentage of waste cannot presently be re-used, re-cycled or composted and the main disposal methods are land- filling and incineration (Giusti 2009).

So in this article author tells about them because of improper solid waste management how it affects on the health of people as well as on the environment. Also he tells the in many countries proper solid waste management is not managed properly.

Rising sea levels, flooding and extreme weather events are also likely to cause destruction and casualties. The main cause of global warming is the increasing amount of greenhouse gases (CO2, CH4 and N2O) in the atmosphere. A significant contribution comes from waste management practices (Smith 2001).

According this author want tells about them because of improper solid waste management it is affected on the health. Global warming is also increasing because of the improper SWM. And many more things affected because of this. The high malaria parasitaemia seen in the solid waste disposal subjects may be due to the fact that the waste dumps offer an excellent breeding ground for mosquitoes, the vectors of the malaria parasites (WHO, 1995).

Since the solid waste disposal workers are not adequately protected while at work, the female anopheles' mosquitoes see them as easy preys for their blood meals. This accounts for the slight decrease in their haemoglobin concentration and their complaint of general body malaise (Cheesbrough, 2002).

The lymphocyte showed significant increase in the case of the solid waste workers. The lymphocytosis observed in this category of workers may indicate the presence of bacterial infections, protozoal infections and granulomatous processes like hypersensitivity pneumonitis (Cheesbrough, 2002).

A mild eosinophilia was observed in the solid waste disposal workers, meaning that there might be allergic disorders and helminthic infections. It was also observed from this study that the years of exposure has no serious impact on the solid waste disposal workers blood indices, probably because those who have consistently worked for that length of time (7-8 years) may become supervisors and are in less contact with the waste or toxicants.

Confidence and Eleanya (2007) So in a article Authors talks about the how the impact is goes on the health of the worker at the time of practising the SWM. They take case study of Health Impact Assessment of Solid Waste Disposal Workers in Port Harcourt, Nigeria. Flies and cockroaches breeding and feeding on the indiscriminately dumped solid waste carry particles of waste from place to place. Flies spread enteric infections such as diarrhoea, typhoid, dysentery, eye infections and skin infections such as cutaneous ephemera [sic] and yaws and incidents of such diseases as diarrhoea have occurred in the informal enterprises. These incidents are common during rainy seasons when fly populations increase and when collections are erratic due to logistic problems. The conditions are particularly worrying during the rainy season when uncontrolled dumping can result in unsightly heaps of waste and this is detrimental to human health." (Jerie, 2016).

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The waste handlers in the enterprises have shown a high risk of muscular-skeletal disorders such as low back pain and elbow/wrist pain twice as often as the control group due to handling heavy loads. Furthermore, the repetition of similar movements of hands and arms when grabbing and disposing waste containers causes joint problems as also observed by Yang 2001; Cimino [41]; and Poulsen and Midtgard [42] in their studies. The risks associated with solid waste management in the informal enterprises can thus be divided into the following categories: occupational accidents, physical risks, chemical risks, ergonomic risks, psychological risks, and biological risks. The health risks either to the worker directly involved or to the enterprise operators and nearby residents are caused by many factors that include the following.

- The nature of raw waste, its composition (e.g., toxic, allergic, and infectious substances), and its components (e.g., gases, dusts, leachates, and sharps).
- The nature of waste as it decomposes (e.g., gases, dusts, leachates, and particle sizes) and their change in ability to cause a toxic, allergic, or infectious health response.
- The handling of waste (e.g., shovelling, lifting, equipment vibrations, and accidents).
- The processing of wastes (e.g., odour, noise, vibration, accidents, air and water emissions, residuals, explosions, and fires).
- The disposal of wastes (e.g., odour, noise, vibration, stability of waste piles, air and water emissions, explosions, and fires).

Mechanical hazards associated with solid waste generated and disposed in the informal sector include piercing, scraping and bruising by scrap metals, old wires and vehicle shells resulting in wounds from contact with sharp waste. Hazards like broken bottles, liquid fires at fuelling depots, residual fires at landfills, bins with jagged edges and compactors pose safety hazards to us employees. Broken bottles, glasses and other sharp objects impale our already worn out gloves thus exposing us to cuts and bruises which may lead to diseases like tetanus, dermatitis and may eventually fester into septic wounds. We also do not have adequate protective clothing to protect ourselves especially face masks, gloves and overalls (Jia 2016).

2.6 Municipal SWM situation in different religious and tourist cities

Barriers facing in the implementation of SWM by local bodies like municipality, JNNURM. Inappropriate and inefficient management of municipal solid waste is one of the root causes of degradation of the hill town environment in India. In absence of adequate capacity of the local bodies, seasonal tourism further aggravates the situation. At national level, various policies and programs have been formulated from time to time for proving sanitation services in urban India. But most of such policies and programs remained silent about special character of the hill cities which demands special attention to the problem of waste management.

While Pahalgam is already experiencing low capacity and resource base in providing adequate solid waste management services to the citizens, tourism creates extra pressure on the system by contributing as high as 75 percent of the waste during peak tourist season.

It is observed that the households which provide accommodation to tourists generate considerably higher amount of waste. By study it is proved that such households receive better services too from the MCP (Municipal Council of Pahalgam), in terms of access to secondary waste bins and collection of waste. Due to the undulating terrain waste collection from isolated households residing on slopes is difficult. MCP does not have adequate waste collection and transportation vehicles and on top of it, during peak tourist season MCP is forced to provide solid waste management services beyond municipal limits.

So by considered all above the issues it is concluded that Pahalgam is unable to cope up with the negative impact of tourism in terms of management of solid waste in the town due to certain valid reasons. And it is important to note that hill towns like Pahalgam deserves special attention for better management of waste to create an attractive and sustainable tourist destination.

Municipal Solid waste management for Climate Adaptation case study of Puri city in the Odisha State of India. So in the article author talks about how and which way the solid waste management is occurred in the Puri city is described. So the Solid waste generation in Puri city can be classified into 4 sources categories namely.

- Waste from households
- Waste from hospital i.e. biomedical waste
- Waste from road sweeping (consisting mainly Sand, dust, paper, polythene, leaves, etc.) 4)Waste generated in Lord Jagannath temple and waste generated from institution.

Temple generates organic waste comprises mostly flowers, food waste and coconut shells. The inorganic material constitutes problem earthen pots used for cooking and other rituals. The temple generated ash which is the product of burning wood for cooking various food items for ritual and devotees.

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Transportation: The Municipality garbage collection vehicle refuse to collect waste from dustbins and road sides and are transported into 2 wheeler, barrows which are provided by the Municipality of Puri. In Puri district primarily 8 storage centre or dumping grounds. Segregation of Recyclable Materials: The urban Solid waste contains materials such as glass, polythene, metallic containers, plastic. So in the Puri Municipality no proper facility for recycling of waste, but somehow recycling is done by rag pickers. They collect everything which is sellable that fetch money for their livelihood.

Disposal: Puri municipality generate about 100 tones waste daily out of which only 30-40 tons of solid waste/garbage is recycled by SWM plant. The rest amount of waste or garbage is dumped hazardously and gives rise to environmental problems So it is found that problems and issues associated with SWM: The effort is not efficient for the proper management of solid waste generated in Puri town. There is lack of co-ordination between Puri municipality. Also the waste generated by temple is also not managed properly. Also no biogas plant, vermicomposting plant like structure is happened by the municipality. (Mothapatra September 2011).

Administrative Setup for Agra MSW Management The main organization which is responsible for urban governance and civic management is the Agra Nagar Nigam. The Health department is involved in planning and management of the SWM activities and in providing sanitary facilities to the residents of Agra. The Engineering department works in coordination with the Health department and undertakes civil and infrastructure development activities for the city. MSW Collection System in Agra City The MSW collection in Agra city is not well organized due to lack of awareness among the citizens as well as civic bodies responsible for collection of waste. Waste Processing and disposal mechanism in Agra Solid waste management.

At present ANN does not possess any Waste Processing Facility. The unsegregated waste is disposed at Shadhara dumpsite located at Agra –Tundla bypass road. Waste is also dumped at various low lying and private vacant plots. Certain recycling waste is segregated and sold by Rag picking community. Various types of wastes were identified in Agra city – recyclables, bio-degradable wastes, and non-bio-degradable wastes.

Also according to Municipal Solid Waste Management Rules, 2000 states that the land fill site shall be away from habitation clusters, forest areas, water bodies, monuments, national parks, wetlands and places of important cultural, historical or religious interests. But actually.

Dumping sites is in the locality where residential /people's houses are available at there. Darjeeling is highly populated hill town where daily waste generation is 30 metric tonnes. This goes upto 50 metric tonnes in peak tourist seasons. In respect of Darjeeling Municipality that solid waste generation is @ 465 gm/cap/day. (The following characteristics are observed after personal survey of different wards.).

The main characteristics of municipal waste management are as follows:

No Storage of solid waste at source. Individual families, commercial establishments and institutions throw their solid waste in bins, streets, drains, jhoras (waterways, natural or reinforced), open spaces and nearby water-bodies. This has resulted in dirty streets and clogged drains.

Partial Segregation and Collection of Recyclable Waste. Households keep aside newspapers, bottles and metal objects for sale to rag-pickers. They also pick recyclable material from waste thrown in the bins, street and jhoras. Some houses, at a distance from the town collect the vegetable waste and prepare manure to use for market gardening.

Inefficient system of primary waste collection. Waste is collected through street sweeping in certain parts of central Darjeeling, which is inefficient and irregular. The waste collected through street sweeping contains all types of waste and the tools used are inefficient (brooms, etc.). The secondary storage of waste collected in open spaces, masonry bins and iron bins is unhygienic and inefficient.

Inefficient and irregular transportation of waste. Waste is transported in the trucks (1.5 to 2 tonnes capacity) and jeeps. Multiple handling becomes necessary and contaminated waste is also handled manually. The transport system can handle only 20 to 25 metric tons of solid waste, thus creating a backlog.

Unscientific Disposal of Waste. The waste is manually dumped in the disposal site, above the Hindu Burial Ground and there is no scientific treatment of the waste dumped. Hospital, construction, toxic and industrial waste are also dumped in the same dumping site. There are people living within the vicinity of the chute and downstream.

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Issues in the Ooty Solid waste management Some of the issues of Solid waste management are as follows:

No segregation of wastes take place either at the source or at the dump site Burning of garbage occurs in gross violation Vehicles carrying wastes to the dumpsite are not covered while the rules mandate that transportation vehicles should be covered and not visible to the public.

