

# Waste generation in india environmental sciences essay



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" There was no ways of dealing with it that haven't been known for thousands of years. These ways are essentially four: dumping it, burning it, converting it into something that can be used again, and minimizing the volume of material goods - future garbage - that is produced in the first place," wrote William Rathje, a noted solid waste expert, about solid waste, above four methods are the way by which a waste could be manage, out of all these four dumping is most commonly use method even from prehistoric times to present age. In ancient city of Troy garbage were used to be dumped inside the house and are covered with the layers of dirt or of clay which result in upward increase in height of roof, these way ultimately new cities were made above older ones. But large part of garbage were used to be dump outside the house on the street of city which during rainy seasons get turned into open sewers which resulted in many diseases. As population grew problem of waste disposal grew. Since the industrial revolution overall urban population of world is increasing with very high rate, similarly in India due to growing urbanization will result in tremendous increase of urban population. Each human activity produce waste but quantity and composition of waste differ by lifestyle, and with urbanization life of people is changing with very high rate, as per ministry of Urban development and Ministry of environment of Government of India this present speed of urbanization will result in increase of urban population upto 41% of total population of country by 2021. With this huge urban population municipal waste management is challenge and ever increasing challenge. As per CPCB estimate by 2047 per capita waste will be more than 945gm. as against 490 gm. presently per capita waste (CPCB 2000a)CPCB estimates thatParameterRate of

increaseUrban population3-3. 5%Per capita waste generation in India1.

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30%Yearly increase of waste generation in India5. 00%Solid waste management is not only moral obligation of ULBs but it is also their legal and professional duty towards citizens. This essential service if not efficiently performed by the municipal bodies will result in health problems of sanitation and environmental degradation (Chavan, 2007). Materials for which generators or users abandoning the material within the urban boundaries of ULB required no remuneration or allowances after abandonment of it is call municipal waste. Generally people see waste as being the responsibility of state (ULB) to collect or to dispose it (Cointreau, 1982)High urbanization result in increase of MSW generation and make its management in scientific and sustainable manner as very complex task for all ULBs (Palnitkar, 2007). SWM is not only activity which is get terminated at disposal point in fact it is much beyond that till recovery of waste and waste recycling (Wealth of Waste 2006)Process by which waste material is transformed into new product in such away that its original identity is lost such process is call up cycling (Cradle to cradle, 2002) and use of that particular material again and again is called recycling. India with population of 1. 21 billion stand at second position among all nation in term of population and its stand rank 7 th in term of area, country is home to 18% of world population, but land being limited and population growth is continuous with continuous development of economy urbanization and life style change in high rate which also means change in waste generated by people. With its limited resources and inadequate system in place to treat waste this growth is causing not only problem to life of people but also to environmentThis situation where scarcity of resources and every increasing pressure on them have created a gap in available services and mismanagement and <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

inefficiency in services and resource utilization. SWM (Solid Waste Management) is one of those services where India need to full fill large gap in the system. Presently SWM systems are inefficient, heavy expenditure service and are very high on potential threat to public health and environmental quality. Due to inefficient SWM service it cause: Deterioration of public health, environmental pollution, natural resources degradation, causes climate change and Greatly impacts the quality of life of citizens. MSW management problem is a result of unbalance and irresponsible life style, and it cause problem with lifestyle and health. The composition of urban MSW in India is 51% organics, 17. 5% recyclables (paper, plastic, metal, and glass) and 31 % of inert. The moisture content of urban MSW is 47% and the average calorific value is 7. 3 MJ/kg (1745 kcal/kg). The composition of MSW in different part of country varied between 50-57% of organics, 16-19% of recyclables, 28-31% of inert and 45-51% of moisture. The calorific value of the waste varied between 6. 8-9. 8 MJ/kg (1, 620-2, 340 kcal/kg).

## **Waste Generation Rate & Quantity**

Per Capita waste of 0. 44 Kg/day in 2001 has increased to 0. 5 kg/day in 2011. And reason in changing lifestyle and improvement in purchasing power of urban citizens. These conditions have increase the waste generation by more than 50% in just 10 years. Million plus populated cities of India ( all 53 cities of Million plus population) account for 31. 5 Million tons of waste per year. The total MSW generated in urban India is estimated to be 68. 8 million tons per year (TPY) or 188, 500 tons per day (TPD) of MSW. Such a steep increase in waste generation within a decade has increased the stress on all available natural, infrastructural and financial resources.

## **Improper Waste Management**

Big cities collect about 70 - 90% of total waste it generates, whereas collection in smaller cities and town is not more than 50%. More than 91% of the MSW collected formally is landfilled on open lands and dumps. It is estimated that about 2% of the uncollected wastes are burnt openly on the streets. About 10% of the collected MSW is openly burnt or is caught in landfill fires. For example only from Mumbai Landfill and open burning of garbage release more than 22, 000 tons of pollutant in atmosphere. As per NEERI and CPCB the major pollutants emitted by burning MSW at land fill are: carbon monoxide (CO), Methane (CH<sub>4</sub>) carcinogenic hydro carbons (HC) (includes dioxins and furans), particulate matter (PM), nitrogen oxides (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>)

## **Objective**

For my research I have selected two cities one is Raipur and Vishakhapatnam because of the difference in waste management practice in this two cities, as Raipur is capital of new state of Chhattisgarh and Vishakhapatnam is one of the oldest cities of Andhra Pradesh and very near to Raipur in distance and these two place enjoy very special connection between them due to trade relation and are very similarly growing in term of economic activities. My objective of research is to findi. What are the difference in handling MSW management practice in Raipur and Vishakhapatnam? ii. Finding scope for entrepreneurship in Municipal Waste Management at Raipur.

