

OFFICIAL PROJECT PLAN

WASTE MANAGEMENT PROJECT



*House 14, Road 116, Gulshan 2
Dhaka 1212, Bangladesh
Phone: (+880)*

*www.greenchannelbd.org
www.facebook.com/greenchannelbd.org*

Prepared by Navin Rahman

Waste Management Project: Introduction

BACKGROUND AND PROJECT MISSION

According to a World Bank estimate, an individual in a developing country produces an average of 0.45 - 0.50 kg of municipal solid waste. The cities and towns of Bangladesh generate approximately 17,000 tons of waste per day most of which do not get treated or disposed off in the right manner. Within the next 25 years, the number is estimated to reach 47,064 tons per day. The *Waste Management Project* has been designed at *Green Channel* to resolve the waste problem in Bangladesh.

The Project aims to put in force sustainable systems of waste collection, segregation, and treatment along with a controlled, systematic and creative ways of reducing waste generation across the country.

LONG TERM VISION

The Project hopes to accomplish four goals in the long term:

Create Efficiency and Convenience within Systems-usage
Change the Culture of Waste Handling through Mass-scale Education Programs
Develop & Implement Creative New Solutions using Research and Development
Utilize the Most Advanced Technology for Every day Systems & Operation

STAGES OF INVOLVEMENT

Waste is usually handled in four stages. The *Waste Management Project* at *Green Channel* will be involved in all four of the stages in the following manner:

Generation	<i>Analyze and reduce the sources of waste</i>
Collection	<i>Identify and improve systems of collection</i>
Segregation	<i>Identify & evaluate existing processes and put in force more efficient ones</i>
Treatment	<i>Identify & evaluate current systems and put in force more efficient ones</i>

CONSEQUENCES OF WASTE INDISCIPLINE

Mishandling of waste can have a variety of consequences on our every day life. Besides creating an unhealthy and unhygienic living environment, it is responsible for the spread of diseases, pollution of lakes and water bodies leading to loss of biodiversity and the inefficient use of land and our resources. It is extremely important that we organize and manage the waste management sector of our country, which is an infrastructural necessity for all of the other sectors to survive.

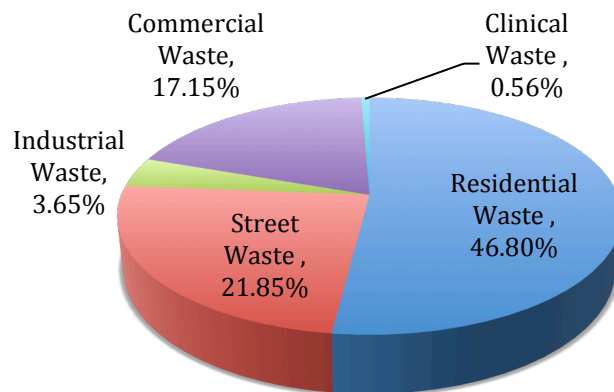
Waste in Bangladesh

GENERATION:

Close to half of the waste (46.8%) generated in Bangladesh come from *Residential* sources. Another approximate 40% comes from *Street* and *Commercial* sources. It is important to know the sources of waste in order to make sure that the collection process (the next step) can be organized most efficiently. The following pie chart shows the exact percentages of waste collected from each source.

SOURCES

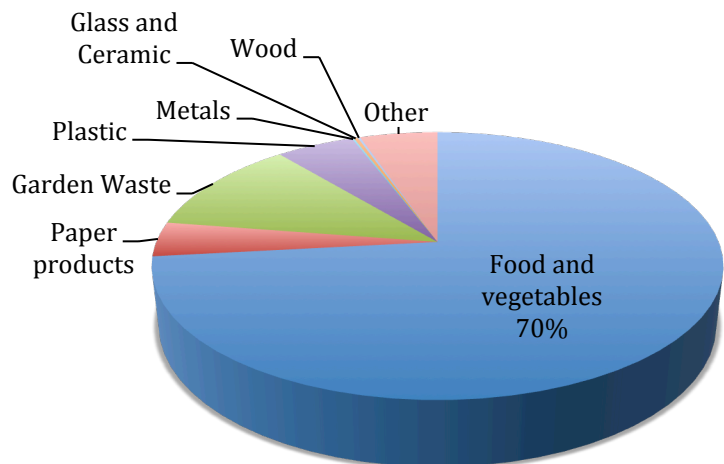
<i>Residential Waste</i>	46.8%
<i>Street Waste</i>	21.85%
<i>Commercial Waste</i>	17.15%
<i>Industrial Waste</i>	3.65%
<i>Clinical Waste</i>	0.56%