Monitoring of waste processing and disposal facilities should be done once every six months. So as tourist place Ooty is facing lots of problems regarding SWM. Also according to Municipal Solid Waste Management Rules, 2000 states that the land fill site shall be away from habitation clusters, forest areas, water bodies, monuments, national parks, wetlands and places of important cultural, historical or religious interests. But actually Dumping sites is in the locality where residential /people's houses are available at there.

Tamil Selvi Jayachandran & Push Jain (2012) talks about like how the solid waste management and as a urban local body and private NGO's in PPP model what are the issues /challenges are facing.

In a paper by Department of Economic Affairs Ministry of Finance, Government of India paper (November 2009) researcher talks about the ULB undertakes the task of solid waste service delivery with its own staff, equipment and funds. In a few cases part of the said work is contracted out to private enterprises.

The management of municipal solid waste is one of the most important obligatory functions of the urban local bodies, which is closely associated with urban environmental conditions. The PPP Models in SWM under JNNURM are generally Tipping fee based Models with private. Equity ranging from 15% to 30%. Infact, the ULB contribution is generally funded by the Private Operator. The remaining 70% is contributed by the Central and State Governments. The O&M contracts entered into are generally for 20-30 years.

PPPs in MUNCIPAL SOLID WASTE MANAGMENT- challenges for Urban Local Bodies are:
Funds: to establish and operate integrated MSW management facilities Technical
Expertise: to set up and operate MSW management facilities Commercial
Competence: to engage the private partner transparently-e.g. Inviting

Expression of Interest'', ''Request for Proposal' and evaluating the proposal technically and financially. Finding Appropriate Land along with buffer zone for MSW management.

"SUSTAINABLE DEVELOPMENT OF HOLY CITY UJJAIN, INDIA BY SOLID WASTE MANAGEMENT." Industrial Pollution Control Board 2005 in this paper Author talks about how and which way the solid waste management is happened in the Ujjain which is one of the holy city. There are many temples in short many religious places we are seeing in the Ujjain city. So because of that lots of tourist attraction in this city. In this paper, it is described that nagar nigam which is a government body of Ujjain for the development of Ujjain city, it always aware. So the Ujjain nagar nigam is seeing the city's solid waste management part. How and which way they managed. When the solid waste management started in Ujjain and what are the problems related to implementation of Solid waste management Ujjain city is facing. It has the following points in its research.

- Problems in handling/ managing solid waste by Ujjain municipality
- Inefficient primary waste collection system
- Poor storage facility
- Problems with secondary collection
- Lack of equipment and tools
- Poor organization and that governance
- Financial problems
- Lack of public apathy
- Political problems

Mina abia During Hajj Pilgrimage: This is the place is out of India. Means Saudi Abia. So in this Research paper researcher mentioned how the Private Mina camp and Municipality of Mina manages the Huge solid waste generated by the floating population in Hajj pilgrims. So to do awareness in between the People is become difficult to the municipality of the Mina. And so because of that lots of barriers they have faces for the implementation of SWM. So the SWM in Mina is divided into Saudi Arabia is considered as developing country especially in environmental terms .Some of the main cities in Saudi Arabia have better SWM than have with recycling considered as a method to decrease use of landfill. However Makkah city (Where Hajj takes place) is not one of those cities , waste is collected and disposed of in Makkah city landfill by Makkah Municipality without any treatment.

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Makkah city is the capital of Islam because of the holy mosques scale places. Where the 1Hajj takes place and so it is destination for all Muslims around the world.

Each year about 4 million of world's 1.65 billion Muslims make pilgrimage (Hajj)to the scared places in Makkah city. So during this period lots of waste generated in Makkah city. So during Hajj Period Makkh Municipality manages the Municipal SWM. Also it is found that Because of Hajj as mega event SWM in hajj to be as poor as SWM in Makkah city. Where all collected waste is disposed of in the Makkah landfill. This means is that to appropriate SWM and effective resource recovery have not be considered as an important dimension in the organization and management of the hajj. There are 7 organizations called Tawafa companies which are responsible for pilgrims and each serves multiple countries from all over the world. Solid Waste Management in Makkah city consist of waste collection, transfer, and transport and disposal in the Makkah landfill. In terms of waste disposal although there are 6 recycling facilities in the western region of Saudi Arabia (5 of them are in Jeddah city) None of them located in Makkah city (MCI 2011).

Also there is no composting facility in this region of Saudi Arabia. So because of that there is no formal waste recycling project in Makkah city. The only way to dispose of waste is by burying in the Makkah landfill. Also total quantity of waste generated in Makkah every year is unknown because of the waste pickers who collects only the recyclable waste from the waste containers in the street. Mina is the camp of Hajj parts.

- Base on the site observation the street (Waste managed by Makkah Municipality)
- Mina camps (Waste managed by the camp mangers)

SWM in Mina streets

In this also the management of Solid waste in mina's street consist of waste generation, storage, transfer and disposal. There are many sources of SW generated in Mina streets as like follows

- Pilgrims throw there waste on to the street while they are walking as they usually find it very difficult to reach the waste bins at the edge of the street(due to crowds).
- Illegal pilgrims, who stay and sleep on side walk of the street because they are not booked into any of Mina camps, throw their waste onto the streets.
- Many camps cleaners dispose their waste of camp in the street. This is because they prefer not to use the compactor boxes of the problems associated with them because of they are full broken.
- Fruit shop waste and small shop generate huge amount of waste.
- Charity donation generated huge amount of waste.

Also by observation of researcher it is found that there were a small number of waste pickers in Mina after the end of the event. (While the cleaning works were collecting the waste).These waste pickers were not looking for recyclable waste but were searching for valuables that pilgrim might have lost. (Alseba 2014).

Effective Municipal Solid Waste Management Practices: A Case study of Shimla, Municipal Corporation, Shimla, India Solid waste management is an essential and obligatory function of Municipal Corporation Shimla(MCS). The MCS through Himachal Pradesh Municipal corporation act 1994 enacted door to door garbage collection bye-laws in 2006.

Waste processing facility is operated on Public Private Partnership by Hanjer Biotech energies private limited. And secured landfill facility is also proposed to be developed on PPP model. The overall monitories and supervision is carried out by MC of Shimla and HP state environment and Pollution Control Board (HPSPCB) in regulatory role.

The duties and responsibilities of the various stakeholders include door to door collection of MSW, segregated storage of the waste at Secondary storage and collection points treatment of MSW and disposal at designated dumping site.

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Also the roles and responsibilities for SWM of Shimla divided into different.

Serial number	Functional element of SWM	Responsible agency	Monitoring authority
1.	collection	SEHB Society	MC Shimla /SEHB Society
2.	Transportation	Health Department of MC Shimla	MC Shimla HPSPCB
3	Processing and Treatment	M/Shanjer Biotech energies pvt limited	MC Shimla/HPSPCB
4	Cost recovery and Recycling	SEHB society and M/s hanjer Biotech energies Pvt. Ltd.	MC Shimla/HPSCB
5	Disposal	Scientific Disposal yet to evolve	MC Shimla HPSCB

Shimla city has successfully banned usage and plastic carry bags with thickness less than 75 microns' consequent to the HP non-biodegradable garbage control act 1995 and latest notification on plastic Waste (Management& Handling) rules, 2011. (Bharti, Singh, D. Singh, Sood 2011).

A Shimla state level solid waste management strategy is recommended to strengthen and empower ULBs for proving sustainable solid waste management services in efficient way. Information exchange workshops and communication plan targeting behavioural change should be steered at state and ULB level in coordination.

The Goa garbage scene: A lot left to be done: How poor is the Goa Solid waste management. As a tourism place how large is the solid waste generated in Goa by floating population and how the SW generated more because of floating population is more than the residential population through the there methodology. So through my research I want to see is there Same problem occurred in Shirdi also for the generation of Huge waste because of Floating population (Kazi, 2013).

2.7 The Economics of Municipal Solid Waste

This article examines the generation and management of municipal solid waste through the lens of economics. The authors estimate that the global burden of municipal solid waste amounted to 1.3 billion metric tons in 1990, or two-thirds of a kilogram of waste per person per day. Industrial countries account for a disproportionately high share of the world's waste relative their share of world population, while developing countries account for disproportionately high share of the world's waste relative to their share world income. Analyses across countries and over time reveal that the generation of municipal solid waste is positively related to variations in per capita income and that the generation of municipal solid waste per capita does not vary with population size among countries with comparable per capita income. Practices for collecting, processing, and disposing of municipal solid waste vary widely across countries, generally in accord with the nature of the waste stream and key environmental and economic features. The least efficient practices tend to be found in developing countries, creating serious threats to local environmental quality and public health. Although considerable evidence indicates that the generation and management of waste is sensitive to income and price variables, natural incentives to over- use common property and the presence of intergenerational externalities both suggest that private economic

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behaviour will not yield socially optimal outcomes in this area. Community intervention may be needed to promote the social good, with evidence accumulating in support of arrangements involving the participation of private firms. The authors' calculations also suggest that improvements made now in the handling of hazardous waste will be far less expensive in discounted terms than un- doing in the future the damage being caused by current practices. Ad- dressing these issues from a rational societal perspective will become increasingly urgent in the future, especially in the developing countries, where the authors project that municipal solid waste will increase at an annual rate of 2.7 percent through the year 2010. (Beede and Bloom 2017). So in the first paragraph author talks about the how the solid waste, specially he focuses on the word municipal solid waste. So the Solid waste which is collected by municipality under its locality, it is called as Municipal solid waste. So according to him municipal solid waste generation is varies according to population, according to countries, according people's per capita income, how and which thing are they use most. Also he tells about the how the poor and least efficient practices carried out in the developing countries and because of that how it is affected on the health.

Also he tells about the how the solid waste is the source of income. Like he tells the if we see the waste to the different angle then actually we can understand it very well. In short he wants to tells about the because of solid waste how and which way economy is generated. Also to keep the hazardous waste with us is also so harmful. So to awareness in society, especially in developing countries it is very important.

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CHAPTER :- 3
RESEARCH METHODOLOGY

3.1 Research Method:

Qualitative. I am using Primary Data as well as Secondary Data. Primary Data is on field basis that I will collected at the time of my data collection. While secondary data is field survey reports, articles, budgetary documents are used for my literature review as well as for my analysis findings.

3.2 Research tool:

- Semi structured interview
- Direct Observation

3.3 Sampling Size:30

- *Method of Sampling: Purposive Sampling*

Purposive sampling is a sampling method in which elements are chosen based on purpose of the study. Purposive sampling may involve studying the entire population of some limited group. So as per my research I want to focus on the solid waste management of Shirdi because of that as my purpose to see the solid waste management implementation how and which is happened in Shirdi MC I chose health department of SMC to understand the Solid Waste management situation of Shirdi, Also the NGO's which are involved for the implementation of Shirdi Solid waste management.

