



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2017; 3(6): 1088-1094  
www.allresearchjournal.com  
Received: 02-04-2017  
Accepted: 03-05-2017

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## Uses of plastic bags and environmental hazard- A study in Guwahati city

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### Abstract

The present pattern of human activity has challenged all the living forms on the earth. Development of science and technological knowledge and experiences of human beings have brought to the fore the conflict between biosphere of Man's inheritance and the techno-sphere of His creation. One of the modern conveniences without which daily life of man cannot be imagined is plastic bags. These cheap, light weighted bags function as a means of carrying food and other goods. The threat to environment and quality of life has been due to accumulation of plastic bags wastes. They are environmental unfriendly to its extreme level. The usage of plastic bags and further 'throw away culture' have resulted in finding their ways into the city drainage system, clogging the drains leading to sanitation problems, sewage problems which ultimately cause severe flash flood in the city. In this study an attempt will be made regarding the usage of plastic bags and environmental hazard with special reference to Guwahati. In this study descriptive method will be used and sample will be selected based on purposive sampling techniques.

**Keywords:** Plastic bags, environmental hazards, environmental awareness

### 1. Introduction

The realization of sustainable development has never been more necessary than today for humankind to continue to prosper and develop. It requires mankind to resolve global environmental problems, in particular global warming, and calls for a collective effort on the part of human beings to gather their deepest wisdom. In Rig Veda, it was stated, "The dust of the other earth and light of the father sky would remain, be associates with full brightness for our welfare." It believes that there were three kinds of God in existence-The Celestial, The Aerial, and The Terrestrial, which signifies land, air and water and the Sun. The whole Brahmananda or the solar system was in peace and happiness because life and environment were very closely related. The Vedic society regards everything about them as pervaded by divine presence. The rivers, mountains, lakes, animals, flora and fauna, are all manifestations of God, and therefore there is a deep respect and gratitude felt towards nature. It emphasizes that human beings cannot separate themselves from their natural surroundings, as Earth has the same relationship with man as that of mother with her child. It is difficult to think of man as something separate from nature/environment as life and environment were so integrally knitted. The present pattern of human activity has challenged all the living forms on the earth. Development of science and technological knowledge and experiences of human beings have brought to the fore the conflict between biosphere of Man's inheritance and the techno-sphere of His creation.

One of the modern conveniences without which daily life of man cannot be imagined is plastic bags. These cheap, light weighted bags function as a means of carrying food and other goods. In 1754, when Horace Walpole suggested the word 'serendipity', no one knew that it would come to be associated with some of the greatest scientists and discoveries in history. In 1898, Hans von Pechmann discovered, by accident or serendipity, a waxy substance at the bottom of the test tube, giving birth to one of the most controversial as well as most widely used substances of modern times— polythene. However, its main ingredient, diazomethane, was highly unstable, and it was Eric Fawcett and Reginald Gibson at Imperial Chemical Industries (ICI) who, again by serendipity, discovered its industrially practical version in 1933. This version too could not be mass-produced, and it was only in 1935, that Michael

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Perrin, again an ICI chemist, developed this accident into reproducible polythene, leading to its viable mass production in 1939.

With its inception in 1957, the Indian plastics industry has also shown a significant growth and currently employs about 4 million people. It operates more than 30,000 processing units, of which 85 to 90 per cent are small and medium enterprises (SMEs). The utilisation of plastics ranges from toys to aircrafts, from dolls to hosepipes, from soft drink bottles to refrigerators, from gramophone records to television sets. Packaging represents the single-largest sector of plastics use and accounts for 35 per cent of plastic consumption. Recently, the government notified the Plastic Waste (Management and Handling) Rules, 2011, to replace the earlier Recycled Plastics Manufacture and Usage Rules, 2003, towards better management of plastic waste. According to the new rules, the minimum thickness of plastic bags has been raised to 40 microns and recycled carry bags made from compostable plastics need to conform to specific Bureau of Indian Standards (BIS) norms. The new rules require the municipal authority to constructively engage with waste pickers, and agencies or groups working in waste management. The district magistrate has been made responsible for the enforcement of the rules, and a committee is responsible for control at manufacturing level.

