

# Waste management in india essay



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## **INTRODUCTION**

India is the second most populated country a second fastest growing economy in the world. From the period of 2001-2026 the population of India is to increase from 1030 million to 1400 million, if we consider the increase rate to be 1.2 % annually then there will be an increase of 36% in 2026. accordingly about 285 million live in urban areas and about 742 million live in rural areas. (Census of India, 2001). In India urbanisation is becoming more because people are moving from villages to cities and there is a rapid increase in population in the metropolitan cities . Mumbai is the largest populated city followed by New Delhi and Kolkata.

" Generally, the greater the economic prosperity and the higher the percentage of urban population, the greater is the amount of solid waste produced"(Hoorweg and Laura, 1999). InHoorweg and Laura, 19991996 about 114, 576 tonnes/day of municipal solid waste was generated by the urban population of India, by the end of 2026 it is predicted to increase to 440, 460tonnes/day This great increase in the amount of MSW generated is due to changing lifestyle and living standards urban population(Hoorweg and Laura, 1999).

## **STUDY AREA**

Delhi is a very densely populated area and is the capital of India. Since Delhi is an urbanised city the annual growth rate is increasing very rapidly in the last decade the growth rate has increased by 3.85%. Delhi is the capital of India this tells us that it is the centre for commerce trade and power, since it is one of the largest cities and the capital it produces excellent job opportunities, which account for its rapid increase in its population and

increased pace of urbanization. Due to the fast urbanisation and the growing population the production of municipal solid waste is also increasing very rapidly. According to a survey Delhi generates about 7000 tonnes/day of municipal solid waste and this municipal waste is to rise about 17000-25000 tonnes/day by the year 2026. due to the rapid increase in the population and municipal solid waste the disposal of the waste has become a great head ache for the municipality in Delhi. Out of the waste gathered only 70-80% of municipal solid waste is collected while the remaining is dumped onto streets or open ditches. Out of the 70-80% collected only 9% of the collected municipal solid waste is treated by composting the remaining is sent to the land fill sites. New Delhi Municipal Corporation (NDMC), The Municipal Corporation of Delhi (MCD) and Delhi Cantonment Board (DCB) are three municipal entities responsible for MSW management in Delhi. (Vikash Talyan, R. P. Dahiya, 2008).

## **IDENTIFICATION OF SOURCES, TYPES AND COMPOSITION OF MUNICIPAL SOLID WASTE IN DELHI**

### **Sources and types of solid waste in Delhi:**

Residential:-the residence might be single family or multiple family dwellers the types of waste they produce are paper, food wastes , cardboard , leather, yard wastes, textiles, glass, special wastes, metals, plastics , ashes, wood and household hazardous wastes.

Industrial: -industries produce ashes, food wastes, packaging, special wastes, housekeeping wastes, construction and demolition materials and hazardous wastes.

Commercial & Institutional: -they produce wood, metals, cardboard, glass, special wastes, Paper, food wastes, hazardous wastes.

Municipal services: -landscape and tree trimmings, Street sweepings, general wastes from beaches, parks, and other recreational areas, sludge.  
(Hoorweg, Daniel with Laura Thomas. 1999)

### **Composition of waste:**

The population of Delhi is 13.9 million, and they produce 7000 tonnes/day of municipal solid waste at the rate of 0.500 kg/capital/day and accordingly the population as well as the MSW is increasing by 2026 the municipal solid waste generated will increase to 17,000-25,000 tonnes/day. Because of the increase in the MSW the municipal body will face a lot of problem after composting and incineration they would still have to deal with a lot of waste and this waste would generally go to landfill sites.

The characterisation of the waste by its type, composition and source is important this will make monitoring and management of solid waste easy. Based on this we can use different types of processes to dispose the solid waste. The following information will tell about the generation of MSW from various sources in Delhi in the year 2004.

Source wise generation of the MSW (tonnes/day) in Delhi

Sources	MSW(Tonnes/ day)
Residential waste	3010

Industrial waste	502
Hospital waste	107
Main shopping centres	1017
Construction waste	382
Vegetable and fruit markets	538

Source :( MCD, 2004)

The Tata Energy Research Institute conducted a study in 2002 in Delhi to determine the physical and chemical composition of municipal solid waste. This study in 2002 tells us that the composition of MSW is not changed that much from the past decade. According to the study the major part of the MSW consists of biodegradables followed by other wastes.

