

Plastic Recycling in Bangladesh

Nasrin Sultana

System Analyst, Bangladesh Water Development Board, Dhaka, Bangladesh

Corresponding author

Nasrin Sultana, System Analyst, Bangladesh Water Development Board, Dhaka, Bangladesh, E-mail: nasrin_sul4tana@yahoo.com

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Introduction

Plastic products are very useful for every household all over the world. This sector is flourishing day by day. It is contributing global economy in general. Earlier the wastes of plastic products were harmful to human health and the environment. But presently in many countries or areas the wastes is being turning into resources through recycling.

Plastic is made from synthetic and semi synthetic materials. ‘The term “plastic” in-cludes materials composed of various elements such as carbon, hydrogen, oxygen, nitro-gen, chlorine and sulfur.’ Plastics have high molecular weight which means in a plastic product there are some polymers that has molecules which contains thousands of atom bonds together [1].

Recycling means the reprocessing and refabricating of a material that has been used and discarded by a consumer and that otherwise would be destined as solid waste. This type of recycle is called post-consumer recycle, as opposed to recycle that is created as a nor-mal part of scrap from a manufacturing process. The reprocessing of plastic materials into useful products needs several steps such as collection, sorting, cleaning and refabricating [2].

In Bangladesh, like other developing countries plastic waste recycling is inadequate. The situation of recycling in the country is

a grim reflection of the extent of environmental hazards caused by the plastic industry all over Bangladesh. The Government of Bangladesh is providing tax exemption on account of recycling. More than half are being recycled leaving the bulk of the harmful stuff to cause environmental degradation, soil erosion, water logging etc.

It has been learnt that as much as 69 percent of the plastic waste is recycled annually. In Bangladesh there are over three thousand small and big plastic industries. From this growing sector Bangladesh Government received revenue above 2(two) thousand core Taka (US\$ 250 million), 1.2 million people are employed in the sector. These industries export at least 4 (four) thousand core Taka (US\$ 500 million) products.

Bangladesh: A Brief Idea about Current Economic Status

Bangladesh is a densely populated country. Its area is 1,47,570 square kilometers and population is 166 million. It is the eighth most populous country in the world with the tenth highest population density. It belongs to ‘Least Developed Countries’ category by the UN and per capita income is US\$ 1751. About 48 percent of the population is employed in the agricultural sector. Bangladesh is dependent upon a limited range of exports of which textiles and garments contribute the maximum share around 81 percent. Despite these limitations Bangladesh has achieved satisfactory levels of economic growth over the past two decades [3].

Table 1: Bangladesh Macro Economic Indicators Macro Economic Indicators

	2011-12	2012-13	2013-14	2014-15	2015-16
GDP at current market price	Tk. 10,552.0 billion	Tk. 11,989.2 billion	Tk. 13,436.7 billion	Tk. 15,158 billion	Tk. 17,295.7 billion
GDP at fixed price	Tk. 6884.9 billion	Tk. 7299.0 billion	Tk. 7741.4 billion	Tk. 8248.6 billion	Tk. 8830.5 billion
GDP growth at fixed price	6.52	6.01	6.06	6.55	7.05
Per capita GDP at current price	Tk. 69,614	Tk. 78,009	Tk. 86,266	Tk.96,004	Tk. 108,172
Overall budget deficit (including grants)	Tk. -418.7 billion	Tk. -443.8 billion	Tk. -536.0 billion	Tk. -706.2 billion	Tk. -808.6 billion
Overall trade deficit	Tk. -737.2 billion	Tk. -560.3 billion	Tk. -529.0 billion	Tk. -456.6 billion	Tk. -315.1 billion
Rate of inflation	8.69	6.78	7.35	6.41	6.01
Revenue GDP ratio	10.9	11.6	11.7	10.8	12.1
Tax GDP ratio	9.1	9.7	9.7	9.9	10.5

Source: Bangladesh Economic Review – 2016

Research Objectives

Plastic recycling is necessary for the protection of nature & environment. It is a non-biodegradable product and cannot be dumped in the ground. The main objective of this paper is to provide a description of manufacturing of plastic and recycling of plastic wastes in Bangladesh to be specific, the paper focuses the following objectives:

1. To identify the present status of plastic recycling in Bangladesh.
2. To know how it could be recycled.
3. To assess the use of recycled plastics.