- *Interviewers:1)*

CO of SMC 2) Health Department people of SMC 3) People for maintenance of composting plant of Shirdi 4) Sai Sansthan people Private organization involving the development activities of Shirdi (Like road, Solid waste management, and some projects of SMC) 5) Greeny Private consultancy people 6)households ,shopkeeper, hotel owners street vendors etc.

In Primary Data collection I have focused on all the steps of Solid waste management that which are practiced during the time of implementation of solid waste management like collection, segregation, transportation, scientific disposal as like I mentioned in the above figure. How and which way that steps are followed in the Shirdi. And What are the barriers the Shirdi MC facing for the implementation of those particular steps of SWM like how the disposal of waste is done, how the waste is collected, is there segregation is happened at Source or not. Also How the Public Versus private Picture, also Labour Vs. tourist, cleaning Vsmanagement picture in the Shirdi in terms of implementation of Solid waste management. Also under the Scheme of Swachh Bharat Mission how the Municipal Corporation manages the Solid waste management.

Secondary data is based on my literature review by using different articles, research paper, journals of different cities regarding implementation of solid waste management.

I want to do the detailed investigation of the following things.

- Find out the how and which way the steps are managed at ward level from collection to disposal
- Relationship between the MC and whatever the different actors are involved in the implementation of solid waste management
- At what level they are involved?
- In Short like how the a) process of solid waste management is going on b) relationship c) accountability in between people d) approach of Shirdi MC at different ward level. Like how they providing the services in different wards as political power is considered in that. Means according to political power they are doing some partiality or not to providing the services to the ward people. That I have to check.
- Also whatever revenue is generated in the Temple from tourist money. From that generated revenue how much the Sai sansthan is spending on the solid waste management.
- Social aspect point of view like what are the different people involve in the garbage collection process of within the campus of temple? Like they are of which particular community or caste. Also they have get money of that cleaning job or they volunteer or they just doing free service of god for there happiness.

Direct observation: During my direct observation I observed the whether the segregation garbage is happened at source or not. Also the composting machine.

- And Document I am using for my analysis:
- Shirdi MC budget (2016-17), MCGM Budget (2015-16),(2016-17).
- Ministry of Urban Development Government of India, Service level benchmark in Urban water and sanitation sector status report (2010-11).

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So there are two rounds of data collection in my research. In the first round of data collection means in the duration of October to November round, I went to the Municipal council of Shirdi. Show the recommendation letter of the college to the CO (Chief officer of SMC) interact with them, discuss about the my research topic to him. Also convey him about why I am doing this research. Then after the discussion for understanding the whole function of municipal solid waste management I interact with the Sub –CO of SMC. Then he give me the details about the SMC SWM. Like From which year the SWM process started by SMC. Also which department is handling this work of solid waste management .Also how the contract have given the SMC to the private contractors for managing the all steps of SWM ,that I mentioned in the above figure.

Also other than SMC what are the different actors are involved for the implementation of solid waste management, So it is found that Sai Sansthan is the temple organization involved in the implementation of SWM of Shirdi.

Then in Second Round of data collection in the duration of December to 10 January I take interviews of 1) health department people of SMC 2) Account Department of SMC to understand the budget (revenue income, expenditure of solid waste management. Also the interviewers that I mentioned above. The focus of to do interview is understanding the overall structure of Solid waste management and how much awareness in between the people, how it is functioning to understand that I did a direct observation.

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CHAPTER :- 4
SWM SITUATION OF SHIRDI

4.1 History Shirdi SWM

The Solid waste management process of Shirdi was started from 2000.When first time the Government of India made rule of solid waste management under the Scheme of Swachh Bharat Mission. Means Proper awareness in between people about SWM, and follow the actual step of solid waste management. Also segregation of dry waste and wet waste. To keep the separate boxes in the Municipal council garbage collection vehicle. Before that they just collect the waste dump on the open area.

4.2 Current Situation of Shirdi Solid Waste Management

Collection, transportation and disposal of municipal solid waste is important function of the urban local body. So in this case Shirdi Municipal council (SMC) collected the SW mainly from households, markets and commercial establishments, hotels and restaurants, marriage halls from the town. And SWM of Shirdi is manages the health department of SMC, headed by a Sanitary inspector, he is responsible for the SWM of town.

Sources of Solid waste generation:

On an average daily about 15000 people visit Shirdi. The number increases on Thursdays and weekend. The number increases on the three important festivals of Ramnavmi (March/April),Guru Purnima(July) and Dussera (October).During around 3 lakh people visit Shirdi while during the other 2 festivals 1.5 lakh people visit Shirdi. The people stays in Shirdi for 2 days during these festivals. The primary solid waste generating sources in Shirdi is household waste, and other large/huge amount of waste generating sources such as hotels, restaurants, markets and shops. But there is no industrial garbage in the SMC get, because there is no industry found near SMC. Because of that there is no industrial waste generated in Shirdi.

Quantity of Waste: Daily 10-12-ton garbage is collected under the MC of Shirdi. By different areas of Shirdi as well as from market as well as from commercial places also. In that 6-7 ton wet garbage is collected and 4-5-ton dry garbage is collected by Municipal council.

Waste generated in the temple:

Total daily garbage collected by Sai sansthan from temple, Bhaktnivas/guesthouse, canteen is 5ton.In which 2ton is wet waste and 3 tons is dry waste. Wet waste generated from the canteen of Shirdi sai Sansthan and dry waste generated in the temple and its surrounding.

Waste generation during fairs:

During the festival of Dussera, about 3 lakh pilgrims stay in Shirdi for 2 days. So during this time waste generated to be 30 tons. During the other festivals of Guru Purnima and Ramnavmi about 1.5 lakh pilgrims stay in Shirdi for 2 days. The waste generated during that time is about 15 tons for each festival.

Household Waste: In Shirdi the waste generated from the households is around 1.75 tons per day, which is 23% from the total waste generation of the town. Household waste mainly consist of organic waste such as vegetables waste, food waste, etc. Also significant quantities of paper and plastic also present in the waste.

Primary collection:

At present SMC has a mini door for house to house collection, but the coverage is not complete. Some of the households dispose their waste into dustbin along the streets by their own means. SMC has provided around 44 dustbins at various locations covering the entire town of Shirdi for effective collection of waste. Dustbins have been provided on all major roads and the average spacing is locality. about 800m (average 800m length of 52 km).

However, this spacing is not uniform throughout town, it varies from place to place depending on the density and Also by doing the discussion with the SMC officials reveal that the many of households, shops and commercial establishments throw the waste on to the open streets drains and open spaces it creating unhealthy conditions. Also the waste thrown into the open drains is crate problems like drainage chock up, so because of that the waste water flows on the streets rather than in drains and forms wastewater pools at certain locations.

Street Sweeping: One of the major activities in the solid waste management is the street sweeping activity, which is time consuming, and labour intensive. In addition to street sweeping, due to the open drainage system in some part of the town, drain desilting is also essential. SMC carries out street sweeping and drain de-silting in the entire town. The drain those cleaned once in two days.

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The manpower employed for the sweeping and cleaning operations include; 22 sanitary workers for street sweeping, 8 workers for drain de-silting activities, 4 workers for cleaning public toilets, 12 workers for solid waste collection from dustbins (@4 per vehicle), thus adding up to 46. In addition, there are 3 drivers and 2 supervisors. The sweeping operation is carried out in two shifts during the day covering different parts of the town. Due to lack of sufficient manpower with the local body, frequency of the street sweeping and de-silting activities is not uniform all over the town. Depending on the locality and necessity, Street sweeping is undertaken on the priority basis. However, main residential and other important areas are swept daily and some of the areas are swept occasionally.

Secondary Collection:

The secondary collection refers to collection of waste from community dustbins and intermediate collection points or transit points. However, in Shirdi, there are no intermediate collection points or transit points and waste is directly transported to the disposal site from dustbins. Waste is collected from dustbin and open dumping sites in the town and manually loaded onto the transportation vehicles.

Frequency of collection: The frequency of waste collection from the dustbins and other dumping points in the town varies depending on the quantity of waste accumulation and the locality. The waste from prime residential locations, commercial areas ,public places like markets, bus stand etc. is collected every day. The Sai Sansthan collects waste from its areas every day. The vehicle performs 2 shifts daily.

4.3 Issues in the Solid waste management of Shirdi:

Transportation of waste:

In Shirdi, waste transportation is carried out using open vehicles.SMC has 3 vehicles, tractor, mini lorry(tata407) and a minidoor for SW transportation the total transportation capacity available with SMC with the 3 vehicles is around 10.5 tons with each vehicle making 2 trips per day. However, considering the bulk density of the solid waste 0.35, the actual collection of the waste is only 3 tons per day.

Disposal of Waste: Waste is dumped on the site annually in ground and left it as it is. The area is not covered after dumping.

Workers under private and total health department people engaged in Shirdi:

As mentioned in the earlier section it is found that SWM is an important function of urban local body.SMC' health department headed by sanitary inspector assisted by 2 supervisors and sanitary workers is responsible for the SWM in the town. Due to lack of sufficient staff strength SMC has engaged the contract of sanitary staff is on temporary basis. The total temporary contractor involved in the sanitation process is 53. It means the SWM contract of Shirdi is given to the private contractors. So every month 10 lakh Rs. they giving to the contractors. All the thing collection, transportation, storage, segregation, dump of Solid waste is seeing the private contractors only.

Absence of effective Primary Collection Mechanism:

The absence of the door to door SWM system in the town because of that unhealthy conditions is occurred in the town. Also on the streets the housekeepers, restaurants, households is throwing the garbage and creating unclean and unhealthy environment. Also segregation of waste is also not doing properly.

Street Sweeping:

The frequency of street sweeping varies from one day one week. Also the length of street per sweeper is around 900m which against the norm of 400-600.Which shows the lack of manpower of daily sweeping.

Collection of waste:

At present SMC collection performance is only about 55%,which is less than the norm of 90-95%.It is found that several times the waste generated in the commercial areas is not collected by SMC. Because of that huge amount of garbage is generated in the city. Hence, there is an immediate need to increase the collection performance of the system to keep the city clean and healthy.

Transportation of waste: at present waste is being transported in open vehicles to the disposal site. Because of that bad smell or route and odour from waste is coming, This is common problem occurred because of open transportation of waste. Narrow lanes in the town are adding to the problem. The vehicles carrying the solid waste should be covered.