## **CHAPTER 2 : Literature review:**

When we spend extra time or energy in doing any work we say like what a waste, surprisingly we use same word to define those materials which we have already used or left of no use, Waste a concept being developed by human it human creation, In nature every by-product or so called waste is a raw material of other process. This is called Circle of life. Generation of waste is almost fixed in every human process and its generation or type or quantity depends on how our consumption pattern is. The person who generate waste is known as waste generator. Basel Convention defines waste as " object or substances which will be disposed or needed to be disposed of under provision of National Law. UNSD (United Nations Statistic Division) defines waste as a material which are not primary product (i. e, for market), product which have no use or purpose for the generator in view of production, consumption or transformation and generator want to dispose it. It can be generated in process of Processing Raw materials Extracting raw materials Converting raw materials into intermediate or final product for consumption In consumption of final product as by product Or any other human activities European Union under Waste Framework Directive define waste as an object the older discard or intends to discard or it is required to be discard. As per Centre for Sustainable Systems, University of Michigan Municipal Solid Waste (MSW) is common term for garbage or trash these type of waste includes durable goods, nondurable goods like plastic plates, cups, paper newspapers, cartoons etc, it also includes yard waste , food MSW is broad term for waste which are generated by common households, offices excluding waste from construction sites or industries or any hazardous waste . US Environmental protection agency define MSW as <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

garbage consists of items from everyday life which are thrown away which includes furniture, clothing, bottles food scraps, food waste , newspapers, paints, batteries clippings, packaging waste, grass, leaf, plant wastes, garden waste, these type of waste are generally comes from source of our homes, hospital and business. United Nation environmental programme according at Basel convention define municipal waste as "'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"

Ministry of Environment and Supreme court of India have come up with Municipal solid Waste ( management and handling ) rule 2000 which define garbage as Municipal Solid waste which is combination of residuals from residential and commercial waste generated in municipal or notified area either in solid or semi solid form this exclude hazardous industrial waste but it also include bio medical waste mainly from hospitals and similar setups, MSW consist of waste generated from households, waste from demolition and construction sites, sanitation residues, waste on streets, waste of hospitals, waste from market area or any other joint of commercial and residential complex. Waste include all item people do not want to use or of no use, which they have already discarded or are in process of discarding or required to discard because of many unwanted properties like hazardous etc, waste include many items varying from household rubbish to bio medical waste, thus all activities of human being give rise to waste. Therefore it has become important to classify waste in-order to treat it judiciously and effectively. Across the world researchers have shown general similarity on the view of municipal waste and its composition United Nation Environment Programme says that Municipal Solid Waste (MSW) is a term which is usually <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

applied for a collection of waste which is heterogeneous in nature produce either solely in urban area or within the boundaries of Urban Local Administrating bodies, the nature of waste varies from country to country from region to region which depend upon the living standard region, this waste Quantity and composition is mainly a function of standard and lifestyle of region , its population and availability and types of natural resources.

## **Table No Source and Type of Municipal Waste**

### **Sources**

#### **waste Generators**

#### **component**

Residential Single and multifamily dwelling Food wastes, paper, cardboard, plastics, textiles, glass, metals, ashes, special wastes (bulky items, consumer electronic batteries, oil tires) and households waste commercial Stores, hotels, restaurants markets, office buildings Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes institutional Schools, government center, hospitals, prisons Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes Municipal Services Street cleaning, landscaping, parks beaches, recreational area Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, and other recreational areas ([http://www.unep.or.jp/ietc/publications/spc/State\\_of\\_waste\\_Management/2.asp](http://www.unep.or.jp/ietc/publications/spc/State_of_waste_Management/2.asp))

Urban Waste mainly consist of two types Organic Putrescible : Putrescible wastes tend to decompose rapidly and unless carefully controlled, decompose with the

production of objectionable odours and visual unpleasantness Fermentable : <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>



Fermentable wastes tend to decompose rapidly, but without the unpleasant accompaniments of putrefaction. Non-fermentable wastes tend to resist decomposition and, therefore, break down very slowly.

**Organic**

The primary difference between wastes generated in developing nations and those generated in industrialised countries is the higher organic content characteristic of the developing countries. As per NEERI and CPCB of India the beauty of Indian Solid waste is that major part of MSW are either organic or could be easily recycle. Major composition of India's Municipal Waste as per NSWAI (National Solid Waste Association Of India) The quantity and composition of MSW generated form the basis of MSW handling but way and process of handling differ largely with the regards to its composition when compare with MSW of western countries (Gupta et al., 1998; Shannigrahi et al., 1997; Jalan and Srivastava, 1995). Scholars, Researcher across the world and even professionals have shown similar type of view on the Municipal Waste handling they all feel integration of MSW handling process as a only way to solve the ghost of MSW. Managing solid waste generally involves planning, financing, construction and operation of facilities for the collection, transportation, recycling and final disposition of the waste (Annepu, 2012). Municipal waste goes through its Life cycle which can be shown as <http://www.nswai.com/images/msw-img4.jpg> Source: NSWAI