## 2. Description of the Study

Guwahati is the largest city in the northeastern part of Indian and often referred as 'Gateway of Assam'. It lies between the banks of the river Brahmaputra and foothill of the Shillong plateau. It is the hub of socio-economic and cultural hub of northeastern regions. According to 2011 census, the total population of Guwahati is 963,429 with a population density of 2695.42/km

Guwahati's 'urban form' radiates from a central core with growth corridors radiating and extending towards the south, east and west. During the past few decades, southern Guwahati areas such as Ganeshguri, Beltola, Panjabari, Jatia, Kahilipara, etc., began forming a southern sub-center surrounding the capital complex at Dispur. In brief, the major components of Guwahati's urban structure are:

- The core or the center of the city comprising of areas such as Pan Bazaar, Paltan Bazaar, Fancy Bazaar and Uzan Bazaar.
- The extended core with Chandmari, Zoo Road, Noonmati and Ulubari.
- The north-southeast Guwahati-Shillong (GS) Road Corridor
- The southern sub-center of Ganeshguri
- The western corridor towards Kamakhya, Jalukbari and LGBI Airport and
- The eastern corridor towards Noonmati and Narengi

The governance of Guwahati has been vested to Guwahati Municipality Corporation (GMC). Guwahati has been mainly sub-divided into four assembly constituencies-Jalukbari, Dispur, Guwahati East and Guwahati West, all of which are part of Guwahati (Lok Sabha constituency). Further for the administrative convenience, it has been again divided into:

- West division
- Dispur division
- South division
- East division

- Central division
- Lakhara division

In this study it has been delimited to Guwahati city and the six administrative divisions of Guwahati have been taken into consideration.

## 3. Need and Significance of Study

Plastic is an organic material manufactured from petroleum derivatives. It is composed of one organic substance or more. It can be shaped into any form or shape as desired. Manufacturing or burning of plastics cause emissions of toxic gases and release a toxic carcinogen called dioxin. The dioxin affects the function of the reproductive and immune system. It also causes hormonal disruption and growth problems. It has the ability to accumulate in the food chain and stay for long periods of time in the environment. It poses serious danger even when it is in small quantities. Plastic bags when dumped into rivers, streams and sea contaminate the water, soil, marine life as well as the air we breathe. When plastic bags are burned, they release a host of poisonous chemicals including dioxin into the air. Moreover, recycling of plastic is uneconomical, and polluting. It is associated with skin and respiratory problems resulting from exposure to and inhalation of toxic fumes, especially hydrocarbons and residues released during the process. Also, recycling plastic bags merely puts them back into circulation in the market place and eventually the environment, thereby making no reduction. Plastic bags are known to clog drains and thus hit urban sewage systems. Choked and blocked drains provide excellent breeding grounds for mosquitoes, besides causing floods during the monsoon season. Due to indiscriminate dumping of plastic bags on land, toxic metals such as lead and cadmium pigments percolate into underground water. Garbage mixed with plastic bags interferes in waste processing facilities and causes problems in landfill operations. Since plastic bags do not undergo bacterial decomposition, land filling using plastic bags would mean preserving the poison forever. Buried in landfill sites, plastic takes hundreds of years to degrade.

Guwahati has been reeling under numerous environmental problems caused by various factors. Plastic/polythene bags have been consumed by the people in purchasing or selling things as well as in various other day to day activities. These have led to disposal of such plastic bags in an unplanned way which result in problems like sewage problems, flash flood, pollutions, and various diseases. Keeping in view with these harmful effects of plastics bags, the present study has been conducted.



**4. Statement of the Problem**

The statement of the problem has been stated as-  
 “Uses of Plastic Bags and Environmental Hazard- A Study in Guwahati City”

**5. Objectives**

- The present study has formulated the following objectives-
- To find out whether the people use plastic bags or polythene bags
  - To study if the people are aware of harmful effects of plastic bags on environment
  - To study if the people use any alternative to plastic bags

**6. Methodology**

The present study is based on descriptive study method. Descriptive research deals with the relationship between variables, the testing of hypotheses and the development of generalizations, principles, or theories that have universal validity. They make an attempt to find out generalized attributes. The method of descriptive research is particularly appropriate in behavioural sciences because many of the types of behaviour that interested the researcher cannot be arranged in a realistic setting. They are non-experimental because they deal with the relationships among non-manipulated variables.

**6.1 Sample**

Purposive sampling is a non probability sampling where the elements/units selected for the sample are chosen by the judgment of the researcher or investigator. Purposive sampling technique is used to select the sample for this study. However, due to limited time frame, the sample has been restricted to 300 household 50 from each administrative division of Guwahati city which is purposely selected.

**6.2 Tools**

A self-structured interview schedule has been used to collect the necessary information regarding usages of plastic bags and environmental hazard associated with it.

**7. Analysis and Interpretation**

The data collected for the study has analyzed statistically using simple percentage and graphical diagrams has been used for better presentation of the scenario. The present study has the following findings regarding uses of plastic bags by the people of Guwahati. The investigator also tried to highlight environmental hazards faced by the people in Guwahati city:

- 1) It has been found that 258 persons out of 300 have responded that they use plastic bag in their day to day life. This shows that 86% of people use it while only 14% have responded that they don't use it or try to avoid using it.

