



## THE NATURE OF SOLID WASTE DISPOSAL IN BOLPUR MUNICIPALITY, BIRBHUM, WEST BENGAL

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### ABSTRACT

*It is an indisputable fact that environmental degradation is increasingly undermining our lives. Therefore, one of the most urgent tasks of our times is to understand the implications of damage on environment and health that we witness today. We cannot ignore study of relationship between solid wastes and environmental degradation as well as deteriorating human conditions. We must learn how to manage the solid waste in Bolpur municipality. The general public, workers and executives, all have to be sensitive to solid waste management issues. Not only that, they have to be fully aware of environmental consequences, of their actions, habits and attitudes. This paper is an attempt not only to presents the existing situation but also promotes the principles of solid waste management in urban areas.*



**KEY WORD:** Solid Waste, Solid Waste Disposal, Solid Waste Management.

### ❖ INTRODUCTION :

We are modern, advance and techno-lover. But our perception is not modernized. We wish to adopt severe speed in our every development and thus to fulfill this objective we supported the industrialization and urbanization. We are trying to wear the Earth with plastic dresses. But we forgot that every development bears some negative impact.

World as well as the population of our country is increasing very hasty. Urbanization is the process of becoming urban, a complex process of change affecting both people & places. It affects the socio-economic, cultural as well as the physical structure of the area. Due to the increasing urbanization several kinds of solid wastes and related problems also evolved.

According to Young, 2010, "our population is still growing and we are producing more garbage". The problem is not concerned within this fast growing rather the problem is the unexpected increasing demand of people. On the other side science and technology is the twin brother and they are always extending their hands for surveying the people's demand. The result is very perilous. Now-a-days our society is facing with a heap of solid waste and environment becomes more polluted. We are civilized but our solid waste pollution is the uncivilized occurrence for our environment. Solid waste pollution sources with problematic scenario and also to give some suggestive measures in the Bolpur town of West Bengal is not only for this area, moreover for all those area where solid waste problem become a giant issue for environment.

### ❖ OBJECTIVE OF THE STUDY :

The key objectives of this study are as follows:

- To explain the nature and distribution of solid waste disposal.
- To search out the sources and types of solid waste materials in this study area.
- To find out the methods of solid waste disposal.
- To identify the risk assessment with solid waste problems.
- To advocate the suggestive measures to pin down the up-and-coming solid waste problems.

❖ **DATA BASE :**

This study was based on both primary data that the researcher generated in the field through investigation and interviews and the secondary data that the researcher collected from different offices.

Primary data has been generated in the field through reconnaissance survey based on logically formatted questionnaires. On The Other hand, Secondary data is made available from different sources like Census Report, Bolpur Municipality etc.

❖ **Location and Extension of the Study Area :**

Bolpur is a municipality town in Birbhum district of West Bengal, India. It is located in the south-eastern part of Birbhum district and it is extended from 23°40' N to 23°67' N latitude and 87°43' E to 87°72' E longitude. The eastern railway has divided the Bolpur into two parts. It is the second largest town of the district after Dubrajpur and has the highest population in Birbhum district.