Solid Waste Management (SWM) is necessity of public and Local Administration bodies are responsible for its management which include from collection to disposal. In order to have efficient and high quality SWM the most important activity is collection and segregation of MSW. Many countries in the world have efficient collection system where waste is separated at the source but in countries like India there is centralize waste collection system and waste is <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

separated after the collection either at some location or at dumping ground. India struggle hard to achieve 100 % MSW collection. Some metros have 70 % collection but smaller cities this percentage is not more than 50 % . (Kumar, 2010) . The benchmark for collection is 100%, which is one of the most important targets for ULBs at present. This is a reason why source separated collection is not yet considered in particular (Annepu, 2012)

## **Impact on Environment**

CH<sub>4</sub> (Methane) and CO<sub>2</sub> (Carbon Dioxide) these are two most widely emitted gases from landfill, unscientific disposal of MSW at landfill lead to high emission of CH<sub>4</sub> and CO<sub>2</sub> these gases have high capacity for global warming . CO<sub>2</sub> cause global warming and CH<sub>4</sub> Methane break ozone layer



Which again cause global warming and also increase hole in Ozone layer, which leads to excessive UV Rays from to sun to earth which leads to many skin diseases and skin cancer also. As per IPCC (Intergovernmental Panel for Climate Change) emission from Municipal waste Dumping ground contribute more than 18 % of total CH<sub>4</sub> emission across the world. Therefore landfill may be termed as one of the highest source for " Global Warming" due to its CH<sub>4</sub> emission. A landfill site may still produce leachate with a high concentration of NH<sub>3</sub>-N for over 50 years after filling operations have ceased. Unless properly treated, leachate that seeps from a landfill can infiltrate the surface water, posing potentially serious hazards not only to aquatic organisms, but also to public health in the long-run. For this reason, landfill leachate represents a potentially serious environmental threat with regard to the pollutants introduced into the aquatic environment (Kurniawan, <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>)

2009). Second most common waste disposal method is burning of waste which is also called as incineration; this method is very commonly used method for waste disposal practices not only by households but also by ULBs at various facilities. As per the data by Green Peace and Global Anti-Incinerator Alliance says " Incineration poisons the environment, bodies, and food supply with toxic chemicals. It produces toxic byproducts, undermines waste prevention and recycling and contributes to global climate change. It wastes energy and destroys vast quantities of resources, drains money from local economies to pay for expensive, imported technology, and provide far fewer jobs than zero waste programs. It also hides the evidence of dirty and unsustainable industries and violate the principles of environmental justice" Even modern incinerators leads many harmful content into the environment, however studies imply that individuals who work at waste incinerators and who live near incinerators have suffered from increases in the rate of mortality as well as many other diseases and effects that diminish the quality of their lives (Pat Costner, 2001). As per Waste Incineration and Public Health, NRC 2000 Many scientific bodies have also shown concern over impact what incinerating facilities are causing to environment and to health of peoples.

## **Policy**

Each and every establishment in this world do produce waste in many form and each type of waste required very separate handling process, keeping this in view Government of India had some rules for its handling under environment protection Act 1989, Hazardous Waste (Mgt and handling Rules), 1989 Bio-medical Waste (Management and Handling Rules)

1998Municipal Solid Waste(Management and Handling Rules) 2000Due to PIL by Almitra H Patel and others in Supreme court of India in 1996 allegation was proved against Government of India, state governments and ULBs that government are not taking appropriate steps towards MSW handling and its management. Then Supreme court set up one expert committee for MSW handling in India which submitted report in 1999, March with many recommendations. To ensure proper implementation Supreme Court established a committee which as a result formed Municipal Solid Waste (Management and Handling Rules 2000) notified by Ministry of Environment and Forests in September, 2000To improve the system, the following seven directions were given:(i) Prohibit littering on the streets by ensuring storage of waste at source in two bins: one for biodegradable waste and another for recycle material.(ii) Primary collection of biodegradable and non-biodegradable waste from the doorsteps at pre-informed time on a day-to day basis using containerized tricycles/handcart/pick-up vans.(iii) Street sweeping covering all the residential and commercial areas on all the days of the week irrespective of Sundays and holidays.(iv) Abolition of open waste storage depots.(v) Transportation of waste in covered vehicles on a day-to-day basis.(vi) Treatment of biodegradable waste using composting or waste to energy technologies meeting the standards laid down.(vii) Minimize the waste going to the landfill and dispose of only rejects from the treatment plants and inert material at the landfills as per the standards laid down in the rules. Supreme Court has also kept a heavy fine of the ULBs failing to compile with this rule and had made ULBs as responsible body for this. MSW Rule 2000 focuses on Decentralize waste management of Municipal Solid waste of cities. Scientific waste management is no longer moral or corporate

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social responsibility; it is legal obligation on the waste generating establishment both public and private. The legal obligation has motivated the Private sector to see business in Waste management sector. As ULBs and government lack many resources due to its inefficiency of MSW management many ULBs are trying to private sector companies as their partners for SWM. Even Private sector partnership has helped many municipalities to developed and established proper process for MSW management. World Bank have also recommended involvement of private participation as an alternative and effective option to boost MSW management. But some ULBs due to unclear agenda and non-clarity of work are not very comfortable with private participation.