Plastics

Plastics are cheap, lightweight and durable materials. It can readily be molded into a variety of products. So the plastic production has increased over the last 60 years. To make a plastic material synthetic or semi-synthetic organic material is used which are moldable. Normally the raw materials of plastic are found in nature such as cellulose, coal, natural gas, salt, crude oil; and most industrial plastic is made from petrochemicals. The main thing of plastic is it can be cast, pressed and extruded in variety of shapes such as films, fibers, plates, tubes, bottles and much more [4].

How Plastics are made

Plastic production can be divided into four categories.

1. Acquiring raw material
2. Synthesizing the polymers
3. Compounding the polymers into materials
4. Molding [5]

Types of Plastic

Plastics can be divided into two major categories.

Thermosets

It is a long chain plastic made by cross-linked of another long chains polymers. It cannot be re-shaped or re-melted after getting one shape. For example Epoxy resin, polyester resin, carbon fiber plastics etc.

Thermoplastics

It can be re-melted or re-shaped easily. This is soft and moldable on cooling. This type of plastic hardens when it gets cold. Such as HDPE, LDPE, PVC, Polypropylene, Polystyrene etc. The most important plastics are as follows.

HDPE is resistant to chemicals, tough and waxy.

Plastics Background in Bangladesh

Almost all people are using plastic goods. The demand of the people is growing and the size of the plastic industry is also growing. It is contributing the industries sector of Bangladesh immensely.

Table 2: Milestones of Development of Plastic Industries in Bangladesh

Year	Technology and Products
1960`s	Small products such as toys, bangles and photo frame where made using handmade molds. Plastic spare parts for jute mills
1970`s	Automatic machines were installed to manufacture household utensils such as plastic jugs and plate
1980`s	Film blowing machines to manufacture plastic bags
1990`s	Plastic accessories especially hangers for exportable garments

2000`s	Molded plastic chairs and tables. Water tank made by rotation molding. Locally developed machines (shredder, extruder, and pelletizer) for recycling plastic wastes
Now-a-days	Now-a-days there are about 3000 plastic factories in the country. Out of them 1968 factories are small, 980 are medium and the rest 52 are large companies which deal internationally.

Methods

Respective, data, information have be gathered through some fieldwork and company visits. Some newspapers, e-mail correspondence and online sources have been provided some secondary data. Container, bucket and bottle can be made by HDPE.

LDPE

LDPE is made from the monomer ethylene. It contains chemical element carbons and hydrozen.

Polystyrene

It is lightweight, soft, good insulator, clear, hard and brittle. It is widely used in packaging industry.

Polypropylene

It is rigid and good chemical resistance. Widely used in packaging at leveling, textiles, plastic parts and reusable components.

Plastic Industries

Bangladesh is consists of 64 districts. But most of the plastic industry is based on the capital city Dhaka, port city Chittogram and Narayanganj, a city close to Dhaka and a large trade centre [6].

Scopes & Limitations

The author visited and interviewed some plastic companies and some of them did not cooperate. Government involvement regarding recycling is not adequate. Some NGO's have done some research about plastic wastes and another used those date for this paper.

Raw Materials

Raw materials are natural things, mostly resins which somebody can get from vegetable oil. Presently petrochemicals are used to make plastics because it is cheap and it is easy to get.

What is Recycling

It is a process of turning wastes into resources. Plastic goods may be thrown away as waste. Recycling can turn them into new product. The process can benefit the nature, environment and the community. It helps to preserve natural resources at prevent pollution.

Earlier plastic waste became problem for health of human, animals and sea creatures.

Now recycling can safe all creatures from its adverse affects.

Plastic Recycling

Recycling is the reprocessing of used materials to a new form from its original state to a new form. This is called post consumer recycle and another type of recycling process which is created as normal part of the scrap from a manufacturing process is plant recycle [7].

Phases of Recycling

- Collecting
- Sorting

- Cleaning and Drying
- Shredding
- Pelletizing

Collecting

The consumers throw the wastes away in anywhere and the collectors called ‘Tokai’ (poor male & female child) collect those wastes from streets, drains, dustbins, highways, embankments, rivers and sell the waste plastic to the respective vendors at a very cheap price. All the city corporation and municipalities are responsible for the collection of wastes.