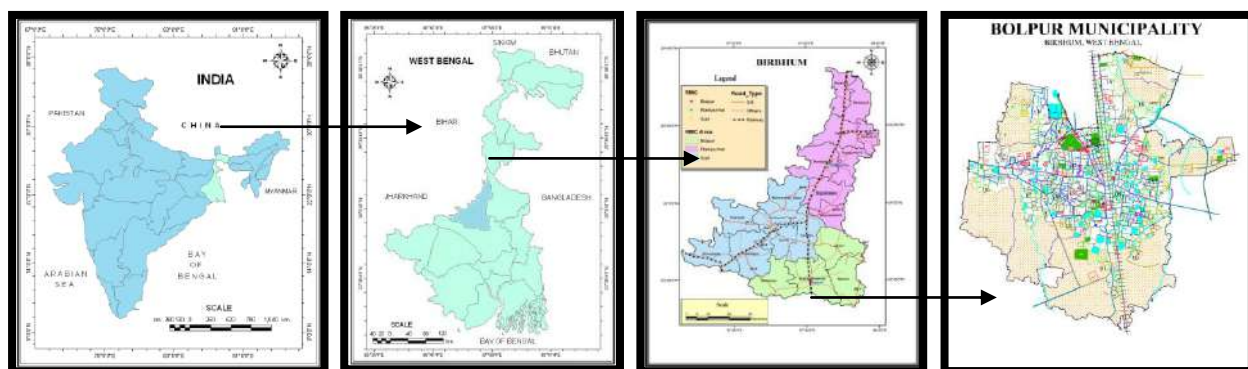


Fig. : Location of the Study Area

❖ **Solid Waste :**

Solid refers to such materials like agricultural refuse, industrial waste, mining residues, demolition waste, municipal garbage or even sewage sludge. Waste is unwanted or useless materials. Merriam-Webster defines waste as "refuse from places of human or animal habitation." The World Book Dictionary defines waste as "useless or worthless material; stuff to be thrown away."

Solid waste is defined as any garbage, refuse, sludge from waste treatment plant, water supply treatment plant, or air pollution control facility and other materials, including solid, liquid, semisolid, contained gaseous resulting from industrials, commercials, mining and agricultural operations from community activities.

Solid Waste Disposal is the proper disposition of a discharged or discarded solid, liquid or semi- solid material in accordance to the local environmental guidelines and laws and placement in a secure site to prevent or decrease the risk of infection.

❖ **Necessity of Solid Waste Disposal :**

The necessity of solid waste disposal are given as follows –

1. Proper solid waste disposal helps to avoid environmental pollution such as air pollution, water pollution, land pollution etc.

2. It helps to prevent health problems, diseases and by this proper disposal we can assure our children and our children's children.
3. It reduces foul smell, breeds, insects, and organism.
4. It reduces in breeding ground for germs and flies.

#### ❖ Sources of Solid Waste Substances :

The sources of solid waste substances may be grouped into 2 categories viz. –

##### ➤ Production Centres -

Production centres may be further divided into small- scale production centres and large scale or industrial production centres.

##### ➤ Consumption Centres -

These kinds of centres contributing solid waste substances may be further divided into individual house, community centres, market and municipal garbage centres.

Alternatively, sources of solid waste substances may be grouped into two broad categories e.g. – (a) Household or Domestic sector and (b) Industrial, Commercial sectors.

#### ❖ Types of Solid Waste Substances :

Solid waste pollutants can be classified into different types depending on their source:

##### ➤ Municipal Solid Wastes

Garbage is generally referred to “Waste” and is also termed as rubbish, trash, junk, unwanted or undesired material. As per the Municipal Solid Waste (Management & Handling) Rule, 2000, garbage is defined as Municipal Solid Waste which includes commercial and residential wastes generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes. Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue, and waste from streets. This garbage is generated mainly from residential and commercial complexes



Plate : Municipal Solid Wastes

##### ➤ Industrial wastes

Industrial wastes include huge amount of abandoned items which create several environmental problems. For example, huge quantities of bagasses are produced in sugar mills during the process of sugar production.



Plate : Industrial Wastes

➤ **Bio- medical Wastes or Hospital wastes**

Hospital waste is generated during the diagnosis, treatment, or immunization of human beings or animals or in research activities or in the production or testing of biologicals. It may include wastes like sharps, soiled waste, disposables, anatomical waste, discarded medicines, chemical wastes, etc. These are in the form of disposable syringes, swabs, bandages, body fluids, human excreta, etc. This waste is highly infectious and can be a serious threat to human health if not managed in a scientific and discriminate manner.



Plate : Hospital Wastes

➤ **Mining Wastes**

Mining wastes are produced during mining operations wherein huge quantities of wastes are dumped on land surface which may be useful for other purposes.

For example, for the mining of metallic ores, huge quantities of earthen materials, rocks and other wastes are created.

➤ **Agricultural Wastes -**

These include roots and stems of crops, straw, hay, dung, food articles etc. There is almost no problem of agricultural waste substances in developing countries because these items are used and refused in a number of ways. For e.g., dungs are used for compost and manures, for domestic fuels etc.