## **CHAPTER 3: Research methodology**

### **Methodology**

For my research I have use case study method, For which I have selected two case, i. Vishakhapatnam Municipal corporationii. Raipur Municipal Corporation.

### **Research Area:**

The research was carried out in Raipur and Vishakhapatnam, Raipur is the Capital City of State of Chhattisgarh, and Vishakhapatnam is one of the oldest and most important city of Andhra Pradesh ,

## **Parameter/ City**

### **Vishakhapatnam**

### **Raipur**

Population 42, 88, 11340, 62, 160 Literacy rate 67. 70 % 76. 43% Sex Ratio 977 female per 1000 male 983 female per 1000 male. Waste generation 1250 TPD 410 TPD

## **Methodology**

### **The case study approach**

The methods in social science research can be broadly classified into two statistical methods and case study method, the latter approach which shall be adopted in this research. While the statistical approach involves study of facts on a large scale, the case study approach involves an intensive study of fewer numbers of facts or cases. Therefore the case study approach is one of an intensive nature which aims at studying everything about something rather than something of everything. P. V . Yound defines Case study as a method of exploring and analysing the life of a social unit, be that of a person, a family, an institution, a cultural group or even an entire community. This case study is designed by qualitative analysis which involve very careful analysis of person, statement, and of situation. The aim of the case study method is to find out the factors that account for the behaviour patterns of the given unit and its relationships with the environment.

### **Data Collection:**

For collection of data I have use observation, informal interviews of different stakeholders, data has been be collected from some secondary source

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mainly like reports of MoE , NEERI, CPCB, results of municipal bodies of Raipur and Vishakhapatnam. Observation of SWM, Solid Waste Management process of Raipur Municipal corporation, and GVMC, Greater Vishakhapatnam Municipal Corporation had been done, following of the route of garbage pickup trucks, I have also interviewed residents of different housing complex and of commercial complex, these interviews were done by following the route of people who are involved with the door to door collection of waste. Some informal interviews of drivers of pickup trucks, garbage collectors were done. With them observation was also done in order to know some minutes details of their work. Informal discussions with Mayor of Raipur and with some municipal officers were also done either during their lunch time or at the time they were at the field during inspection of their areas. In this research link with the literature and theories with the ground work done has been tried to be done. Approach has been used to make inferences which are implicit in statements made by the officers of the municipal bodies.

## **CHAPTER 4: CASE**

### **CASE 1: CASE OF RAIPUR MUNICIPAL CORPORATION**

Raipur, Capital city of state Chhattisgarh formerly a part of Madhya Pradesh. Raipur is located in centre of large plain also called as Rice bowl of India due hundreds of varieties of rice which are grown here. Surrounded by Mahanadi river on east, dense forest on southern part and Maikal hill rise on North west of city, Raipur merge with Chota Nagpur plateau in North east, and Deccan plateau lies on south of Raipur. Demographics Due to its importance in central India since from pre independence time city had been attractive

place of trade and it had attracted people not only from Madhya Pradesh but also from other states like Bihar, Uttar Pradesh, Orissa, from far North and from South India also, This had made Raipur into multi-cultured place. As per government of India census report of 2011 Raipur is home of 4, 062, 160 people which has increased by 34. 65 % from last census of 2001. It account for 15. 09% population of whole state of Chhattisgarh. With area of 13, 083 Km<sup>2</sup> its population density is 310 per sq. Km. Raipur has higher sex ratio compared to rest of country its sex ratio is 983 female per 1000 male. With literacy rate of 76. 43% it has above average literacy rate than rest of country. Total urban population of city is 36. 49 % of total population means 1482282 people live in Raipur city with sex ratio of 941 female per 1000 male in urban area with urban literacy rate of 86. 45 %. For administrative purpose Raipur Municipal Corporation (RMC) has divided city into 8 zones and these zones are further divided into wards totalling to 70 wards catering almost 60, 000 households. Economy Raipur always remain as a important place for economic activity being connect by mail railway route, it in in between Mumbai- Howrah route and well connected by national highways mainly by GE road NH6. This city is one of the oldest industrial town of Madhya Pradesh, due to its location it is also important place for trade, Korba being hub of mines and large heavy industries and Bhilai have largest Steel plant of India which is under SAIL (steel Authority of India) Raipur support these big government PSU with many supporting industries, its closeness with Bailadia, (the largest iron ore mines of India) and availability of ample water , coal and sand stones Raipur has become one of the largest place of India in term of cement industries and Sponge iron & steel making industries.

Due to all these factors Raipur has become a place of traders and

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businessmen per capita income of Raipur is much above the per capita income of rest of the state, Apart from these industries Raipur is also a textile hub for central India, due to heavy industries in state Raipur is being developed as a intellectual source for these industries Raipur is home of country largest National Institute of Technology, it is only place in India where you have AIMS, NIT, IIM , National Law University, and National Music University. Due to all these factors Raipur has been develop as place for entrepreneur. And with government being supportive for investment and new business many new companies are opening their offices and branch at Raipur. Since 2006 Government of C. G is promoting arts with all its resources some of new film studio for regional language movies has been started at Raipur. With all these economic activity and its development as educational hub this city experience continuous rise in population with multi culture nature and ever increasing pressure on its infrastructure and resources, This has created massive pressure on Raipur municipal corporation. Reason to its large industrial activity Centre for Pollution Control Board have listed Raipur among top 15 most polluted place of country in 2005. As per data by state resource centre in the last decade underwater level of Raipur had decreased by 15 %, This scenario demand effective resource management for the city if city want to progress with holistic development and in this regard one of the most important activity is Municipal waste Management. Municipal Overview: Waste is always a by-product of any and every human activities economic growth has lead to increase in total amount of waste generated, similarly with each passing day Raipur is developing in sense of economic parameters which is also causing growth in amount of waste generated in the city. Today Raipur generate <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