Physical composition (as wt. %) of MSW Chemical composition (as wt. %) of MSW

Parameters	2002
Biodegradable	38. 6
Inert	34. 7
Glass and Crockery	1. 0
Paper	5. 6

Non-biodegradable 13.9

Plastic 6.0

Parameters 2002

Moisture 43.8

Phosphorus as  
P<sub>2</sub>O<sub>5</sub> 0.3

Organic carbon 20.5

nitrogen 0.9

C/N ratio 24.1

Calorific value 713.  
(kCal/kg) 0

Source :( TERI, 2002)

The composition of MSW of an urban population depends on various factors like place location, climate, commercial activities, population, cultural activities, economic status if the residence and urban structure . Before we do anything we need to know the composition of the MSW so we can determine the best suited operations and equipment for the facilities that dispose of the MSW. There was a survey conducted by Municipal Corporation of Delhi to evaluate the composition and properties of MSW. This study

involved the different places in Delhi where MSW was produced. The following table tells the details of the study

Composition (as wt. %) of MSW generated from various sources in Delhi

Parameters	Food wastes		Inert	Others	Moisture	Ash content	C/N ratio	Calorific value (kcal/kg)	Higher calorific value
	Percentage	Percentage							
1. low income group	58.4	15.7	22.8	3.1	54	21.8	39	754-2226	2238-4844
2. Middle income group	76.6	21.2	0.5	1.7	65	6.3	30	732-1939	3415-6307
3. High income group	71.9	23.1	0.3	4.7	59	10.9	31	-	1300-1887, 4503-5359

4. JJ									1582
Clusters	69.	14.1	15.	0.7	63	15.6	46	204-	-
(Slums)	4		8					1548	4912
Vegetabl									3083
e	97.	2.3	0.	-	76	3.3	16	0-	-
markets	2		5					1309	4442
Institutio	59.								2642
nal areas	7	33.8	4	2.5	50	6.7	35	129-	-
								3778	5459
Streets	28.		56.						10071188
	4	12	1	3.5	19	56.7	51	-	-
								2041	3289
Commerc	15.								18153373
ial areas	6	68	-	16.4	18	8.8	15	-	-
							8	4593	6185
Landfills	73.		10.						2042
	7	9.2	8	6.3	47	15.3	38	191-	-
								4495	5315

Source :- (MCD, 2004)

### **RELEVANT REGULATIONS FOR MUNICIPAL SOLID WASTE MANAGEMENT IN INDIA**

The major policies and legislative frameworks for the municipal solid waste management in Delhi are

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- Municipal Solid Waste (Management and Handling) Rules, 2000: according to this policy there is a set process for the collection, sorting, storage, transportation and disposal of the MSW.
- The Bio-Medical Waste (Management and Handling) Rules, 1998 and Amendment Rules, 2003:- bio-medical waste should be treated according to the standards of schedule v.
- The Delhi plastic bag (Manufacture, Sales and Usage) And Non-Biodegradable Garbage (Control) Act, 2000: according to this plastic bags should be recycled and non-degradable plastic bags should not be dumped in public drains.
- Hazardous Wastes (Management and Handling) Rules, 1989 and Amendment Rules, 2000 and 2003:-there are limitations for the import and export of hazardous wastes and there should be proper handling and management of hazardous waste. (Ministry of Environment and Forests, 2000)

## **MUNICIPAL SOLID WASTE MANAGENENT IN DELHI**

### **Primary collection and storage of MSW in Delhi**

According to the Delhi municipal corporation act 1957 the owners, tenants or the person who is occupying the residence, commercial or industrial area is responsible for the disposal of the MSW at a particular area provided by the municipal corporation. But this rule was changed in 2000 which stated that the collection of MSW would be from house to house because of this rule the municipality cooperation faced a lot of problem due to the rise in population as well as residential houses so doth the systems are being applied to collect MSW. The municipal cooperation of Delhi is getting awareness programs to help the citizens understand the need of segregating the municipal solid

waste by placing two separate bins one for recycling materials and the other non-recycling materials. By doing this the municipality is reducing the work load and they can dispose of the material in an easy way without any fuss. The municipal authority has a schedule for the collection of the waste example a particular area will have a particular day for the collection of MSW.