Plate : Agricultural Wastes



➤ **Packing Wastes :**

These include packaging of different materials such as polythene, plastics, paper board, paper, jute etc. These packagings are generally used several times in different forms in developing countries but these are immediately discarded after their first use and hence present the problem of their disposal.



**Plate : Packing Wastes**

➤ **Human Wastes :**

Human wastes include sewage in the cities which is disposed off in several disposal bodies such as underground pits, lakes, tanks, rivers and seas. In the rural areas mainly in the developing countries people use open lands as lavatories and thus stools pose a serious environmental problem. These human excreta are washed by rain water and are carried to nearby tanks, lakes and streams.

**Methods of Solid Waste Disposal :-**

Mainly 4 types of methods are dominant in solid waste disposal –

➤ **Incineration :**

Incineration is an important method of disposal especially of garbage. It reduces waste materials into their base components by burning them. This process generates heat, which is then used for energy. The by-products of this disposal method include various gases and inert ash. Incineration produces various levels of pollution depending on the incinerator design and the waste material being burned. However, filters can minimize the pollution. It reduces waste volume by up to 90 percent of the original refuse.

➤ **Recycling :**

Recycling is a conservation method of waste disposal. It involves reusing materials by reprocessing them industrially and turning them into new or similar products. The most common recyclable items are plastic, paper, glass and aluminum. Recycling bins are available for home, office or public use to collect recyclables before being taken to recycling centers. Recycling is the most environmentally friendly method to dispose of waste because it does not add any waste material. The downside of recycling is that only certain items can be recycled, and processing plants are expensive to operate and maintain.

➤ **Compositing :**

Composting is a natural biodegradation process that converts organic wastes into plant food. This occurs by allowing the waste to sit in one place for months until microbes decompose it. This process can turn unsafe waste products into safe compost. Composting preserves more nutrients than incineration and is the preferred method for organic waste disposal. Household garbage can be composted at backyard to serve as useful nutrient material for vegetation. The disadvantages are that it is a slow process and requires a lot of land.

➤ **Sanitary Landfill :**

Waste products that cannot be reused or provide another benefit must go somewhere. That place is usually a landfill. With recent technology, waste can be dumped in a landfill without the danger of polluting groundwater. This is done by placing protective lining beneath the waste to prevent harmful chemicals from leaking into the groundwater and polluting drinking water. Each layer of waste is compacted and covered by a layer of earth. Soil with low permeability is preferred for landfills in order to make the waste materials less susceptible to leakage. Some landfills use hardening materials such as cement or asphalt to seal each layer of waste. Landfills are usually located in areas without flooding or high groundwater levels.



**Plate : Incineration**

**Plate : Composting**

**Plate : Sanitary Landfill**

❖ The span of different disposal substance that means how long these can extend infectivity.

Waste items	Duration of life expanse
Cotton Rags	1 – 5 months
Paper	2-5 months
Orange peel	Up to 6 months
Photo film	20- 30 years
Tin cans	50-100 years
Wool socks	1-5 years
Plastic coated drinking cartons	5 years
Cigarettes ends	1-12 years
Leather shoes	25-50 years
Artificial fiber clothes like nylon	30 – 40 years

**Table : Long Root of Diverse Waste Materials**

❖ **Waste Disposal in Bolpur Municipality :**

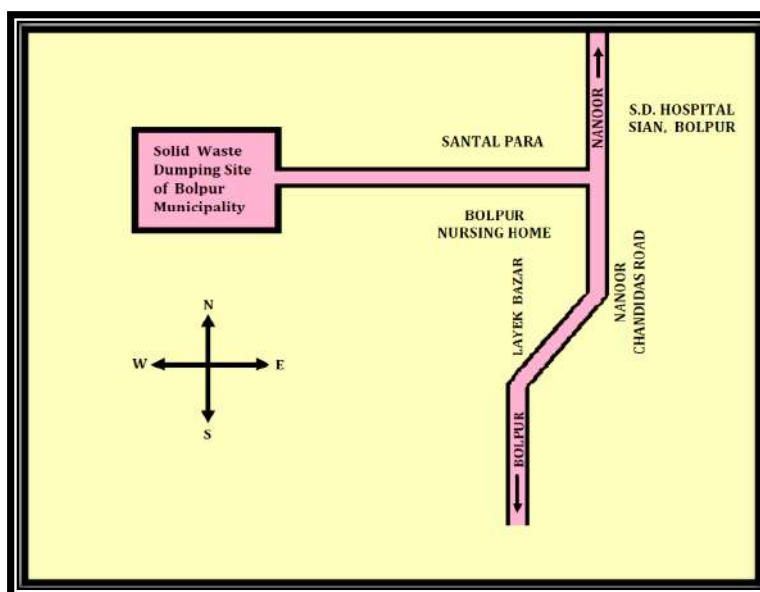
At present total population of Bolpur municipality is 81,579 and total number of families is approximately 16,315. Generally 500 grams solid waste is generated per head per day. The following table will tell us about the total waste disposal –