And the following pie chart shows a break down of the composition of waste in Bangladesh. More than two-thirds of the waste (70%) is composed of Food and Vegetables, which are biodegradable. The next largest percentages consist of Garden Waste (11%), Plastic (5%) and Paper Products (4%), which are also either recyclable or biodegradable. This is helpful to know so that once we have identified our sources and created a systematic process of collection, we can also set up an efficient system of segregation at the very point of origin.

COMPOSITION

<i>Food and vegetables</i>	70%
<i>Garden Waste</i>	11%
<i>Plastic</i>	5%
<i>Other</i>	5%,
<i>Paper products</i>	4%
<i>Glass and Ceramic</i>	0.25%
<i>Wood</i>	0.16%
<i>Metals</i>	0.13%



COLLECTION:

The waste-collection process is very poorly set up in Bangladesh. Only about 2% of the Dhaka City Corporation's budget goes towards Waste Management; its only source of income being the fees collected from house to house for the waste collection.

SEGREGATION:

Waste in Bangladesh is also not segregated at the point of origin, contaminating the biodegradable part and hindering the proper process of decomposition. Over time, due to the lack of attention given to the management of the system, current municipal solid waste has become a mixture of different kinds of dangerous constituents like toxic radioactive substances, methane gas, pathogens, industrial effluents, medical, pathological and harmful chemicals.

TREATMENT:

There are four possible ways of treating waste in general. And they are:

1. *Open Dumping Ground*
2. *Sanitary Landfills*
3. *Composting*
4. *Incineration*
5. *Plasma Technology*

Out of the 5 major ways of disposing waste outlined above, Bangladesh solely uses the first option - Open Dumping Grounds. The open dumping ground option simply allows the dumping of waste (unsegregated in the case of Bangladesh), without any sort of treatment.

PROBLEMS UNDER THIS OPTION:

Even under just this one option, many things go wrong in Bangladesh. The height of the landfills should not be below the highest flood level of the locality, which is never ensured. The low level of the ground consequently facilitates anaerobic fermentation in place of aerobic fermentation, thus delaying the process of settlement and stabilization from 2-3 years to decades.

Authorities in Bangladesh do not bother to purchase lands for this purpose at most times. They utilize private properties for dumping. And under such arrangements the landowners get to take advantage of raising their lands to a higher level free of cost by providing their land for open dumping ground purposes.

Some of the hazards of the existing open dumping sites in Bangladesh are that they follow no engineering design; the dumpsites are neither separated from other lands or water bodies nor contain retained walls to revert drainage of leachate. No safety measures are followed either. The landfills are also usually not provided with bottom liners or top covers.

POSSIBLE TREATMENT SOLUTIONS:

Composting: The Solution for Biodegradable Waste

Given 85% - a major chunk of our total waste - is biodegradable, composting is a great waste treatment option. It is also suitable because of the high moisture content in our waste. Moisture is one of the most important factors in waste management. Municipal solid waste in Bangladesh contains as much as 65% of moisture, whereas it is only 23-32% in India, and 15-35% in Europe, making the waste here more suitable for composting. Moisture in municipal solid waste helps quicker and easier decomposition and fermentation.

Biodegradability in the waste also allows it to get absorbed into the soil without affecting the environment if it does not include hazardous materials and plastic in the mix. Waste with biodegradable properties is also suitable for biogas generation through disposal in properly designed sanitary landfills.