total of 410TPD which means per capita waste generation in Raipur is 276.6 gm per day, this figure is much lower than national per capita waste generation of 500gm per day. But this figure does not mean Raipur Municipal Corporation and citizens of Raipur are not facing problem from municipal waste. Even with this amount of waste RMC is not able to collect and dispose all waste it generates, RMC is only able to collect 310 TPD of waste. Major composition of waste in Raipur is as follows

## **Type of waste**

### **Percentage**

Organic waste 46% Paper 12% Wooden 3% Plastics 15% Dust 15% Cloths/ rags 2% Metal 4% Rubber 2% Glass/ceramic 1% Major Source of waste generation in Raipur:

### **Source**

#### **% of waste**

#### **Amount of waste (TPD)**

Non Slum Households 45.8187.78 Slum Households 10.241.82 Hotels, Choultries etc 10.442.64 Shops and establishment, schools, temples etc 8.635.26 Market, Vegetable shops & meat shops 728.7 Industries 1561.5 Hospitals & Clinics 28.2 Other 14.1

## **Total**

**100**

**410**

Graphical distribution: source of waste and its percentage with respect to waste generation in the city. Raipur which is located in central India has taken initiative in implementing MSW Rule 2000 by introducing target to achieve 100 % door to door collection. Change in leadership in Urban administration in 2009 Ms Kiran Mani Nayar, Mayor of Raipur she introduced target based appraisal for Municipal Waste Management team which is headed by chief Public health officer, she tries to introduces Extra benefit for health department by giving target for door to door garbage collection facility . This target to achieve 100 % door to door collection of municipal waste has enabled: Livelihood opportunity for more than 1800 people who belonged to most deprived segment of society Many public - private partnerships in MSW management space. Application of many ergonomically tool for successful MSW management. Providing space for new entrepreneurship in this sector. Many partnerships with waste producers. Efficient recycling technology and setup for useful purposes. Raipur Municipal Corporation (RMC) started a project in 2010, Swachta Doot Project As per Rajesh Chandrakar ,( Zonal Head, Zone number 5 which cover Ward number 59, 60, 61, 64, 65, 66, 67, 69) " in last two year that is from 2011 to 2012 ward number 59, 60, 64, 65 has achieve 100 % door to door collection for garbage, I had also been able to generate employment for 300 people in my zone" Similarly zone head of Zone Number 7 , Prakash Naidu says " I have generated more employment than zone number 5 , even have

made 2 waste segregation point in my zone" This type of competition between zonal head of various zone in RMC is giving positive impact for overall city, now city have achieve almost 78 % door to door collection in last 3 years it has generated employment for as many as 1800 people who belongs to lowest strata of society, earlier these people where either waste pickers or even some were beggar, although these employment activities are contract based but this has able to improve the lives of many people and of many households. SWATCH DOOT Project which was started in early 2010 has evolve as a flagship programme for the waste management of Raipur under RMC , this project include following major aspect: Door to door garbage collection on daily basis Segregation of waste At source At decentralized location Lifting of garbage and its transportation Generation of employment Improving awareness of citizens

### **Door to door garbage collection of daily basis:**

This is core activity of whole waste management activity of city, it was incorporated to comply with MSW rule 2000 guidelines, infact if this activity can not be done in efficient way than whole waste management plan will collapse. Ms Kiran Mani Nayak, Mayor of Raipur she says " Unless and until garbage is not collected my whole motive to make city clean for for future generation will collapse" when I enquired about her motivation for waste management activity in city she says " in 2002 my neighbour child fall in the open pit for drainage because for drainage pit was open for many days and no one was bothering for it, that child was only son of my neighbour , latter in next monsoon season that child got malaria and died, I felt as we all are responsible for his death" she also told me about her visit to United states of

America with his son who was working in Salt Lake city of Utah, and she was amazed with the cleanliness of the city. Swatch DootRag pickers and some private sweeper who have spent all their life in garbage and foul smelling and in some of the most unhygienic working conditions are engaged as a Swatch Doot for the door to door collection of wasteSwatch Doot are trained rigorously about the safety of themselves and how to use equipment and they are also trained about their behaviour towards local residents how to behave and how to deal with any unfavourable behaviour from resident towards them, they are also trained regarding health issues and medical issues and practices. Their training modules also include importance of discipline and sincerity towards their work and how they are important for society and look issues and work in professional manner. These doots collect garbage from morning 6 am to 1 am they have proper uniform which could be identified easily by people they collect garbage all 7 days a week and 365 days a year. They have also been trained to keep themselves neat and look good so that they could be easily accepted by communities. Once the waste is collected they are directly transported to designated local container so that waste does not get stored to resident area for longer time. This method is in resonance with MSW 2000 rule thatWaste is not exposedWaste is handled only onceAnd no requirement for burning or dumping of waste in the street or in open places. RMC has deployed many specially designed mechanical tricycles, multi bucket dumpers, rickshaws because on the nature of waste is different at different places. These types of equipment have many advantages, likes; Workers have access to all types of road including narrow and crowded. Segregated waste collectedWaste is directly loaded to containers and does not require any human touch. RMC have many