Total No. of Families	Average Family Member	Average Waste Disposal / Family / day	Total Waste Disposal	Total Waste Disposal in kg
16,315	5	2.5kg	Per Day	40,788
			Per Month	12,23,625
			Per Year	1,46,83,500

**Table : Total Waste Disposal**

From the above table it is evident that 1,46,83,500 kg solid waste is generated per year in Bolpur municipality.

The following map represents the road way of Bolpur dumping site which is located by the side of the Bolpur nursing home at Bhagar Danga, Sian, Bolpur. The approximate area of the dumping site 10 Bigha. The distance of the dumping site is approximately 5 kilometers from Bolpur municipal town.



**Fig. : Solid Waste Dumping Site of the Study Area**

Different source of solid waste pollutions in Bolpur has been shown in the following table-

Sources of Solid Waste	Types of Solid Waste
Flour and oil mill	Khai
Motorcycle garage	Burned mobile , slag irons, used bits of clothes
Other vehicle repairing garbage ( Bus, Taxi, Truck etc.)	Slag machineries
Grocery	Plastic , carton box, tin, rejected jute bag
Sweet shop	Whey
Bakery	Chat

**Table : Sources And Types of Solid Waste**

In most of the municipal towns of West Bengal there is no proper arrangement for the collection and disposal of domestic wastes and sewage and hence the substances spread on the ground within the

surroundings. So the collection and disposal of solid wastes and domestic sewage are serious problems in the municipal town. Dumps of domestic garbages remain at their places for several days and thus pollute the environment. Fortunately in Bolpur municipality the scenario is in opposite direction.

❖ **Waste Collection :**

As per the statement of local people, 30 per cent families stated the garbages collected once a week, 50 per cent families responded that waste collected twice a week and other 20 per cent said that the wastes collected thrice a week. It is thus desired that the frequency of waste collection should be increased and properly maintained.

No. of days attended per week	No. of Family said 'Yes'	% of Family
1	60	30
2	100	50
3	40	20

**Table : Interval of Waste Collection**



**Fig. : Interval of Waste Collection**

❖ **Dustbin Clearance :**

The management of solid wastes involves collection of waste substances and their disposal through dumping in suitable dump sites and their incineration in the Bolpur municipality the households garbages collected in dustbin which are placed nearer to their houses.

The under mentioned table and pie diagram shows that as per the statement of 70 per cent of local resident ,the clearance of domestic wastes that is dustbin of the residential localities are performed regularly but 30 per cent localities are denied.



