



# A Study on Municipal Solid Waste Management in Bongaigaon, Assam

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## Key Words:

Bongaigaon municipality  
Solid waste management  
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## ABSTRACT

Bongaigaon Municipality with an area of 14.31 square kilometre, consisting of 25 wards, is situated in the western part of Assam in India. Bongaigaon town, the district headquarters of Bongaigaon district is a commercial as well as an industrial area. Solid waste management in this area is a challenging task. The present study includes all types of solid wastes other than biomedical waste, generated in the Bongaigaon Municipality area and their management. One kilogram sample was prepared by mixing solid wastes collected from different kinds of sources in the Municipality area. The constituents of the sample were characterized and percentage of each of them was determined. Secondary data related to solid waste and its management were collected from the Municipal authorities. The area generates around 25 tons of solid waste per day with 0.355 kg rate of waste generation per person per day. However, only 21 tons of solid waste is collected for disposal by the civic body. Again, out of around 25 tons of solid waste generated, 44% was found to be biodegradable while the rest was nonbiodegradable.

## INTRODUCTION

With increasing population and industrial growth the amount and varieties of solid waste materials have been increasing day by day. This creates a great threat to the environment and human civilization. Solid waste is on its way as a result of urbanization and industrialization (Sharma 2004). Improper disposal leads to spreading of diseases and unhygienic conditions besides spoiling the aesthetics (Kirpalani et al. 2005). Solid waste contaminates groundwater in the nearby areas of disposal sites. It was found that the parameters like TDS, alkalinity, TH, chloride and nitrate exceeded the desirable limits, which infers that the groundwater up to a radius of 1000 m is not suitable for drinking purpose (Karthikeyan & Murugesan 2007). The average per capita solid waste generation rate of 0.35 kg has been reported for cities and towns having a population between 2.0 and 5.0 million (Shekdar 1999). Thus, study on solid waste and its proper management to minimize its effect on the environment becomes utmost important. Bongaigaon Municipality with an area of 14.31 square kilometre consisting of 25 wards is situated in the western part of Assam in India. Bongaigaon town (26°28'N and 89°96' E), the district headquarters of Bongaigaon district is a commercial as well as an industrial area. The Bongaigaon Town Committee was first constituted in the year 1961 and was upgraded to a Municipal Board in the year 1977 (Project Report for Integrated Low Cost Sanitation Scheme (ILCS) for Bongaigaon Municipality, Bongaigaon 2008). Many industries of medium category such as IOC, Brahmaputra Carbon Limited, aluminium factory and a large number of small scale industries are operating in Bongaigaon town. Moreover, a major oil sector industry namely, Bongaigaon Refinery and Petrochemical Ltd. (BRPL) along with a number of downstream industrial units is situated near the study area. A big workshop of Indian Railways covering Bongaigaon and

New Bongaigaon and a number of health units belonging to government and private sectors are working in full flow. In 2001, the solid waste generation of Bongaigaon town was 15 tons per day with per capita generation rate of 0.247 kg per day, when the population was 60,655 (Solid Waste Management of Bongaigaon Town 2002). The concerned authority is not yet able to implement the Municipal Solid Waste Management Handling Rules, 2000 in the area. Lack of proper sewage disposal and drain system is another problem of the town. The fragmented canals become cheap storage of all kinds of municipal wastes and sewage. This is creating foul smell all the way along with unlimited growth of germs. Unchecked movement of pigs in the Municipality area helps spreading of germs here and there. The present study was carried out from May 2007 to December 2008, which includes all types of solid wastes other than biomedical waste generated in the Bongaigaon Municipality area and their management.

### **MATERIALS AND METHODS**

All the wards of Bongaigaon Municipality were visited and studied for the collection points (30) as well as the different sources of solid waste. Ten persons from each ward were also been interacted regarding solid waste generation, its management and the role of individuals and the Municipality in this respect.

One kilogram sample was prepared by mixing solid waste collected from the different kinds of sources in the Municipality area. The sample of the waste was then characterized and percentage of each of the constituents was determined. Secondary data related to solid waste and its management were collected from the Municipal authorities.

### **RESULTS AND DISCUSSION**

**Solid waste generation:** At present, the area generates about 25 tons of solid waste per day along with a large volume of sewage out of which only 21 tons of solid waste is collected for disposal by the civic body. Considering the rate of increase of population as per census report of 2001, the approximate population of the area in 2008 is 70,420. The rate of solid waste generation per person per day was 0.355 kg which crossed the all India average of the same (Shekdar 1999). Major sources of solid waste generation are given in Table 1. Again, out of around 25 tons of solid waste generated, 44% was found to be biodegradable, while the rest nonbiodegradable. The percentage of different components of solid waste generated in the study area are given in Table 2. The study revealed that people belonging to high income group throw larger amount of nonbiodegradable waste in comparison to people of low and middle income groups. Again, people belonging to low income group throw solid waste here and there making the roads and drains more unhygienic.