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Unavailability of Solid waste Disposal Site for the long term:

The SMC has a designated solid waste site Rui Shivar. The Site is under the SMC from five years. After this new site will have to be identified. There is some issues of people because ofthis is open dumping ground. so proper compound and net is required for covering this site. It is necessary to assess its technical and environmental suitability, on a high priority.

Disposal of waste:

The waste disposed improperly at the site. The waste is finding its way onto the roads surrounding areas due to blowing wind, making the area around the site unhygienic. The area nearest 0.5 km.

4.4 Research Questions:

Central Research question:

- How the Solid waste is managed in Shirdi?
- What are the alternative ways in the Shirdi to manages the Solid waste management?
- What is the potential loss of Shirdi MC facing to see the solid waste as wealth?
- What is the contract between the 1) Municipal council and private contractors 2) MC and Sai Sansthan 3) MC and Farmer 4) Sai sansthan hospital and private agency (For collection of bio-medical waste, water mineral bottle) to managing solid-waste management.

According this following 8 stages Shirdi is managing the solid waste.

So according to SWM 2000 rules set up the Solid Waste is managed in Shirdi. Like the according to 6 stages 1) Reduction at household level 2) reuse and recycle at household level 3) Collection 4) Segregation at source 5) transfer and transport 6) energy generation 7) Disposal 8) Landfills

After the as I mention in the second question what are the alternative ways to manages the solid waste then as I mention above two ways the SMC manages the Solid waste

1) Primary Collection:

SMC has a mini door for house to house collection, but the coverage is not complete. Some of the households dispose their waste into dustbin along the streets by their own means. SMC has provided around 44 dustbins at various locations covering the entire town of Shirdi for effective collection of waste. Dustbins have been provided on all major roads and the average spacing is about 800m (average 800m length of 52 km). However, this spacing is not uniform throughout town, it varies from place to place depending on the density and locality. Also by doing the discussion with the SMC officials reveal that the many of households, shops and commercial establishments throw the waste on to the open streets drains and open spaces it creating unhealthy conditions. Also the waste thrown into the open drains is create problems like drainage chock up, so because of that the waste water flows on the streets rather than in drains and forms wastewater pools at certain locations.

Secondary Collection:

The secondary collection refers to collection of waste from community dustbins and intermediate collection points or transit points. However, in Shirdi, there are no intermediate collection points or transit points and waste is directly transported to the disposal site from dustbins. Waste is collected from dustbins and open dumping sites in the town and manually loaded onto the transportation vehicles

Then What is the Potential Loss Shirdi MC to see towards the solid waste as wealth, then as I mentioned daily 10-12-ton garbage is being collected by Shirdi MC. The whole process from collection to disposal of SW is seeing by the private contractors of Shirdi under the health department of MCS Daily. They use the MC vehicle for the collection in which they kept 3 separate dustbins. So in on dustbin they kept wet veg waste that daily 2 ton veg wet waste is giving to the sai Sansthan for there biogas. On that Biogas only they cook the food of canteen, and then another dustbin they put the non-veg wet waste, and dry waste in third box. so from ton 1&1/2 ton wet waste is used for the composting. MCS make Composting plant which is away from the municipality. Where they built the composting pit and in that pit they put this daily wet garbage and for making the composting. The SMC has already given the contract for composting the waste to M/s Clean Eco and Environment Developers Pvt. Ltd. Situated at Loni. The bio fertilizer is sold under the brand name of Nisarg Raja. Then this composting is giving to the testing in the Rahuri Agriculture Mahatma Jyotiba Phule university. After testing the composting the university give the report in that they mentioned that it is actually good compost to use for the agricultural purpose. But in Shirdi there is not any farmer take it by purchasing so they have to give them in free. Otherwise it is kept remain as it. So because of that SMC not have get any profit for making the composting plant .So according to me this is major loss Shirdi MC is facing to see towards the waste as wealth.

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Image: 4.4.1: Segregation of Garbage

Source: During observation in the fieldwork

After Segregation recycle and reuse of dry garbage by giving to seller:

MC of Shirdi at the time of collecting garbage from vehicle they kept the separate dustbin of dry and wet garbage. And because of that there is no problem occur for recycling the dry garbage in which plastic, glass, fibre like material mainly found. Reduce, reuse and recycle formula is applying in Shirdi SWM.

4.5 Organizations involved in Shirdi the for the implementation of Solid Waste management

In Shirdi the Solid waste management process different participants are involved for the implementation of solid waste management. So in the SWM process at top Municipality is involved for the implementation of solid waste in Shirdi. Like the municipality of Shirdi is managing the waste generated from the 17 wards of town. Also waste generated in the Commercial as well as the waste generated by floating population of Shirdi outside the campus of temple of Shirdi.

Next is the Private body Sai Sansthan managing the solid waste of Temple, Also of the Guest house/Bhakt nivas waste generated by floating population for doing awareness in between the people about the solid waste management, there is one consultancy involve. This consultancy has appointed by the Municipal Council of Shirdi. Name of this consultancy is greeny. They are doing awareness in between people, in schools, as well as in Societies by workshops, short films, drama. So people also eagerly see it and understand it. This is contract basis agency, So MCS have given them a one-year contract to do awareness, why the SWM is important, how the dry and waste segregate. What is the benefit of SWM.

Also there is some special relationship is found in between the Shirdi Municipal Council and Sai sansthan.MCS collecting waste every day from the town, so the daily whatever wet waste and dry waste is segregated which around 10-12 ton. So from the wet waste they again segregate two type of waste Veg waste and non veg waste. Then from this daily 2 ton Veg waste s given to the Sai Sans than by the MC of Shirdi. Sai Sans than has their own biogas plant. So this bio-gas plant is used for the canteen cooking purpose.

Direct observation: During my direct observation I observed the whether the segregation garbage is happened at source or not. Also the composting machine. How this machine segregated the unwanted waste and make a composting that I observed that how much amount of water is required, how much amount of culture is used to make compost that I see during the direct observation. Also

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at the time of segregation of garbage also people kept dry garbage in the plastic and wet garbage in dustbin box. It is found that the hotel owners of Shirdi kept the separate box for the non-veg wet waste an veg wet waste. Because SMC giving daily 2ton veg wet waste to sai sansthan for the biogas plant. So Because of this co-ordination in between the municipal Council and Sai Sansthan, MC and Grenny Consultancy. This consultancy is very helpful for the implementation of solid waste management process.

Also Shirdi is famous because of Sai Baba's temple daily thousands of people come across different parts of city. Therefore, huge amount of garbage is generated in the city, also in the campus of temple huge amount of plastic bottles are collected. That bottles Sai Sansthan is purchasing to the one agency. This agency every week coming to collects this bottles and giving the money to the Sai Sansthan. Also There is also a hospital facility under Sai Sansthan, name is Sainath hospital. Whatever waste generated in this hospital that waste is also collected by the one agency. In the bio-medical waste different types materials are available. Plastic, glass, iron etc. So Annually the Consultancy and Sai Sansthan mechanical department Atul Wagh decide Fixed the rate of this unwanted material. And according to that rate Consultancy giving the money to Sai Sansthan, it means from that unwanted material consultancy has get profit.

So it is found that the by generated waste Sai sansthan is making profit by selling it. This is actually very good way to reduce and reuse of Solid waste. There is special correlation is found in between the Sai Sansthan and that agency.

4.6 Political intervention:

In terms of political intervention if we see then it is found that in Shirdi Election from 17 wards 17 Councillors are elected and from that 17 Councillors one mayor is selected and who ever will become Mayor of that particular ward. So after discussing with officer of SMC as well as the shopkeepers they tell me that there is somewhat politics is found in the Shirdi. In terms of providing the services. Like they said the person who become mayor of the particular ward for that ward getting the more facilities and more development is happened of that ward as compare to other. Like water, sanitation, solid waste management, street light conditions, drainage line this type of services.

Also the people who clean the temple area they are on paid job. They are not doing the free job. But there is one thing is found that the people who are cleaning in temple they are belong to Schedule caste. But they are getting money for this job whatever they are doing.

Also the people who are coming from outside so I will ask from 2-3 of them. Like how is the Shirdi environment, also in terms of getting the services. So they said that there are very few religious at their special guest house for the people who are come from outside for living 2-3 days Like they talk about the sai sansthan made bhkat nivas. Also the Shirdi's environment is also quite clean as compare to other cities by seeing the religious place.

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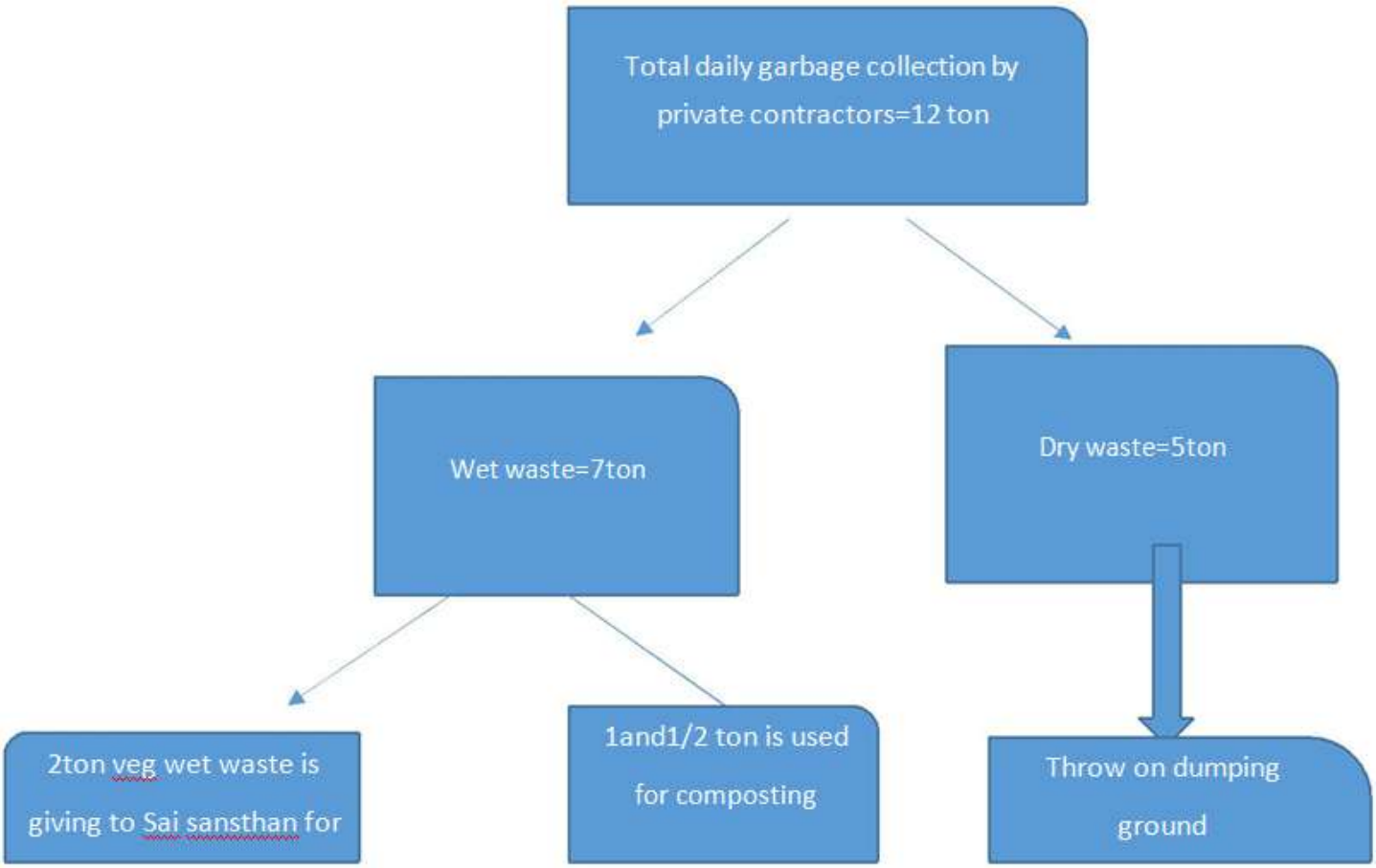