Dustbin Clearance	No. of Family	% of Family
Yes	140	70
No	60	30

Table : Dustbin Clearance

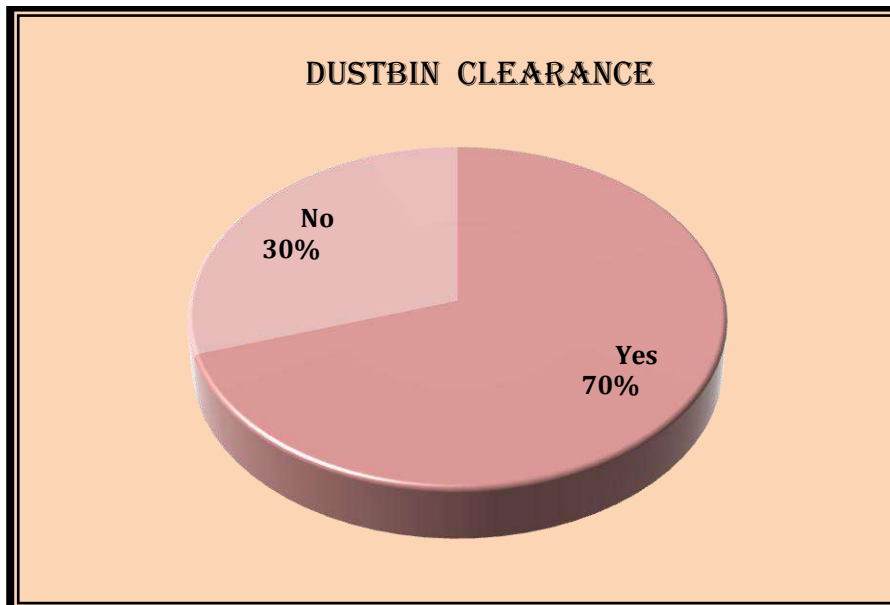


Fig. : Dustbin Clearance

❖ **Dumping Area of Wastes :**

Bolpur municipality has proper arrangement for the collection and disposal of domestic wastes. The collection and clearance of municipal wastes from various collection sites of different words are performed almost regularly in the Bolpur municipality. So far the dumping sites are concerned 50 per cent wastes collected in the dustbin, 30 per cent wastes cleared by van and rest 20 per cent garbages are dumped anywhere.

Rapidly increasing quantities of solid wastes are dangerous signs of environmental problems in near future. So quick and efficient automatic machine for the collection and disposal of solid waste substances should be introduced.

Dumping Sites	No. of family said 'yes'	Deposition of Waste in %
Dustbin	100	50
By van	60	30
Anywhere	40	20

Table : Dumping Area of Wastes

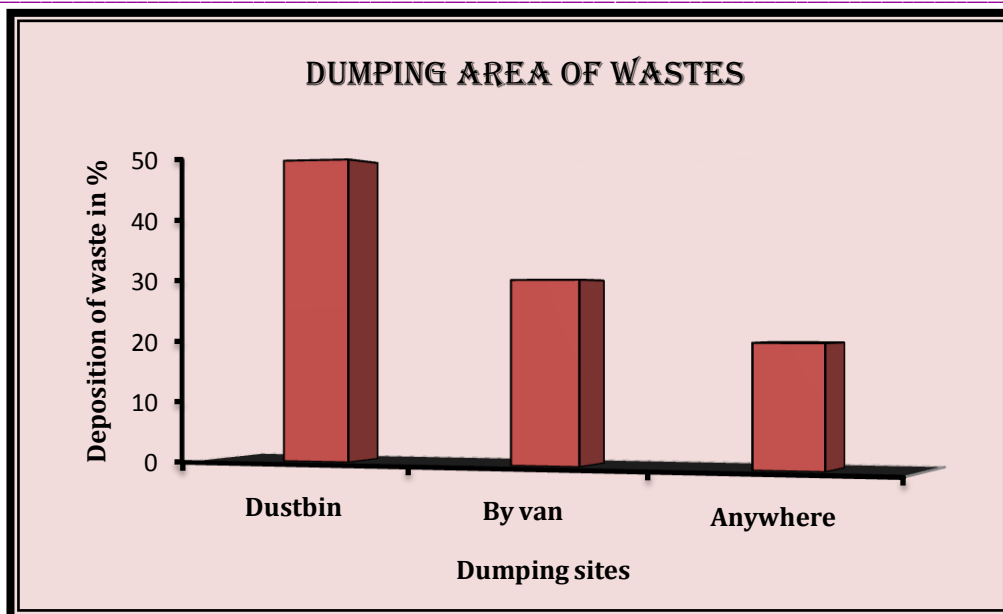


Fig. : Dumping Area of Wastes

❖ **Level of Satisfaction**

Solid Waste Management is one of the essential obligatory functions of Bolpur municipality. This service is falling too short of the desired level of efficiency and satisfaction resulting in problems of health, sanitation and environmental degradation.