Sanitary Landfill: Solution for Non-biodegradable Waste

The second option, the building of Sanitary Landfills, is the process of dumping waste after treating it to eliminate hazards, and to control methane gas emissions through the surface. Ground treatment, design and engineering work are the prerequisites for conducting this method, thus requiring an initial capital investment. Bangladesh does not operate any sanitary landfill to this day. JICA undertook a project to convert a dumping ground into a sanitary landfill earlier in the decade but failed to complete the project because the preconditions were not met.

Considering all the options and the socio-economic context of Bangladesh, the building of Sanitary Landfills is an essential for Bangladesh in order to ensure safe treatment of waste, prevention of health hazards and any dangerous impact on the environment. This method also controls the emission of methane gas and allows for the generation of electricity from waste, which may very likely draw the attention of the private sector, opening up possibilities for economic growth.

OPTIONS NOT SUITABLE FOR BANGLADESH

Incineration – Since there is high moisture in our waste, *incineration* is not a good option for us. Wet waste takes more heat and energy to be burnt. The moisture value for residential and commercial waste is 50% and 54% respectively, which are rather good for composting.

Plasma technology – *Plasma technology* is far too advanced and expensive for Bangladesh. It is not going to be an option for a very long.

OTHER POSSIBLE GOVERNMENTAL INITIATIVES

A few other initiatives from the government could help improve the system of waste management:

- *Relocation of tanneries outside Dhaka*
- *Mandatory laws regarding the use of Effluent Treatment Plants (ETPs) for all industries,*
- *Building new public toilets to prevent the currently 60% of Bangladeshis (who cannot afford sanitary latrines of any form) from contaminating public areas with human waste.*

Another problem of overflowing waste in the streets that the government could solve is by designating special facilities for slaughtering animals during religious holidays. A big generation of solid waste occurs during the occasion of *Eid-ul-Azha*. Around 40% of the slaughters in the country take place on this occasion. The rules of slaughtering animals are seriously violated during this time. Blood, bones, livers, fats, intestines etc. are found all over the roads. The traders arrange temporary markets within the city corporations, creating additional sources of wastes in the form of animal dung, fodder, hay, leaves, etc. which becomes the responsibility of the municipal workers to clean up. Millions of animals are sacrificed on this occasion in Saudi-Arabia as well, but they can only slaughter the animals at places officially arranged by the government. The government of Bangladesh can also arrange similar facilities for people to make their sacrifices in those designated places during the occasion.



Green Channel Foundation

Web: greenchannelbd.org | Email: info@greenchannelbd.org

Goals

Organizational Goals must be S.M.A.R.T

Specific
Measurable
Achievable
Relevant
Timely

Following is a brief description of each goal set by the *Waste Management Project* Team. All of these goals will be addressed in more detail using the SMART tool in the Action Projects Section of this document.

GOAL #1: CREATE EFFICIENT AND SUSTAINABLE SYSTEMS

The existing waste management system in Bangladesh is managed extremely poorly. The *Waste Management Project of Green Channel* will aim to create an efficient system of processes at every level (collection, segregation and treatment) in a way that will sustain itself in the future.

GOAL #2: REDUCE GENERATION OF WASTE

Besides creating efficient and sustainable systems of waste management the *Project* will also aim to reduce the generation of waste across the country through mass scale education and awareness programs.

GOAL #3: DESIGN CREATIVE SOLUTIONS

The *Project* will be continuously involved in Research and Development in order to incorporate new ideas, creative solutions and innovative thinking into our already established systems and processes.

GOAL #4: OPERATE SYSTEMS USING THE MOST ADVANCED TECHNOLOGY

The *Project* will also seek to incorporate the most advanced technology in their work and any systems design.