Figure 4.6.1 Daily Garbage collection in the Municipal council of Shirdi

Figure 4.6.2 Waste generated at Peak time according to Floating population (70% Wet waste and 30%dry waste)

In Shirdi During Peak time as I mentioned above around 15000-10000 people giving visit and holidays time around 100000-50000.So because of that more and more Like as I mentioned in the above figure it is found that daily garbage collection is 12 tons but in this figure we are seeing that during peak time around 18-20-ton waste is generated. That generated waste is collected by the municipal council of Shirdi.

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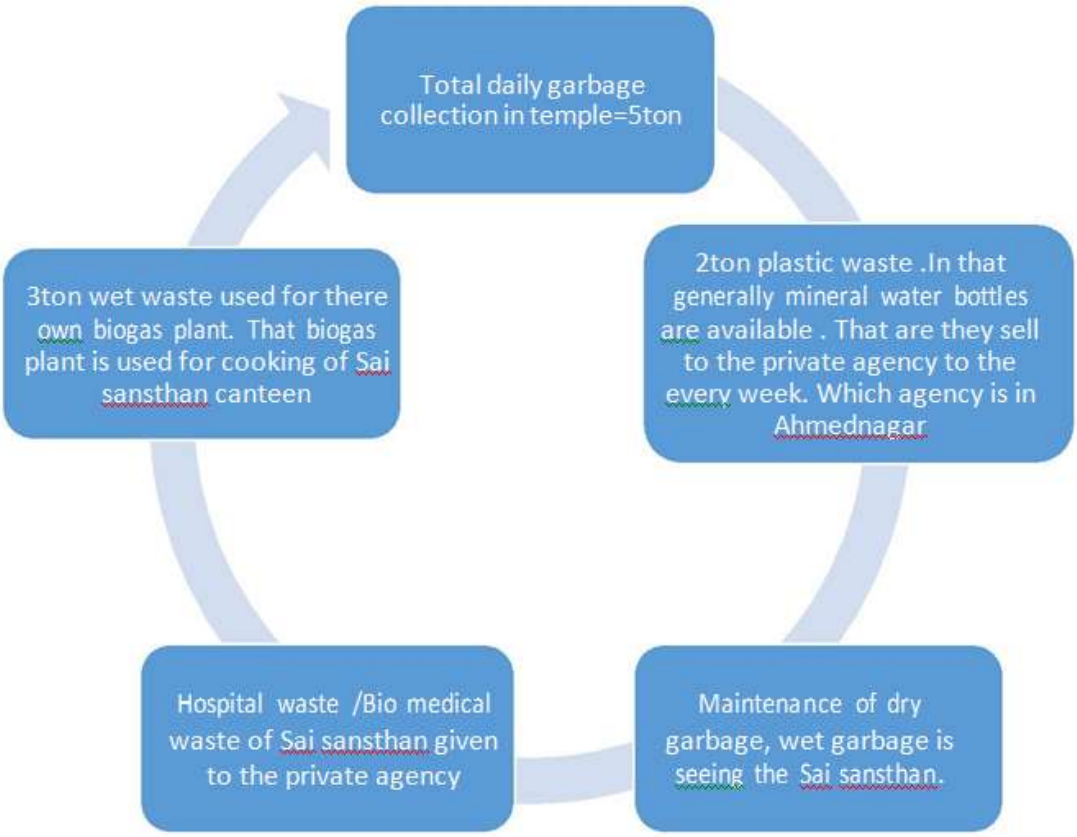

Figure 4.6.3Waste generated in Sai Temple

As I show in this figure it is seeing that Shirdi Sai sansthan has their own biogas plant. On that biogas plant they cook food of the sai sansthan canteen. The people who come from the outside city for those special and good food is served in the sai sansthan canteen. And for this biogas plant the Sai sansthan is using the wet waste generated in the canteen, temple campus. And dry waste is they just throw the outside the dumping of SMC. Also Shirdi Sai Sansthan has their own hospital. So the maintenance of Sai Sansthan hospital as well as collection of biomedical waste is seeing the Sai sansthan.

Image 4.6.4 composting machine

Source: Self observation

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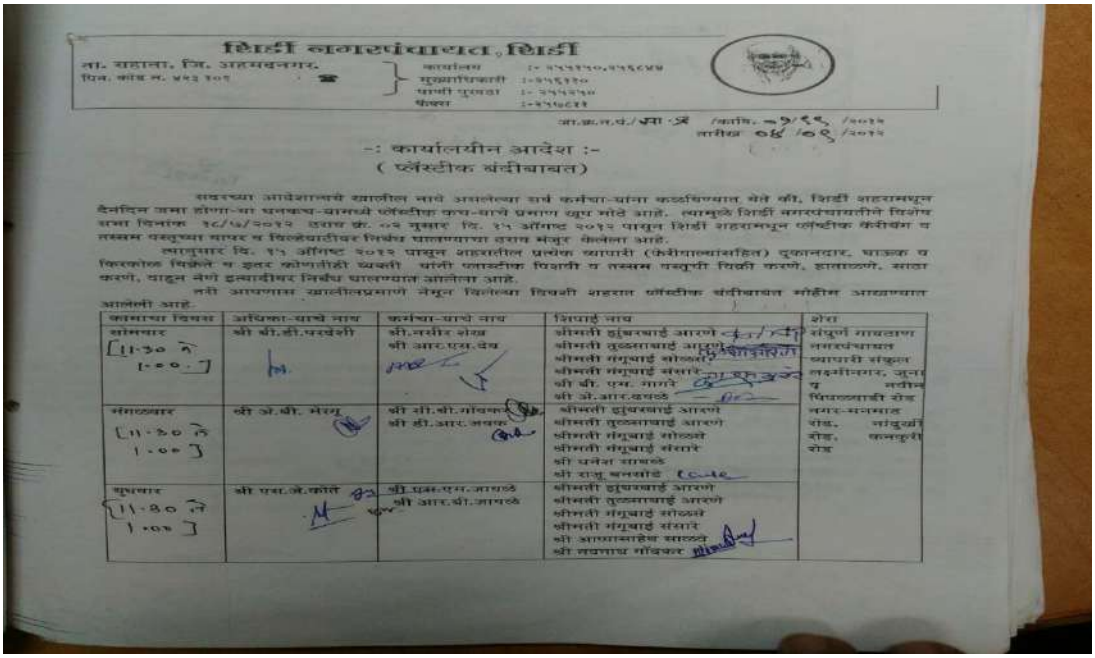
This is the composting machine of Shirdi municipal Council. From Daily 1 and ½ garbage is used for the composting. so in this machine firstly the unwanted garbage separated then the process for to make the composting is start. So By the Direct observation it is found that the whatever daily composting this machine is made which is still remain as it is. Which no in the actual use still because the SMC has send this compost to the Rahuri Jyotiba Phule agricultural University but still the result of this is not come yet. So marketing is not happening of this compost made by Municipal council. Because of that somewhere I feel that SMC is facing potential loss if we see towards the waste as wealth.



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ता. राहाता, जि. अहमदनगर.

-: कार्यालयीन आदेश :-

(प्लॅस्टीक बंदीबाबत)

Figure 4.6.5 Shirdi Document on the plastic ban

Source: Self observation

Image 4.6.7 Shirdi Declaration pamphlet on Plastic ban

Source: Self Observation

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शिर्डी नगरपंचायत शिर्डी

जाहिर प्रकटन

प्लॅस्टीक पिशवी व वस्तुच्या वापर– विल्हेवाटीवरील निर्बंधाबाबत शिर्डी नगरपंचायत हद्दीतील तमाम नागरीक व रहिवासी यांना या जाहिर प्रकटनाद्वारे कळविण्यात येते की, महाराष्ट्र शासनाने संपुर्ण महाराष्ट्र राज्याचे क्षेत्र हे प्लॅस्टीक कचरा मुक्त क्षेत्र म्हणून घोषित करण्याचे ठरविले आहे., पॅलिथीन (प्लॅस्टीक) पिशव्या व इतर वस्तुच्या वापर व कचऱ्यामुळे पर्यावरण व मानवी जीवनास गंभीर धोका निर्माण झाला आहे., शासनाच्या असे निदर्शनास आले आहे की, गटारे, मल प्रवाह, नाले तुंबण्यास प्रामुख्याने प्लॅस्टीकच्या पिशव्या व अनुषंगिक उत्पादनामुळे निर्माण होणारा प्लॅस्टीक कचरा कारणीभुत असून त्यामुळे पर्यावरण विषय गंभीर समस्या निर्माण होत आहेत. म्हणून भारत सरकार पर्यावरण व वन मंत्रालय यांनी सन अधिनियमाद्वारे प्लॅस्टीक वापरावर निर्बंध घातलेला आहे., त्यामुळे शिर्डी नगरपंचायतीने विशेष सभा दिनांक १८/७/२०१२ ठराव क्र. ०२ नुसार दिनांक १५ ऑगस्ट २०१२ पासून शिर्डी शहरामधून प्लॅस्टीक कॅरीबॅग व तत्सम वस्तुंच्या वापर व विल्हेवाटीवर निर्बंध घालण्याचा ठराव मंजूर केलेला आहे., त्यानुसार दिनांक १५ ऑगस्ट २०१२ पासून शहरातील प्रत्येक व्यापारी (फेरीवालेसहित) दुकानदार चालक व किरकोळ विक्रेते व इतर कोणतीही व्यक्ती यांनी प्लॅस्टीक पिशवी व तत्सम वस्तुंची विक्री करणे, हाताळणे, साठा करणे, बाहुन नेणे इत्यादीवर प्रतिबंध करण्यात येत आहे., तरी शिर्डी शहर प्लॅस्टीक मुक्त करण्यास सर्व नागरीकांनी व व्यापाऱ्यांनी याची नोंद घेऊन नगरपंचायतीस सहकार्य करावे.