Dumps of domestic garbages in the dustbin, basket and other places remain stagnant for several days and thus pollute the environment by bad smell and harmful gases and hampered the socio- cultural environment too. So proper collection of wastes should be maintained. According to the resident of Bolpur municipality, the level of satisfaction for solid waste management is highly satisfied – 28 per cent, medium satisfaction – 52 per cent and low satisfaction – 20 per cent which is appended below through table and pie diagram. I think the level of satisfaction may be increased upto desired level by increasing the frequency of waste collection and using the efficient automated machine.

Level of Satisfaction	No. of Responded Family	% of Family
High	56	28
Medium	104	52
Low	40	20

Table : Level of Satisfaction



Fig. : Level of Satisfaction

❖ **FINDINGS :**

- The solid wastes of Bolpur municipality include plastics, papers, glass, bottles, cans, garbages mostly coming from domestic uses. The quantity of solid waste generated in Bolpur municipality is about 45 metric ton per day.
- Total population of Bolpur municipality is 81579 and total number of families is 16315. Total waste disposal per year is 1,46,835 metric tonnes.
- The disposal of wastes plastic bag poses an acute problem in Bolpur municipality.
- Municipal authorities implemented various control measures for solid waste management such as they have supplied basket of disposing off the household garbages to each and every families.
- Collection and clearance of municipal wastes are done almost regularly.
- The heaps of solid wastes are carried by tractors and vans to dump sites early in the morning so that the local people cannot be affected by bad smell and harmful gases.
- The garbages are collected by van puller twice a week in Bolpur municipality.
- 70% residents of the locality stated that the performance of municipal authority regarding the waste collection is satisfactory.
- So far the dumping sites are concerned, 50% wastes collected in the dustbin, 30% wastes cleared by van and rest 20% garbages are dumped anywhere.
- 70% of population of Bolpur municipality reported that their willing to pay service tax for waste management.
- Most of the people of the study area (about 52%) reported that the level of satisfaction is moderate.
- The heaps of municipal garbages are spread by stray cattle, pigs, rats, rodents and poor people who collect some reusable items such as iron and aluminum junks , paper, plastics etc. cause fatal diseases.
- The municipal waste is disposed off by the method of incineration. By this method, the waste of the study area is reduced its volume and weight. It is also noticed that it can render toxic wastes into less toxic substances.

❖ **RECOMMENDATIONS :**

To restrain the unpleasant upshot of solid waste, the following remedial recommendations should be adopted-

- In daily life, the kitchen waste items like vegetables, fruits, rice other food items should give to local animals in daily at specific location. Through this maintaining, we can curtail the food waste and pollution from our daily life.
- In respect of garments we would like to stop the 'one garment for one time' concept and in case of richer, the old one should be distributed among the poorer. In this way we can reuse the garments.
- Pack your lunch in reusable bags rather foil pack when you will journey in train.
- Purchase fruits and vegetables loose rather packed when these are required.
- Procure refills materials.
- Utilize shopping bags and reject unnecessary carrier plastic bags.
- Buy recycled goods.
- Obtain reusable nappies.
- Buy soft drinks in large bottles.
- Prefer sturdy products like rechargeable batteries.

#### ❖ CONCLUSION :

Bolpur municipal town has a great importance since it is adjacent to Santiniketan Ashrama, founded by Rabindranath Tagore. In the context of beautification of this area the solid waste management of Bolpur municipality is done more effectively than the other municipalities of Bengal. But it is very unfortunate that the solid wastes of Bolpur municipality is disposed off unscientifically (no sanitary landfill exist) at present. This has adverse impacts on not only the ecosystem but also on the human environment. Unscientific disposal practices leaves wastes unattended at the disposal sites which attracts birds, rodents, fleas etc. to the waste and creates unhygienic conditions. The plastic content of the municipal waste is picked up by rag pickers for recycling either at primary collection centres or at dump sites. Moreover, since the rag picking sector is not formalized, not all the recyclables, particularly plastic bags, gets picked up and are found littered everywhere, reaching the drains and water bodies ultimately choking them. For the betterment of Bolpur municipal solid waste management, the authority should apply "polluter pays" principle by settling waste management changes for those who generate the wastes.

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