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different model of selection of equipment for waste management and it has also given freedom to their zonal head to do modification as per their specific requirements. Types of vehicles for transportation of waste:

## **Type of vehicle**

### **Number of vehicles required**

### **Existing no. of vehicles**

Twin container dumper placer (3. 0/4. 5

m<sup>3</sup>)3920pushcart830480tricycle16434Auto-tippers218122Tipper

trucks5332Total1304688Graphical distribution of vehicles available and

required: Age wise distribution of vehicles use by RMC : ageTwin container

dumper placer (3. 0/4. 5 m<sup>3</sup>)pushcarttricycleAuto-tippersTipper trucks0-3

years1021025701203-06 years5176532906-09 years358415709 years +236

54Graphical distribution of ages of vehicles: Waste Segregation : Waste is

not same in all part of city neither it is same in community nor in any

particular households, composition of waste from every household is very

different and also it is mix in nature in order to manage waste two things are

most importantProper collectionProper segregationMajor compositions of

waste according to its characteristic can be divided into following groups:

Recyclable like glass, paper , plasticsOrganic waste like food leftovers,

garden wasteToxic like tin batteriesReusable like plastic bottle, polythene

bags

## Categories of waste

### percentage of waste

Recyclable (like glass, paper , plastics) 59  
 Organic waste like food leftovers, garden waste 5  
 Toxic like tin batteries 6  
 Reusable like plastic bottle, polythene bags 20  
 Rest 10  
 Total 120

Graphical distribution of composition of waste: While those waste which are recyclable are dry in nature organic waste are of wet kind and are 100% recyclable hence for them to get recycle bacterial action are needed. If properly segregated than resource required managing them decrease by considerable amount, RMC in order to fulfil its dream for recycling 100% recyclable waste it has taken following steps: Educating the community about the composition of waste and its effect if not dumped in proper manner, for this RMC have started School campaign Awareness camps at colleges Hoardings Advertisement campaign in local newspapers Awareness campaign at offices and banks. Training to swatch doot about the importance of segregation of waste Collection of waste from household in segregated manners daily Directly loading to trucks in segregated manner, without any human. Using specially designed rickshaws and tipper for transport of segregated waste. Lifting of garbage and its transportation Lifting of garbage and its transportations are done with specifically designed vehicles once the waste is segregated at source and loaded these are transported to recycling facilities and to the decomposition facilities some are also transported to land fill at Sarona , Atari and Hirapur dumping ground. These waste containers have target to transport the waste at 85 % of their capacity, means when the containers are filled by 85 % of their capacity they are required to transport it so that no overflowing

happens. But while talking to some of the driver like Aaju " kitna kare sahaeb hum to pura bharne ke bad hi jate hai, bade sahib thode hi dekhne aa rahe hai." It seems there is no regular checking of these guidelines which causes overflow and waste dropping at some of the areas. Employment generation These initiative of RMC have resulted in employment generation for many people belonging to lower strata of society till now from 2006 waste management activity of RMC is able to generated employment for more than 15000 people across the city. Recycling facilities: RMC with collaboration with one Bangalore base companies and with few local entrepreneur have started many facilities for recycling and reuse facilities like RMC have started

## **Facilities**

### **Number of facilities**

Windrow composting  
 2RDF processing facility  
 1Leachate treatment plant  
 2Bio-Methanation Plant  
 2Apart from these facilities RMC with collaboration with Sulabh international have started 100 public toilets, and it had set few targets for its services

## **Service Provided**

### **Time schedule**

Street cleaning and transportation of waste Daily  
 dailySweeping in bus stands and market places Daily  
 dailyDisposal of collected waste in dumpsite  
 Daily  
 dailyMaintenance and cleaning of public toilets and urinals  
 Daily  
 dailyRemoval of debris and construction wastes Within 24 hours  
 after  
 within 24 hour of informationRemoval of dead animals Within 24 hours



afterwithin 24 hour of informationCleaning of Jam bridge Within two days  
afterwithin 2 daysinformationdailyCleaning of sewer 3 day basison 3 day  
basisCleaning of drains Weekly basisweeklySpecial  
conservancyarrangements Festivals and other important

## **CASE 2: CASE OF GREATER VISHAKHAPATNAM MUNICIPAL CORPORATION**

Vishakhapatnam is located on south coast of India which is also commonly known as Vizag, being a second largest city of Andhra Pradesh after Hyderabad , it is 625 km far from Hyderabad toward east, Vizag is home of many heavy industries mainly of public limited companies , being gifted as natural harbour, it is oldest shipyard of country and one of the largest, during colonial period it was called as Waltair , till today this name is also in use mainly for outer part of city. DemographicsCity has inclusive and multi - ethnic population in nature it has favour of all part of country, being a industrial place this city grew tremendously during 1990 to 2000 and its population had doubled during this period of time mainly because of large migrant workers for various industrial jobs. As per India's population census report total population of Vizag is 4, 288113 in 2011 and it has growth rate of 11. 89% as compared to last census, it is basically 5. 06% of Andhra's population, earlier population density was 343 per sq km now it has increased to 384 per Km<sup>2</sup> with the percentage increase of 11. 9%. With the total area being fixed at 11, 161 Km<sup>2</sup>. Total urban population us 47. 5% with sex ratio of 983 female per 1000 male and literacy rate of 82. 01% , 47. 5 % of district population is urban population with urban sex ratio at 983 female per 1000 male with urban literacy rate of 82. 01 % city has also being