The Delhi municipal authority provides a primary storage facilities like dustbins, metal containers that have different capacities ranging from 1m<sup>3</sup> , 4m<sup>3</sup>, 10m<sup>3</sup> to 12-15 tonnes these containers are placed in locations that are easily accessible to people. The size of the containers that are placed at a primary storage location depends on the amount of MSW being produced by the area and the population of the area. These metal containers and bins are emptied with the help of modern hydraulic collection trucks. In Delhi on an average there are 3-4 collection sites. The MCD has employed about 50, 000 people for primary storage collection, 2600 for secondary storage collection and about 370 people for sweeping the streets. (Ministry of Environment and Forests, 2000)

### **Transportation**

The MCD has many vehicles for the collection of primary and secondary storage waste. The MCD in its fleet contains refuse removal trucks, tractors and loaders they have about 100 vehicles to do the job. What these vehicles do is they collect the waste and take them to the landfill sites.

### **Recycling and re-use**

Recycling and re-use of MSW is done in a widespread manner where waste pickers are employed as well as there are self employed waste pickers who

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collect the waste and sell them. How the system works is that these waste pickers and waste collectors gather waste from the residential areas, commercial areas, streets and landfill sites and they sell them to the dealers these dealers range from small, medium and large dealers. After the dealers purchase the materials they are sent to the recycling plant that is established by the government. The following table tells us at what rate the materials are sold (Ankit agarwal, Ashish Singhmar, 2004)

#### Prices of recyclable materials at different recycling levels

Recyclable material	Recyclable material Price at small recyclable dealer (Rs.)	Price at medium recyclable dealer (Rs.)	Price at large recyclable dealer (Rs.)	Value added in the Process (%)
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#### Plastic

PET bottles	1. 75	2. 25-2. 50	3. 75-4	121
Milk packets	5. 5-6. 5	6-7	8-8. 50	37. 5
Hard plastic like shampoo bottles, caps	7-7. 25	9	10-10. 5	41
Plastic thread, fibres, ropes,	6-7	8-8. 50	10	67

chair cane

Plastic cups and glasses	7-8	10-12	13-14	80
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Paper

White paper	3-3. 25	3. 75-4	5-6	76
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Mix shredded paper	2-2. 25	2. 25-2. 50	3-3. 25	47
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Cartons and

brown packing	2. 25	2. 50	3	33
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Papers

Fresh newspaper	3-3. 50	3. 25-3. 75	4. 50-4. 75	42
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Tetra pack	1. 75-2	2-2. 25	2. 75-3	53
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Glass

Broken glass	0. 50	0. 90-1		90
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Bottles	2	2. 25-2. 50		19
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Aluminium

Beer and cold drink cans	40-45	43-48	75-85	88
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Deodorant, scent cans	42-45	55-60	90-95	113
Aluminium foil	20-22	25-27	30-32	48
Other metals				
Steel utensils	20-22	25-27	30	43
Copper wire	70-75	80-85	95-100	35

Source :( Ankit agarwal, Ashish Singhmar, 2004)

### **Composting:**

Coming to composting only 9% of the total MSW is composted the remaining 91% is sent to landfill sites. There are three places set up by the Delhi municipal authority for composting MSW where as two plants are set up at Okhala and the other one is set up at Bhalswa . These plant has a treatment capacity of 150 tonnes/day but they are not utilised to the fullest because of the cost. The treatment capacity of the plant at Bhalswa is 500 tonnes/day. (Vikash Talyan, R. P. Dahiya, 2008)

### **Incineration:**

The municipal cooperation of Delhi also tried incarnation they built an incineration plant with the help of a foreign company. But this was shut down immediately because the MSW did not have enough calorific value the minimum calorific value is between 1200-1400 kcal/kg. (Vikash Talyan, R. P. Dahiya, 2008).