**Management of solid waste:** Bongaigaon Municipality is the responsible authority for solid waste management in the area. For solid waste management, the total Municipal area is divided into two zones, i.e., north zone and south zone. Category of staff involved and facility of solid waste management in Bongaigaon Municipality area are depicted in Table 3 and Table 4 respectively. Solid waste has been collected from 30 specified spots. Twenty one ton out of 25 ton solid waste generated per day was found to be collected for disposal leaving 4 ton to create unhygienic condition in the area. During winter, this produces bad smells and makes the nearby air unsafe for respiration, while in rainy season water passes through it and enters to drinking water sources making the water polluted. Partial collection of waste witnessed flash floods in the area because of its accumulation in the drains. The Municipality has no dustbins and did not carry out segregation process of waste before its disposal.

Solid waste of the area is disposed off about 1.5 km away from the Municipality area adjacent to the cremation ground. No scientific method is adopted while disposing the solid waste. The waste transported from the collection spots to the landfill site was found to be uncovered. This might cause air pollution along with spilling on the roads. The workers involve in waste management remain without hand gloves and shoes. This along with manual unloading brought the workers to direct exposure of waste. Lack of provision of segregation and recycling of refuse attracts plastic, metals, glass, etc. collectors to spread waste here and there. This not only made themselves available to exposure for evil effects of it but polluted both air and water of nearby areas. One important observation was that some parts of the Municipality area were not yet covered for waste collection. In fact, only thirty number of collection spots were found to be insufficient to cover the whole Municipal area. Insufficient use of disinfectants like phenyl, bleaching powder, etc. together with lack of sincerity in draining of refuse by some people also made some areas quite unhygienic.

### CONCLUSION AND SUGGESTIONS

The area generates around 25 tons of solid waste per day. The rate of waste generation per person per day was 0.355 kg, which crosses the all India average of 0.350 kg. Again, out of around 25 tons of solid waste generated, 44% was found to be biodegradable, while the rest nonbiodegradable. The study revealed that people belonging to high income group throw larger amount of nondegradable waste in comparison to people of low and middle income groups. The Municipality had no dustbin, and no scientific method was found to be adopted while disposing the solid waste. Uncovered waste transportation system might cause air pollution along with spilling on the roads. One important observation was that in the municipality area there were some zero waste collection parts.

Table 1: Major sources of solid waste generation in Bongaigaon Municipality area.

Sr. No.	Sources of solid waste generation	Quantity (Ton)	Percentage
1	Household	10.00	40.00
2	Commercial	7.50	30.00
3	Industrial	0.50	2.00
4	Street sweeping	4.33	17.33
5	Others	2.67	10.67

Table 2: Percentage of different components of solid waste of Bongaigaon Municipality area.

Sr. No.	Component	Approximate weight (percentage)
1	Vegetables, fruits, etc.	23.4
2	Paper and paper products	8.6
3	Plastic	10.3
4	Cloths	3.8
5	Rubber	4.7
6	Leather, foam, etc.	6.5
7	Wood	0.7
8	Metals	5.8
9	Glasses and ceramics	6.0
10	Animal residues	6.0
11	Ash and coal	1.5
12	Concrete, stones, etc.	22.7

Table 3: Category of staff involved in solid waste management in Bongaigaon Municipality area.

Serial No.	Category of staff	No.
1	Sanitary Officer	1
2	Sanitary cleaner	Regular-6, Casual-60
3	Tractor driver	3

Table 4: Disposal facility in solid waste management in Bongaigaon Municipality area.

Serial No.	Disposal facility	No.
1	Tractor with tailor	3
2	Wheel barrow	4
3	Cesspool cleaner tank	1
4	Hand cart	1
5	Tricycle	12

Considering the outcome of present study, the following suggestions may be made for better management of solid waste in Bongaigaon Municipality are.

1. The Municipality should follow the Municipal Solid Waste Management Handling Rules, 2000.
2. No area under the Municipality should be left out from solid waste collection.
3. The Municipality should have sufficient number of dustbins in each ward.
4. Number of collection spots need to be increased.
5. While transporting from the collection spots to the landfill the waste should be covered.
6. There should be sufficient use of disinfectants like phenyl, bleaching powder, etc.
7. Time to time arrangement of awareness programmes in the wards might help the Municipality in this respect.
8. Stress should be given to improve the drainage system.
9. Adequate plantation in the Municipality area is utmost important.

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