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registered in fastest growing cities of world with rank of 122. City is being divide into 72 wards for administrative purpose GVMC, Greater Vishakhapatnam Municipal Corporation was established on Nov 2005 now cover 111 Km<sup>2</sup> area and 542692 households. Economy From small community of fisherman this city has shown phenomenal growth mainly due to natural harbour and strategic location between madras and Kolkata. Now it is home of one of the largest port of country with many heavy industries it is important location for country mainly because of it port for export of iron ore coal from Chhattisgarh and Orissa. In last two decade it has also grown into upcoming location for many IT companies because of its strong infrastructure and availability of educated people due to many universities and educational institute. Since 2005 many BPOs have started operating from Vizag, in total there are 109 BPOs ( small and mid-sized) In 2007 software export from Vizag was valued at 45 million \$ USD, and it is increasing from year by year. Being surrounded by hills, fertile lands and beautiful beaches this city has also become a strong tourist destination. But with this growth this city has not forgotten its roots in culture and historical occupation. Vizag has many temples which has become as favourite spot for tourist and its fishing industry is growing with good rate, providing opportunity for livelihood for many people especially rural and people living around costal belt. In last few years many film studios have also come up so it is also becoming host spot for movie shooting, Due to all this economic activities many new residential complex have been constructed in last few years, and many new slums have also been came up, this is causing continuous pressure for GVMC to maintain city in good health, due to large amount of settlement municipal waste is increasing day by day which is <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

causing effect on not only on health of citizens but also on environment and nature, which could have very dangerous effect on the city growth. In order to solve this problem GVMC have to be efficient and need to have many innovative solutions for its waste management. Municipal Waste overview: Municipal solid waste is one of the most essential activity of any urban setup. Due to continuous increase in population and economic activity various infrastructural services are now under pressure similarly municipal waste management has also being under stress but from the past this activity was always taken for granted by public and even by Local municipal bodies, which now has become a serious threat to health and environment Greater Vishakhapatnam Municipal Corporation (GVMC) is responsible for Municipal Solid waste (MSW) handling of Vishakhapatnam. This study has been carried out to understand scenario of waste MSW management its handling and find scope for social entrepreneurship in this space. With population of 4. 2 million Vishakhapatnam generate total of 1250 (TPD) Tons per day waste, which is equal to 613gm per capita waste generation per day which is 100 gm above national average per-capita waste generation. Which mean per house hold generate 2. 3 Kgs of waste per day. This huge amount of waste generation is challenge for GVMC. No one could stop generating waste as waste is compulsory by product of all human activity being Vizag is developing with strong growth rate in same pace waste generation is also growing, which is causing health problem for citizens and problem for fishing industries also. With each passing day Vizag is witnessing increase on people inbound migration of people because of strong economic development whether in form of construction or of in the form of any other economic activity, Apart from waste generation from people living in Vizag, waste is <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>

also generated by people who come to city as a tourist every year it host more than 1783000 tourists per year. These tourist bring economic prosperity to the place with them but also their stay, their travelling and many other activity generate waste also taking national average into calculation total waste generated by these tourist would be generate extra 802 TPD (ton Per day) amount of waste, one more point must be considered is that the flow of tourist is not even throughout the year, mainly concentrated during holiday periods of year. This is also major problem for GVMC because GVMC need to have system in place during this period of time which could only be achieved by either having ad-hoc arrangement at this particular holiday season or having permanent system, being keeping permanent system will increase the cost because of ideal time of system during this period and keeping ad-hoc system have risk of performance because if tourist flow increase or due to any major change in other activity this could affect the whole process. GVMC's Public health department headed by chief Health officer is responsible for MSW handling and management of all 72 wards, it also include waste generation from small industrial setups and its residential area, but waste generated from large industrial setups like of HPCL refinery, Vizag Steel , Vishakhapatnam port trust and Indian Navy are manage and handle by them only. But they have to submit report regarding their waste handling to GVMC. When waste was collected and percentage of its constituent was calculated with alliance with GVMC its shows: The major sources of waste generation in Vishakhapatnam are as follows

**Source****Amount of waste(TPD)****% of waste**

Non Slum Households 508.7540.75  
 Slum Households 13010.4  
 Hotels ,  
 Choultries etc 256.2520.5  
 Shops and establishment, schools, temples  
 etc 161.2512.9  
 Market , Vegetable shops & meat shops 137.511  
 Industries 12.51  
 Hospitals & Clinics 252  
 Other 18.751.5

**Total****1250****100**

Graphical distribution: source of waste and its percentage with respect to waste generation in the city. MSW handling in Vizag follow following process Municipal waste is collected from all source by using various methods, waste which is generated by people or by generators are firstly dispose it either to dustbin or any other place, this waste which has been disposed are collected by road sweepers and waste collectors and disposed at the various located de-centralized waste dustbins, from these dustbins waste is transfer to various bins in small heap by road. As Vizag is important tourist place some particular part of year GVMC are needed to put extra work force for waste collection and transportations, because of tourist being unaware with the normal habit of waste disposal by citizen so period of time when tourist flow is higher than normal days GVMC needed to put extra employees. Cleaning of road start at morning 3: 00 Am cleaning staffs which are also called as pourakarmika are local people, while interacting with them