In Dhaka city, there are two categories of collectors. These are primary waste collectors and secondary waste collectors. Residents, households and tokais are primary waste collectors and on the other hand Dhaka City Corporation (DCC) is the secondary waste collector [8].

Sorting

In Bangladesh sorting process is done manually by the types and colors. The agencies concerned don’t use any machine to sort the waste plastics.

Cleaning & Drying

Cleaning is the critical phase of recycling process. Because most of the waste plastics are contaminated by dirt, grease, oil etc. Some detergent mixed water is being used to remove the contaminants. In Bangladesh all cleaning process is done manually, normally in the river, canal or pond and dried them in sunlight.

Shredding

The sorted and clean plastic wastes are sent to the shredder to cut into flakes. Shredder is a machine of rotating blade which cut the plastics into the small pieces. Then the pieces have been collected in a bucket.

Pelletizing

This is the last phase of recycling. The plastic flakes are put into an extruder where it (extruder) melts the flakes. The melted flakes then extruded through a small die hole. After melting the reprocessed plastics the liquid mixture is shot into molds or extruded to make a new plastic product.

Benefits of Recycled Plastics

Recycling of plastic has many benefits for the country if the recycling is done systematically. The three beneficial sectors are

- Social Benefits
- Environmental benefits
- Economic benefits

Social Benefits

People throw their wastes on the road or dustbin and plastic wastes litter the streets and bind the water removal system in the drain which causes mosquitoes and flies.

Environmental benefits

Bangladesh used to have very fertile lands in the world but because of non-biodegradable wastes it is losing its fertility.

Economic benefits

If the manufacturing industries start using recycled plastics then they can save money and the price of the products will be less than the virgin products.

Plastic Products in Bangladesh

Applications of plastic products are used mainly in packaging, medical, household sector in Bangladesh. Garbage bag, toothbrushes, plastic doors, chairs, tables, bed, PVC pipes, electric switches, toys, buckets are some of the products that the plastic industry are manufacturing now-a-days in Bangladesh. Although plastic industry in Bangladesh has made a remarkable progress over the years but still they need a well-designed plan to be more reliable to the consumers.

Table 3: Plastic products and its application in Bangladesh

Applications	Products
Household	Chair, Table, Sofa, Bucket, strainer, Bowl, Tableware, bath ware
Accessories for RMG	Packaging material. Bags, hanger
Construction	Plastic pipe, door, toilet flush
Agricultural products	Plastic pipes for irrigation and plastic films for shedding crops
Healthcare and Electrical	Blood bag, saline bag, injection medicine container, Electric cables and wires covers, switches

The companies in Bangladesh don’t make any products with the recycled plastic flakes. They export the flakes. So it will be a good opportunity to start an industry only for the recycled plastic flakes.

There are some companies who are directly involved with plastic recycling but they recycle only PET bottles and they export the chips (flakes and scrap) to china. In 2013, in a TV interview the president of PET flakes exporter association told that around 500,000 40

Metric ton per year of flakes have been exported and they earn around 1500-2000 million dollar in a year [9].

Prospect of Plastic Products

Because of the low costs, a plastic recycling factory could be quite rewarding to start in Bangladesh. The main prospects are below:

- Affordability of the labour cost
- Fast developing recycling industry
- Consumption rate of plastic in Bangladesh 5kg/year as compared of world 30kg/year
- population growth in Bangladesh is high and therefore the consumption rate will increase

Focusing on Future

1. Some quarters blamed this sector for environment pollution. It is due to lack of awareness of plastic waste management. Therefore enhancement of awareness is necessary in the community level.
2. Government as well as the private sectors needs to give more importance to plastic waste management.
3. Plastic industries need to take some special or different measures for plastic waste management.
4. Coordination is necessary among the plastic waste collectors, recycling operators and consumers.

5. Through these efforts, the waste management would emerge as a major productive industry.
6. The coordinated effort of the Government, Consumers, Recycling Industries and Plastic product manufacturers could create positive environment. Because plastic waste is a wealth.
7. Existing recycling facilities need to increase and made efficient and compliant with environmental standards.
8. Policy and Financial incentives are necessary [10-16].
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