Source: Self observation

4.6.7 Shirdi Declaration pamphlet on Plastic ban

Maharashtra Government Declared manifesto to ban on plastic because under observation of Maharashtra Sawchh abhiyaan. It is found that the problem of drainage chokes up, sewage problem is occurring mainly because of plastic. Plastic garbage is the mainly responsible for all this problem and because of that it is very badly affected on the environment. So because of that ministry of Environmental and Forest department of India decided that use of the plastic is strictly prohibited. By considering to this prohibition Shirdi nagarpanchayat according to Special date meeting 18-7-2012 resolution number 2 from the date 15 August 2012 declared the resolution of a prohibition on the Plastic carry bag and disposal of any plastic material. Therefore from the date 15-August-2012 did the prohibition on every merchant, street vendors, grocery shopkeeper, wholesaler and any another who either carry the plastic or kept storage of plastic.

4.7 Greeny consultancy

- This is the private consultancy.
- Doing awareness in between the people about the SWM.
- Also in school, colleges they are doing awareness in between student by using short film, drama etc.
- Also the importance of garbage like from wet garbage we can make composting, so how the segregation of garbage is important that work also did the greeny consultancy.
- So after doing awareness and giving importance to people about garbage then there is more cleanliness found in Shirdi. As like shown in following picture.

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Image 4.7.1: Before cleanliness awareness and after cleanliness picture of Saibaba English School nagar, Manmad road

Source: Greeny 2016 survey report

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Image 4.7.2 : Before cleanliness awareness and after cleanliness picture of : Hotel international opposite sai baba darshan, Gate no.1, near Union Bank of India

Source: Greeny 2016 survey report

Image 4.7.3 Before cleanliness awareness and after cleanliness picture of Water Tank areaNandu
Source: Greeny 2016 survey report

So By seeing the above picture it is found that there is lots of improvement I have seen during my interviews to the households, shopkeepers, hotel owners. By Seeing the Shirdi MC Report it is found that around 95% people know about the importance of SWM and how to segregate the dry and garbage.

- Also hoteliers, vegetable vendors do a segregation of wet and dry garbage at the source only. Also hardly 5% people don't know about the segregation and all and also they throw a garbage on open space.
- Otherwise after taking interviews of households it is found that the each and everyday the SMC vehicle.

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In overall conclusion I find that as Shirdi is grown up city. From small village, now it becomes an city town and lots of changes development occurs in Shirdi. From one of them is cleanliness as a religious place there is lots of people visiting from different town, cities. Therefore the people's attraction always firstly goes on the cleanliness. Therefore, to become city more cleaner, smarter SMC always doing different program. Also doing awareness in between people, schools students about cleanliness program, solid waste management. As like water, housing. development of wards SMC also give the equal importance to the solid waste management. By doing the survey of Shirdi by greeny Private consultancy it is found that in Shirdi around 95% known about the Solid waste management only 5% people don't know about the implementation of solid waste management. Also further it is found that around 92% people doing the segregation of garbage at their houses itself like keep separate dustbin for dry and wet garbage so it's impact directly goes on the proper disposal of solid waste. Otherwise it is difficult then for the people who collecting the garbage at the source. Therefore, it is found that the implementation of condition of solid waste management somewhat good from last 2-3 years. After did an observation and discussion with people during interview I somehow felt that understanding of people about the Solid waste management is good.

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CHAPTER:- 5
ANALYSIS

5.1Overview of Analysis

In Analysis I have chosen 3 themes one is I am doing the comparison of Shirdi SWM with other religious city. And according that it is find out the SWM of Shirdi is doing the best from last 2-3 years.

- Shirdi's Population is 36004.
- So as per my topic I am focusing on the how the SWM condition in Shirdi.
- For analysing that I am using the service level bench mark 2010-11 water, sanitation report of Ministry Urban development.
- In the first table I show the Service level benchmark of solid waste management Then I chose the 8 cities which is religious or tourist famous city. (Shimla, Tiruvhanthpuram, Ujjain, Kolhapur, Tuljapur, Agra,
- Varanasi, Ujjain, Trimbkwshar)

Also seeing the Solid waste management steps from 1) Household level coverage2) Efficiency of Collection of MSW 3) Extent of Segregation4) Extent of MSW recorded 5) Extent of Scientific disposal 6) Efficiency in redressal of customer complaints 7) Cost recovery 8) Efficiency in collection Charges.

That all above mentioned cities. And I do a comparison of Shirdi SWM with this cities. From this cities the 1st rank means good implementation of Solid waste management is found in Kolhapur, then Tiruvhanatpuram SWM is coming in the 2nd rank according I selected city. Then next is Shirdi is coming on 3rd rank after that Shimla, Tuljapur, Trimbekeshwar, Varanasi, Agra is coming.

So the condition of solid waste management I show by 4 colour according to that red colour means no implementation happened yet. Then green is show the full implementation happened in the city ,Blue is shows the SWM condition of that particular city of that is in progress and black is showing the very less amount of implementation is happened in the that city of that particular city.

Then I am using the Shirdi Municipal council budget 2016-17, as well as MCGM(Municipal corporation of greater Mumbai 2015-16,2016-17) budget. By this budget I saw the revenue, income expenditure as well as capital expenditure of Shirdi SWM. Like according to population wise Municipal corporation of greater of Mumbai and Shirdi Municipal council how much money spend on the per capita per households.

Next I see the what are the different actors, organisation involved in the Shirdi Solid waste management other than SMC and how is the relationship in between this organisation. And how the formal and informal relationship is having in between the SMC and sai sansthan, other agencies, with the help of diagram.

5.2 Comparison of Shirdi SWM with the different cities by using Service level benchmark (2010-11)

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Solid waste management step	benchmark	median	average	Green	blue	Black	red
Household level coverage	100%	25	35	>60	30-60	0-30	0
Efficiency of Collection of MSW	100%	80	75.6	>90	90-70	70-50	0-50
Extent of Segregation	100%	0.0	10.8	>50	25-50	0-25	0
Extent of MSW recorded	80%	0.0	14.5	>50	25-50	0-25	0
Extent of Scientific disposal	100%	0.0	9.4	>50	25-50	0-25	0
Efficiency in redressal of customer complaints	80%	61.0	54.7	>80	60-80	30-60	0-30
Cost recovery	100%	0.0	7.3	>60	30-60	0-30	0
Efficiency in collection Charges	90%	0.0	14.4	>60	30-60	0-30	0

Table 5.1.1: Service level Benchmark ranking for indicator values of SWM

Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report (2010-11) page no:24

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City	State	type	Household level coverage	Efficiency of Collection of MSW	Extent of Segregation	Extent of MSW record	Extent of Scientific disposal	Efficiency in redressal of customer complaints	Cost recovery	Efficiency in collection Charges
			100%(2010-11)	100% (2010-11)	100%	80%	100%	80%	100%	90%
Shimla	Himachal Pradesh	Municipal Corporation	84.8	74.8	10	15	0.0	74.1	9.9	44.4
Thiruvananthapuram	Kerala	Municipal Corporation	49.1	68.3	79.8	96.7	100.	94.0	36.6	87.0
Ujjain	Madhya Pradesh	Nagar Palika	6.0	72.0	0.0	0.0	0.0	3.0	100.	30.0
Kolhapur	Maharashtra	Municipal Corporation	91.0	91.9	30.0	83.7	90.0	79.8	70.0	97.3
Tuljapur	Maharashtra	Nagar Palika	50.0	80.0	0	0	0 red	50	50.0	5.0
Shirdi	Maharashtra	Nagar Panchayat	70	70	60	40	50	40	30	20
Agra	UP	Nagar Nigam	0.0	88.0	26.0	25.0	0.0	50	0	0
Varanasi	UP	Nagar Nigam	27.3	85.8	0.0	0.0	0.0	66.0	0.3	41.3
Trimbakeshwar	Maharashtra	Nagar Palika	70.0	70.0	10.0	20.0	0.0	60.0	0.0	0.0

Table 5.2.2: Religious /tourist cities SWM status (2010-11)

Source: Ministry of Urban Development Government of India, Service level benchmark in Urban water and sanitation sector status report (2010-11) page no: 61,62,63,66,67

Note: Green: is represent very good condition about the solid waste management. Blue: is represent good condition about the SWM
Black is representing poor condition of SWM,
Red represent Very poor condition of SWM menace not implemented SWM in that city at all.

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City	type	Household level coverage	Efficiency of Collection of MSW	Extent of Segregation	Extent of MSW recorded	Extentof Scientific disposal	Efficiency in redressal of customer complaints	Cost recovery	Efficiency in collection Charges
Shimla	Municipal Corporation	best	good	Poor	poor	Very poor	good	poor	good
Thiruvanan thapuram	Municipal Corporation	good	poor	Best	best	best	best	good	best
Ujjain	Nagar Palika	poor	good	Very poor	Very poor	Very poor	Very poor	best	good
Kolhapur	Munici-pal Corporation	best	best	Good	best	best	best	best	best
Tuljapur	Nagar Palika	good	good	Very poor	Very poor	Very poor	poor	good	poor
Shirdi	Nagar Panchayat	best	good	Best	good	good	poor	poor	poor
Agra	Nagar Nigam	Very poor	good	Good	poor	poor	poor	Very poor	Very poor
Varanasi	Nagar Nigam	poor	good	Very poor	Very poor	Very poor	good	Very poor	good
Trimbeshk war	Nagar Palika	best	good	Poor	poor	Very poor	good	Very poor	Very poor

Table 5.2.3: So by seeing the above table and if we compare the cities SWM condition then it is as follows

Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report(2010-11) page no:24

And by seeing the following table of the Maharashtra State condition of Solid waste management and compare the Shirdi Nagarpanchayat condition of SWM with Maharashtra state SWM condition then it is found that the 1) Household level coverage: best 2) Efficiency of Collection of MSW: Mean/good 3)Extent of Segregation: Best way practices 4) Extent of MSW recorded: good 5) Extent of Scientific disposal: good 6) Efficiency in redressal of customer complaints: minimum /poor condition 7) Cost recovery: poor 8) Efficiency in collection Charges: Poor

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Indicators	Median	Mean	average	Min	Max
Household level coverage	70	239	66	7	100
Efficiency of Collection of MSW	80	244	76	20	100
Extent of Segregation	20	158	39	5	100
Extent of MSW recovery	-	113	39	1.1	
Extent of Scientific disposal	10	138	45	4	100
Cost recovery	-	68	32	0.1	100
Collection efficiency	-	63	42	0.5	100
Complaints redressal	67	241	66	10	100

5.2.4 Maharashtra State Solid Waste Management Situation

Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report (2010-11) page no:101

The practise of door to door collection in the State is carried out by the ULB or its available service provider. Almost 239 ULB's have reported door to door collection with 66% average.