Final disposal of MSW:

Of the total amount of MSW collected 91% is sent to landfill. These landfill sites are located at the outskirts of the city. The land fill sites are the nearest available low line area or waste lands. The transfer of the MSW to these sites is by the vehicles that the Delhi municipality has. These landfill sites are chosen based only on availability and not on any other reason. These landfill sites are poorly maintained which arises a problem of health and safety as well as environmental concerns. There is another big issue because of the poor maintenance of the landfill sites there is a lot of leachate that is being produced mostly in the rainy season due to which the ground water as well as the river next to the landfill sites is getting contaminated. At these landfill sites with the help of bulldozers the MSW is levelled and compressed. The MSW is compressed to a layer of 2-5m and a covering is provided. At the beginning there were 20 landfill sites that were created by the Delhi municipality out of which 15 are exhausted already. At present there are 3 landfill sites that are being operated one is at Gazipur it was started in 1984 , the other landfill site is located at Bhalswa it was started in 1993 , the last operating land fill site is located in Okhala it was started in 1994. (Vikash Talyan, R. P. Dahiya, 2008).

### **HEALTH AND SAFETY AND ENVIRONMENTAL RISKS**

Health and safety and environmental risks are a major concern in the MSW management in Delhi. The workers as well as the waste pickers are not provided with proper health and safety equipment like boots and gloves. The working conditions are unhygienic . the chance of transfer of infection is high and because of this if a worker gets sick he loses his wages. The workers are also not provided with medical insurance. The environmental risk is also high

because the landfill sites are not maintained properly and the leachate gets leaked into the underground water as well as the river Yamuna . these issues should be looked into very carefully.

### **IMPROVEMENT**

We can improve these poor conditions by privatisation. We can let the private sectors help in the disposal of MSW. The Delhi municipal authorities can open the incineration plant and dispose the waste. They can also involve the local communities as well as the NGOs to help in the disposal of waste. The municipal authorities should identify a proper treatment technology. The authorities should increase standards of reuse and recycling of waste mainly composting.

### **CONCLUSION**

With the rapid increase in population and fast urbanisation of Delhi the current policies and regulations want be sufficient for controlling the rapid increase in the MSW. Due to this the health and safety as well as the environmental risks are increasing . The municipal authorities of Delhi cannot keep up with the MSW that is being produced now but according to a prediction the MSW by 2026 is going to increase 4 folds if this happens the municipal authorities will be facing a lot of problem. Even the Delhi government has realised this and they are making changes in the form of master plans. The government is also approaching the public and private sectors for help like the citizens and the NGOs. First of all people should be educated on proper disposal of MSW. The government should see to that the master plans are being properly followed at all levels. Only by doing this the Delhi municipal authorities can keep the MSW in control.

**Referencing**

Ankit agarwal, Ashish Singhmar, 2004. Municipal solid waste recycling and associated markets in Delhi, India. Resources, Conservation and Recycling

Census of India,. 2001. Ministry of Home Affairs, Government of India (GoI). [Online]. available <http://www.censusindia.net>

Hoorweg, Daniel with Laura Thomas. 1999. Working Paper Series Nr. 1. Urban Development Sector Unit. East Asia and Pacific Region. Page 5. [Online] <http://web.mit.edu/urbanupgrading/urbanenvironment/sectors/solid-waste-sources.html>.

Hoorweg, D., Laura, T., 1999. What a waste: solid management in Asia. Working Paper Series No. 1. Urban Development Sector Unit, East Asia and Pacific Region, the World Bank, Washington, DC

MCD, 2004. Feasibility study and master plan report for optimal solid waste treatment and disposal for the entire state of Delhi based on public and private partnership solution, Municipal Corporation of Delhi, Delhi, India.

Ministry of Environment and Forests, 2000. the gazette of India. [Online]. Available <http://envfor.nic.in/legis/hsm/mswmhr.html>

TERI, 2002. Performance Measurements of Pilot Cities, Tata Energy Research Institute, New Delhi, India.

Vikash Talyan, R. P. Dahiya, 2008. State of municipal solid waste management in Delhi, the capital of India, Waste Management Volume 28, Issue 7, 2008, Pages 1276-1287

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