I found they are very motivated and dedicated for their jobs but the reason for so strong dedication was unknown to me, as per Amritambu ( one of pourakarmika working at RK road) " this is our place it is our responsibility to keep this place clean" he says " people who come from outside do not understand Waltier, it is very holy place and we are doing very holy job to keep our land clean" GVMC has placed total of 3289 dustbin across the city , there are two size of bins and are placed and collected according to the waste generation by the locality, the placement of bins are divided into routes because from these bins garbage is collected by dumpers, the sweeping activities and transferring of waste from local / community or door to door collection to bins installed by GVMC is done in public -private partnership. City also have many hospital and private clinics GVMC had contracted a private company to manage and handle bio-medical waste at Bio -medical waste Processing facility on Srekalapuram road. The waste which are infectious in nature are collected by private company and are treated by them at some particular cost. After the collection of waste next step is to transport it to dumping ground this is done by GVMC with private partnership, GVMC had outsourced some of it route due to almost 60% of transportation of waste is done by GVMC and rest 40% are transported by private companies on charges bearded by GVMC. For transportation of waste GVMC mainly use tractor tipper, tractor trailers, dumpers and small auto trailers depending upon the size of waste and distance from the disposal site. Total fleet size of GVMC is as follows

## **Vehicle**

### **Fleet size**

Tractor tippers7Tractor trailers12Dumpers8Auto trailers6TOTAL

vehicles32Ages of vehicles are as follows

### **Age**

#### **Tractor tipper**

#### **Tractor trailers**

#### **Dumpers**

#### **Auto trailers**

5 ≥32355 to 10272110 to 15122015 to 20111Loading and unloading of garbage are done mechanically at both point except at few smaller loading point where it is done manually , from here garbage are directly transported to dumping site at kapuluppada, which is the oldest dumping site of Vishakhapatnam it is also largest dumping site of district. Those people who are engaged in lifting or loading- unloading activity are directed to use proper protective measure and GVMC officers regularly do surprise visits at random point to check safety measure are properly undertaken or not, As per K. N Vishnu ( area health office) " since April 2011 I had suspended 12 workers for not wearing gloves although suspension was of only 7 days but this type of activity also create awareness and fear among workers" Each vehicle have one driver and one helper, while talking with drivers major problem which came forward is shortage of workforce and even after shortage GVMC is not recruiting new drivers, for total 32 vehicle GVMC have only 37 drivers and 35 helpers and for private partner who handle rest 40%

of route drivers are made to work overtime without any substantial compensation, but Mr Vishnu says " GVMC could not do anything regarding overtime by driver of our private partners, what GVMC could do is checking safety measure which we regularly do". The waste which is collected are disposed at the kapuluppada there segregation of waste into done, and those waste which could be compost are send to composting plant at vidavyapuram which is 4 km from kapuluppada. This plant have capacity to handle 200 Ton per day, inorganic garbage however are mostly form land fill but the land fill at kapuluppada is on its maximum capacity therefore GVMC is also considering new landfill facilities at gajuwaka and cheemalapally near vepagunta. GVMC is considering tangudubilli and tadivaripalem as new landfill option and simultaneously developing new composting facility at these two locations. But majorly burning of waste at kapuluppada is very common site and this is causing tremendous loss to nature and health of people as per local resident near kapuluppada having typhoid and malaria is very common disease for them, every child in that community has gone through these diseases, Water quality is deteriorating day by day, as being costal area fresh water is very much required for every activity but quality of water and quantity is decreasing. GVMC is also doing pilot testing of few measures: Door to door collection and separation of waste into dry and wet at source, this is on pilot phase at 7 wards. Ban on plastics, GVMC is trying hard to completely ban plastics in Vizag but still facing difficulties, mainly because of non-availability of alternative polythene bags. Its also coming up with new composting facility and slurry from this compost facility will be use for vermicomposting GVMC is also planning to construct Solid waste park at Ramannadoravalasa, which will have all facility for waste management, <https://assignbuster.com/waste-generation-in-india-environmental-sciences-essay/>



facilities will be of state of art level, will also have RDF and IEC activities. But these measure are still in pilot phase or in policy level, what is needed is the GVMC needed to handle its waste in more scientifically methods, because disposing waste without scientifically methods cause more harm, second land is very rare resource and it is needed to protected and judiciously utilized, what is needed is before applying any policy change GVMC need to prepare ground for its policy like in polythene bags without making availability of alternative of poly bags ban can not be successful and it will only lead to exploitation of consumers. Although GVMC need to learn a lot regarding waste handling but GVMC has shown very appreciating effort in keeping city clean, they are very effective in keeping roads, temples, areas and beaches clean, although waste is not properly handle after collection but GVMC has gained some expertise in collection and transportation of municipal waste . But Vizag city must look for better and scientifically effective methods for composting, disposing and recycling of waste. GVMC needed to analysis result of their pilot project much sooner and effectively, The GVMC spends Rs 10 crore annually on garbage clearances and this amount could generate more result if scientific procedure are followed.