The segregation and processing of waste is carried out in ULB. The averages computed are only for the ULBs which have been reported the values which has been indicated as mean countable.

Sr.No.	Class	Population
1	IA	75 million
2	IB	1-5million
3	IC	100000-1million
4	II	50000-100000
5	III	20000-50000
6	IV	<50000

5.2.5 City grading according to population size. The City ULBs classified into classes based on the population as given in the table below:

Source: Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report(2010-11) page no:114

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City name	Population	Class
Shimla	169,578	II
Thiruvananthapuram	3,307,284	IB
Ujjain	515,215	II
Kolhapur	549,236	II
Tuljapur	34,011	IV
Agra	1,760,285	IC
Varanasi	1,435,113	IC
Shirdi	36,004	IV
Trimbeshkwar	12,056	IV

Table 5.2.6 Population & Classwise Category of city

Source: Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report(2010-11)

As per selected cities religious as well as tourist cities. I have categorised them into according to class wise, population wise. So according this table Shirdi's population is 36,004 and which is come in the 4th category.

Solid Waste Management	Household level coverage	Efficiency of Collection of SWM	Extent of Segregation	Extent of MSW recorded	Extent of Scientific disposal	Efficiency in redressal of customer complaints	Cost recovery	Efficiency in collection Charges
National	39.0	80.0	0.0	0.0	0.0	70.0	0.0	0.0
IA	71.0	86.0	1.0	7.0	0.6	41.0	7.0	0.0
IB	37.0	86.5	12.0	11.0	0.0	80.6	70.0	40.5
IC	41.9	80.7	0.0	0.0	0.0	70.0	0.0	0.0
II	48.6	80.0	0.0	0.0	0.0	70.0	0.0	0.0
III	30.0	80.0	0.0	0.0	0.0	70.0	0.0	0.0
IV	30.0	75.0	0.0	0.0	0.0	70.0	0.0	0.0

Table 5.2.7 The Following table shows according cities population classification SWM situation

Source: Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report(2010-11) page no:116

So as we seeing the SWM situation according to National as well as population wise It can be seen that IA and IB cities are particularly segregating of SW and recovery of the SWM. Whereas the cities falling in the other categories have no such Provision. The ULBs under classes of IC, II, III, IV does not practice, segregation, recovery, scientific disposal of SWM. But by seeing the above table Shirdi is also come under IV category but the Segregation recovery as well as scientific disposal condition is found good as like IA city.

- Means if compare the Shirdi SWM condition at National, state as well as population wise with other cities then it is found that condition of SWM Shirdi is really good. By seeing the above table Shirdi is coming in 4th category of City's population range.
- And according to this report/SBM the type 4th category's cities SWM condition is very poor, but Shirdi is exceptional in that, report.
- In that report from all the steps collection to disposal in every step it is showing in green zone. Means it is good.
- Then another one I am find out the how the relationship of SMC with the people/organisation who are involved for the implementation of SWM. (like Sai Sansthan, other agencies.

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- And in last I am doing the comparison of Budget of SMC SWM and MCGM SWM and by using this data I will see how much this municipality is spending on SWM. Per capita, per person that I will see.
- It is found that Population of Mumbai is greater than Shirdi then obviously there is per capita per person income, expenditure of Shirdi Municipal on Shirdi SWM is more than the MCGM (Municipal of greater Mumbai).

Revenue	2015-16	2016-17
From solid waste make composting	500000	500000
Pay and use toilet	10000	10000
Dirty water connection fee	500000	500000
Fee process disposal of solid waste	400000	400000
Treatment and reuse of dirty water fee	400000	400000
Drainage connection fee	50000	50000
SWM Municipal Fine the charges from (From Council property get a profit)	450000	300000
Cleaning worker salary	7800000	7800000
Fund from Shirdi Sai Sans than	1000000	1000000
Grant for Maharashtra cleaning mission	2000000	1000000
Grant for building to new composting pits and its development	8000000	8000000
Grant for solid waste management	115400000	115400000
Property Tax	42,50,000,00	45000000

Table 5.2.8 Revenue income of Shirdi SWM

Source: SMC 2015-16,2016-17 budget

Revenue Expenditure	2015-16	2016-17
Purchasing garbage dustbin and its repairing	25000	5000
Transportation of garbage for dumping	600000	100000
Contract giving to cleaning contractor	12000000	12000000
Solid waste management process and composting	2000000	2000000
Open sewage repairing	250000	50000
For maintenance of dumping ground	90000	90000
Capital expenditure		
Purchasing solid waste management composting machine	2500000	1000000
For making garbage segregation method more strong	2560000	1500000
Building for new composting pits and its development	8000000	8000000
Solid waste (25% 0f grant)management	2885000	37500000

Table 5.2.9: Revenue and capital expenditure of SWM

Source:SMC 2015-16,2016-17 budget

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Type	2015-16 in crore	2016-17 in crore
Revenue income	112.10	115.83
Revenue expenditure	1855.93	2069.76
Capital expenditure	422.50	316.57
Property tax	4513.53	4956.18
Refund of property taxes	138.67	288.85

Table 5.2.10 Budget Estimate of MCGM

Source: MCGM 2015-16,2016-17 budget

By seeing the above table it is found that budge Estimate (Capital expenditure, revenue expenditure, revenue income) of SMC on the Solid waste management is more than that of the Municipal council of greater Mumbai. The reason behind that is one is the population of the both cities. If we compare the population of both cities, then it is found that there is huge amount of difference is found. Like Mumbai's Population is 12,442,373, and Shirdi's population is 36,004. Also Shirdi is currently grown up city, so according to that the need, requirements and people's lifestyle and load of local governance in terms of providing the services to the people's is varies in this both the cities. Also what are the conditions, rules SMC is following for the implementation of Solid waste management from that faze MCGM already gone, it means it comes in one the one of the stable phase now it jump from grown up city towards the developed city. Therefore, the need, requirements and structure to managing the Solid waste management in metropolitan cities as like Mumbai and in the small city like Shirdi there is definitely huge difference is found. Therefore, load of local governance like municipality is also functioning in a very different way. Like in Mumbai Contents 23 wards Zone1.(Ward A , Ward B ,Ward C , Ward D ,Ward E) Zone 2. (Ward F North Ward F South Ward G North Ward G South) Zone 3(Ward H East Ward H West Ward K East Ward K West). Zone 4(Ward P North ,Ward P South, Ward R central ,Ward R north ,Ward South) Zone 5(Ward L ,Ward M East ,Ward M West) Zone 6 (Ward N,Ward S, Ward T). And population of each ward is above the 1 lakh and if talk about the population of Shirdi, then it is 36,004 from 2011 census. As I mentioned above itself therefore in between the expenditure, income of Solid Waste management or in the budget of the municipality find the lots of difference means capacity of spending on solid waste management of this 2 urban local body is really vary.

Municipalities	Year	Revenue Income	Revenue expenditure	Capital expenditure	Revenue +Expenditure
Shirdi Municipal Council	2015-16	3205.19	408.079	442.867	850.94
	2016-17	3205.19	394.26	394.40	788.66
Municipal council of Greater Mumbai	2015-16	90.09	149.16(Fiscal Deficit)	166.34	420.77
	2016-17	93.09	339.56(fiscal Deficit)	254.42	488.72

Table 5.2.11: Revenue income, Revenue expenditure, capital expenditure of sold waste management of Municipalities

Source: SMC 2015-16,2016-17 budget, MCGM 2015-16,2016-17 budget

5.3 Different Actors involved in the Shirdi for implementation of Solid Waste Management

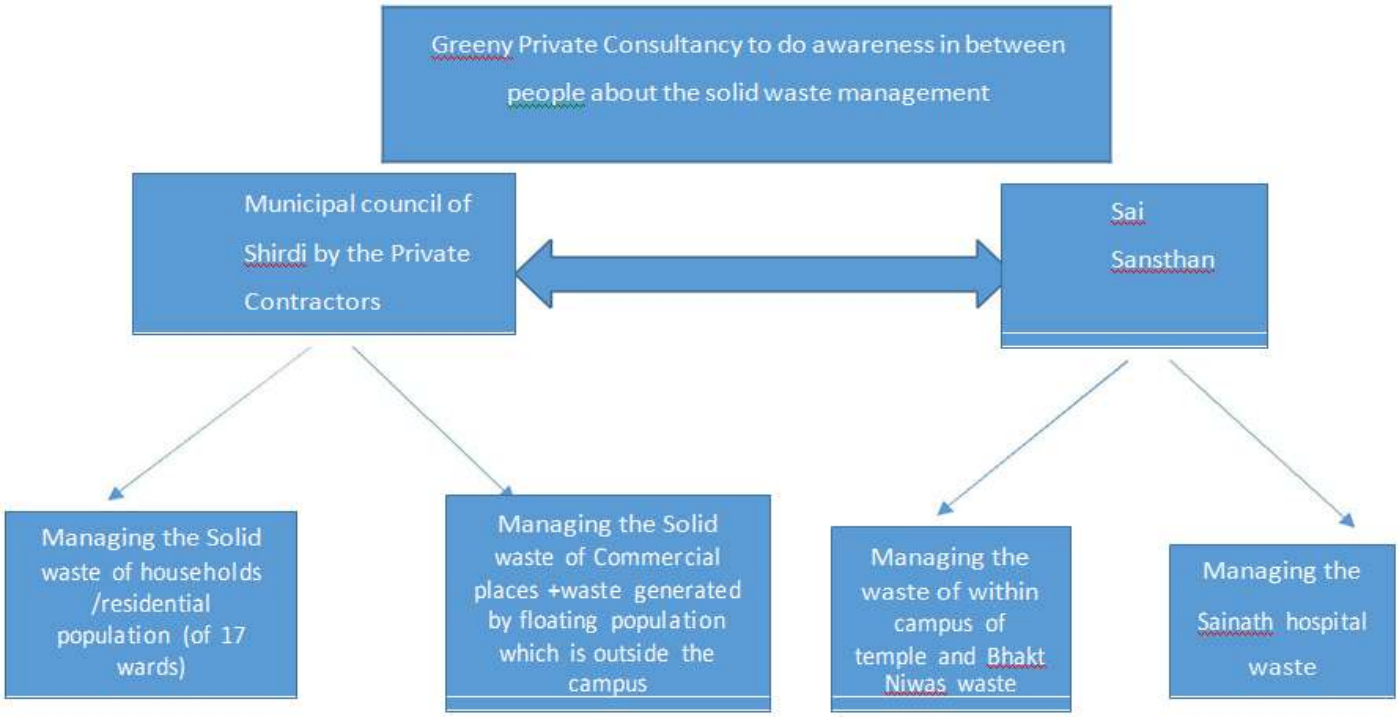

Figure 5.3.1 What are the different actors involved in the Shirdi solid waste management. Is shown by following diagram