Action Projects

SYSTEMS FOCUSSED PROJECTS:

Collection And Segregation Projects

Given the major sources of waste in Bangladesh, that make up 85.5% of the total waste, come from just three sources, Action Projects designed under the Collection Category will focus mainly on those three sources: **Street Waste, Residential Waste and Commercial Waste.**

Also given the major composition categories of waste in Bangladesh come from just three categories as well, that make up 90% of the composition, Action Projects under the Segregation Category will focus on those three categories: **Biodegradable Waste (food, vegetables & garden waste) Paper Products and Plastic.**

ACTION PROJECT #1: PROJECT TRASH PATROL (ORGANIZING STREET WASTE)

This Project aims to organize the collection of Street Waste by setting up trashcans in all public roads of Bangladesh. The project was first launched in Dhaka back in 2012 and will be launched in the rest of the Divisions in the subsequent years. This is also a project undertaken in partnership with the City Corporation that is in usually charge of emptying the trash from these receptacles, while we fund, manage and maintain them.

Design The Trashcans are made out of steel and come with a heavy chain and pad-lock to ensure *durability, prevention of theft and convenience of installation.* The unit price for each trashcan and its accessories is about \$60.

Timeline: Jan – June 2015 Phase 5-10
(Dhaka) July – Dec 2015 Phase 6 –16

Budget: USD 45,000

Evaluation Factors: Number of Trashcans Set up
Number of Trashcans in Good / Excellent Conditions (Scores: 0-3)
Number of Trashcans being used regularly
Qualitative Feedback from society (by area)



Starting 2016 the *Green Channel Projects Team* will work to create a system of segregation for Street Waste at the point of origin (most likely by providing classified trashcans along side our green-colored trashcans).

ACTION PROJECT #2 (RESIDENTIAL WASTE)

Project #2 will aim to organize waste collection and segregation from Residential sources in Dhaka and will be designed in more detail starting 2016.

ACTION PROJECT #3: (COMMERCIAL WASTE)

Action Project #3 will aim to organize waste collection and segregation from Commercial sources in Dhaka and will be designed in more detail starting 2016.

Project # 1, 2, and 3 will be replicated in the rest of the country only after building a successful model in Dhaka.

Treatment Projects:

ACTION PROJECT #4: COMPOSTING

Given composting is such a great option for Bangladesh, in terms of moisture content, atmospheric suitability and waste biodegradability this Action Project will be a major focus of our *Waste Management Project* in the following years. The Project will aim to set up composting units across the country, and use composting as a major way of getting rid of the 85% of our total waste. This Project will be designed in more detail starting 2017.

ACTION PROJECT #5: RECYCLING

This Project will aim to set up recycling plant units for paper and plastic products, in various parts of Dhaka and will be designed in more detail starting 2017.

OTHER OPTIONS:

In the long run we look forward to building a sanitary landfill in the country, in cooperation with the Bangladeshi Government and International Institutions like JICA and the UN.

Treatment Projects will also be replicated in the rest of the country only after building a successful model in Dhaka.

AWARENESS-BASED PROGRAMS



Awareness Building and Public Education is a very important aspect of our every day work. Environmental Education and Waste-Management Discipline is greatly lacking in Bangladesh. The *Waste Management Project Team* will design Awareness-based Programs to promote environmentally friendly practices across the country.

PROJECT #6: SCHOOLS

This Project will design research-based creative programs for children (of varying ages) that will be introduced into the school curriculums across the country. The Project will aim to promote environmentally friendly practices in children from an early age. There will be four programs designed, each for a specific age group and all the programs will incorporate the components: creativity, thought leadership and the learning of best practices.

Timeline: (2015)	<i>January – March</i>	<i>Design Programs for ages 3 – 6</i>
	<i>April – June</i>	<i>Design Programs for ages 7 – 10</i>
	<i>July – September</i>	<i>Design Programs for ages 11 – 14</i>
	<i>October – December</i>	<i>Design Programs for ages 15 – 18</i>

Project Implementation Timeline in Dhaka (Total Number of Schools: 105)

(2016)	<i>January – March</i>	<i>Program launch in 26 schools</i>
	<i>April – June</i>	<i>Program launch in 26 schools</i>
	<i>July – September</i>	<i>Program launch in 26 schools</i>
	<i>October – December</i>	<i>Program launch in 27 schools</i>

Evaluation Factors: *Participation Rate, Change in behaviors, Initiative Taking, Creative Development*

The Programs will be launched in the rest of the country only after building a successful model in Dhaka.