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Formal and Informal Relationship in the implementation of SWM in between different actors:

- There is no Public private partnership is found in Shirdi.
- For the implementation of Project of SMC like regarding SWM, water, sanitation etc. the fund is providing the Shirdi sai sansthan.
- Also there is every year parking money is getting to the SMC by Sai Sansthan.
- By observation it is clear that there is no informal relationship in between farmer and SMC. Like the MC people want give free composting to the farmer to use. But no one is using it.
- Also there is another connection is found Shirdi has famous Sai Baba's temple. So lots of tourist coming from outside the temple. And lots of waste is generated.
- Because of lots tourist Specially mineral water bottle generated /stored, so the sai sansthan people giving contract to one agency for that. Every month that agency vehicle is coming and collect the bottles. And give money to the sai sansthan in return to bottles.
- There is no separate fund come from the central government for the implementation of Solid waste management in Shirdi.
- Whatever total fund is coming by 14th finance commission so in that they mentioned how much fund they have to spend on the development of solid waste management. like from total funds during the current year they have spend 20% from the total fund.
- Also sometimes the fund is inadequate for the implementation of solid waste management. So from MC money as well as by Sai sansthan fund they do a management of Shirdi Solid waste management.

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CHAPTER:- 6
POLICY RECOMMENDATION

6.1: Overview of Policy Recommendation:

So in the policy recommendation I am giving the my own reflection about the solid waste management of Shirdi, Find out the lacunas somewhere about the solid waste management situation in SMC by my whole research during my fieldwork, findings and analysis how it can be improve according to me.

Then I am Focusing on the state level policy recommendation like how the situation of Solid waste management in Maharashtra state and what is lacunas in the implementation of solid waste management. And what is the changes will have to be do for the improvement of SWM situation of Maharashtra.

6.2: Policy recommendation of SMC

In Shirdi implementation Solid waste management is handling the SMC. But there are the NGO's are also for the implementation of Solid waste management like sai Sansthan, which is temple organization which also involved in the development of Shirdi infrastructure like roads, airport,SMC project funding.

But during my data collection I see the whole structure of SMC solid waste management. Basically the Health department of SMC managing the solid waste management situation of Shirdi. Then I see the how the daily activity for the implementation of SWM, then it is found that the private contractors are doing the whole thing of Shirdi SWM like all the steps from collection to disposal. So they daily collect the garbage by SMC vehicle by ward wise as well in market places, hotel. In that they keep separate dustbin for dry and wet garbage. So during the fieldwork observation it is found that SMC keep the one more separate plastic for the veg wet waste and that daily 2 ton veg wet waste they are giving to the Sai sansthan for there bio gas plant, so I think here is lacuna or complexity I am seeing., Why is SMC giving the daily 2 ton veg wet waste to the Sai Sansthan bio gas plant. It means SMC not seeing towards the Solid waste as a wealth. If they giving it free but they can't even think that how much valuable is the solid waste of Shirdi. And they are just giving it in free they don't even get money by that wet waste. So according to me the Shirdi MC way to see towards the solid waste have to be change.

If they change it then I think if instead giving that waste to the Sai Sansthan by using that they can also stand there own biogas plant and which is really profitable for SMC. Also SMC have there composing plant they are making the compost from the machine but no one want to use it, So I think SMC have do awareness in between people about there made composting by using experiment show to people how it is good for grown up the trees, crops. Otherwise I am seeing that no using it. So if they do awareness then definitely farmers of Shirdi use that compost in their agriculture to ripe the crops. So I think If people agree then they can definitely purchase that compost from SMC instead of purchasing it from market and it is really profit for the SMC from the composting plant.

6.3 Policy recommendation of Maharashtra solid waste management

According to Ministry of Urban Development Government of India, Service level benchmark in Urban water and sanitation sector status report (2010-11). The Situation Maharashtra Solid waste management is So according to this table I think it is found that the solid waste management situation of Maharashtra is not satisfactory in all the steps of SWM. Like as seeing the above table. According to Swachh Baharat mission to do awareness in between people about the solid waste management, I think if awareness by using different like short films, dramas means by entertainment reach up to the people, student about the message of cleanliness, how the garbage by using the Reduce, reuse and recycle method we can use it. How valuable the solid waste. In many villages of Maharashtra state still don't have their own individual toilets therefore they prefer to go to open defecation which is really unhealthy and because of the surrounding areas are polluted and several diseases are spread like Malaria, Dengue and it is affected on the health.

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Indicators	Median	Mean	average	Min	Max
Household level coverage	70	239	66	7	100
Efficiency of Collection of MSW	80	244	76	20	100
Extent of Segregation	20	158	39	5	100
Extent of MSW recovery	-	113	39	1.1	
Extent of Scientific disposal	10	138	45	4	100
Cost recovery	-	68	32	0.1	100
Collection efficiency	-	63	42	0.5	100
Complaints redressal	67	241	66	10	100

6.3.1: Maharashtra State Solid Waste Management Situation

(Ministry of Urban development Government of India, Service level benchmark in Urban water and sanitation sector status report 2010-11) page no:101

Also awareness about the solid waste management ,like garbage segregation, don't throw the garbage outside open area, giving the importance to the cleanliness is very important also whatever daily kitchen waste if they mix it with mixture and make a compost of that waste then it is helpful reduction of garbage and compost is use for the grown up the trees, but how to make the compost for that they have to either use the compost machine or build the cement pits and in that they can daily put there wet garbage like fruits cover, vegetable waste etc. And by proper maintenance they can make the compost. But for that to give the training, workshop to this people is very important. Also the small advertise like for ex: Amitabh Bachhan's advertise.

(*Source: https://youtu.be/gzs2t6BCrU0)*on Swachh Bharat Mission how to make composting is really helpful .In that video Amitabh Bachhan with help of Society meeting doing awareness about the how to make composting and how it is helpful for to reduce the garbage and to make farming land more fertile. Then I think the picture about the Maharashtra Solid waste management situation, mindset of people to see towards garbage will definitely change.

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CHAPTER:- 7
CONCLUSION

So overall after doing the data collection and after did an analysis of the data. Then I understand the Solid waste management of Shirdi. Also as local governance how the SMC is doing the implementation of Solid waste. Which department of SMC take initiative to see the all process of solid waste from garbage collection to disposal. So it is found that the health department of SMC is managing the whole process of solid waste management. Under the health department for the implementation of solid waste management private contractors are involved. So every month they have get money from the SMC.

After taking interview it is clear that at starting for the implementation SWM, to do awareness in between people to give the importance to the people for the solid waste management, how to segregate garbage, to give the importance behind that, importance about cleanliness is very difficult. But day by day the picture is change. People's mentality to see towards garbage is change. Now a days People by their own do a segregation of garbage at source Only Somewhere as that I mentioned above issues regarding cleaning, street sweeping, carrying garbage from the vehicle openly smell is spread. So to cover up the garbage vehicle is very important. Also as a grown up city SMC is spending the money on the solid waste management is more than the Mumbai Municipality during analysis I found that, also according to the 2010-11 service level benchmark document Solid waste management condition, means in terms of implementation of solid waste management is come in green zone means it is good sign towards the implementation of solid waste management in Shirdi. Cleanliness I found more and more after did the awareness by greeny consultancy in Shirdi in between the households, shopkeeper etc. To show the videos such type of animated video greeny consultancy showing to the people, as well as school student and doing the awareness in between people.

Via entertainment to do awareness in between the people about the solid waste management is one of the best way. So by considering that SMC has give the contract to do awareness in between people about the cleanliness. Greeny is by Short animated films doing the awareness in between the people to show the students as well as shopkeeper, fruit vendors, hotel owners etc. Also they are trying to make the machine which can easily burn the sanitary napkin. Which is really helpful to reduction of garbage as well as people /rag picker who are collecting the garbage.

APPENDIX

Appendix 1: Calculation of total revenue income, revenue and capital expenditure of the in Shirdi MC Table 5.1.8 and 5.1.9:

SWM Revenue income per household in Shirdi =115400000/36,004=3205.19942rs. Revenue

expenditure=14692500/36004=408.079(2015-16)

SWM Capital expenditure=15945000/36004=442.867(2015-16) Revenue

expenditure=14195000/36004=394.26

Capital expenditure=14200000/36004=394.40

2015-16Revenue+capital expenditure/population=14692500+15945000=30637500/36004=850.94

2016-17Revenue+capital expenditure/population=14195000+14200000=28395000/36004=788.66

Appendix 2: Calculation of total revenue income, revenue and capital expenditure of the in MCGM of 5.1.10 Table:

Population of Mumbai city according to 2011 census:

12,442,373population according to 2011: it urban / metropolitan population 18,394,912

2015-16(SWM Revenue income per capita per person/house=1121000000/12,442,373=90.09 Rupees)

2016-17(SWM Revenue income per capita per house/person= 1158300000/12,442,373=93.093 Rupees).

SWM Revenue expenditure=1855930000/12442373=149.16Rs. (2015-16) SWM Revenue

expenditure=2069760000/12442373=166.34Rs. (2016-17) SWM capital

expenditure=4225000000/12442373=339.56(2015-16)

SWM capital expenditure=3165700000/12442373=254.42(2016-17)

SWM capital +revenue expenditure =5235460000/12442373=420.77(2016-17) SWM capital +revenue Expenditure =6080930000/12442373=488.72 (2015-16)

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