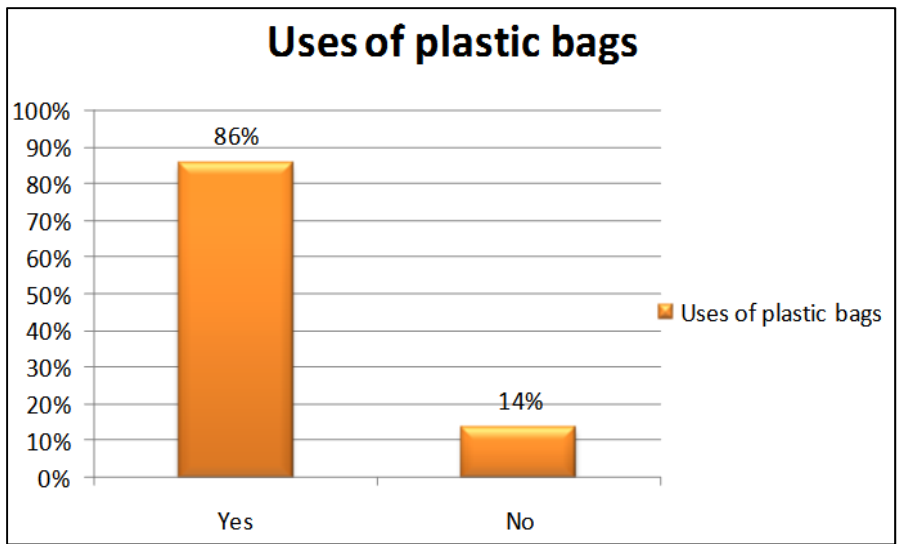
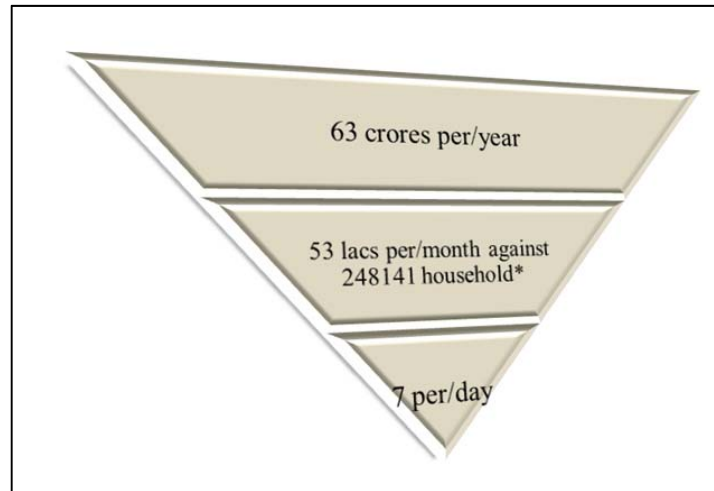


Fig 1

- 2) In spite of it the average no of plastic bags uses in every household is 7, which sum up to 1,736,987 per/day number of bags against 248141 household (including both residential and non residential purposes) according to census report of 2011.

The amount of plastic bags for a year has increase to 63 crores i.e., 34 lacs kg (5 gram per one plastic bag). It has increased from 1.8 crores kg per year in 2004 to 5.4 crores kg per year in 2014. But in 2016 only 34lacs kg/year are used by the people of Guwahati which comprises only plastic grocery bags. Even the numbers of respondent using 40 micron plastic bags are only 39% in comparison to 78% not using it.



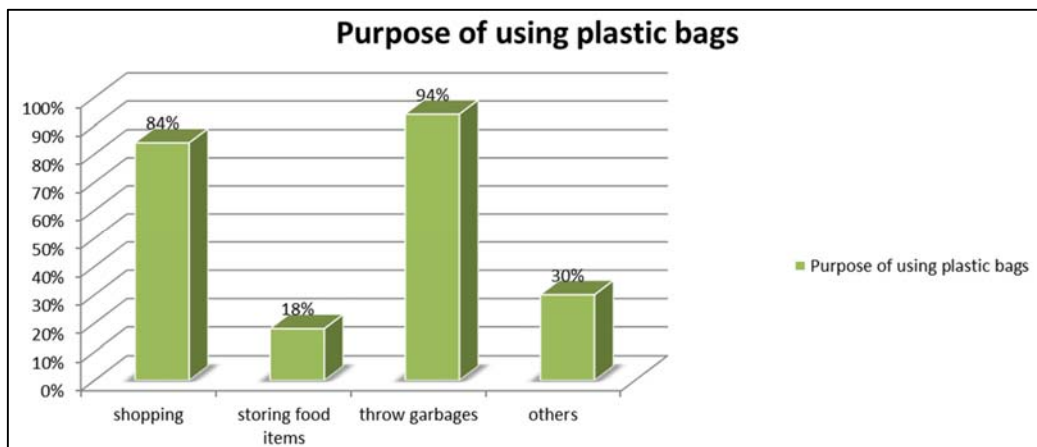
**Fig 2:** Amount of plastic bags used

3) It has been found that 60% uses it for being easily available while 54% as it is light in weight and durability. This is diagrammatically shown as follows:



**Fig 3.**

4) The purpose behind the use of plastic bags is shown below:



**Fig 4.**

5) The survey has shown that though people claim to be educated still their techniques of disposing polythene bags are not satisfactory. The table below shows that

Table 1

Techniques of disposal of polythene bags	%
Open dumping	62%
Burying	22%
Burning	56%
Throw away in the backyard	6%
Throw in drain	42%
Dustbin/public garbage bin	86%
Reuse	10%

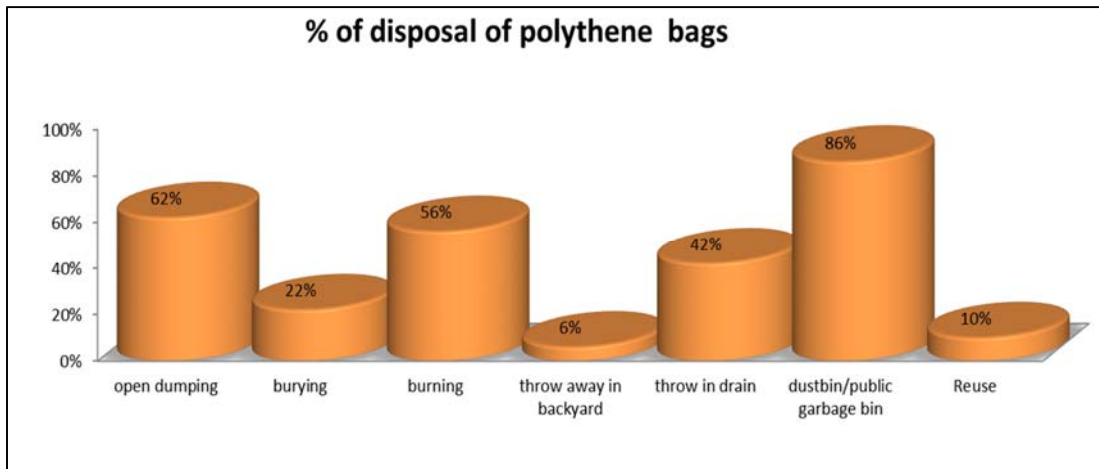


Fig 5

6) People in Guwahati city though they are using plastic bags in their daily life they still confronted that they are harmful for the environment. 100% responses shows that the people are aware of the fact that they cause problems to both man and environment. The table showing the problems as specified by the respondents:

Table 2

Problems	Percentage
Land/soil pollution	40%
Air pollution	34%
Sewage problems	37%
Artificial flood	92%
Water pollution	46%
Others	10%

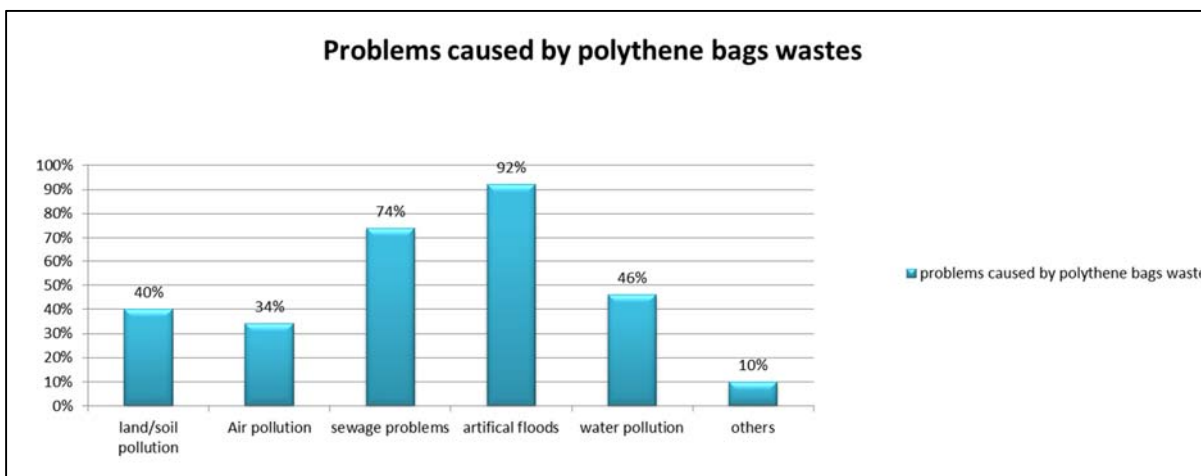


Fig 6.

7) The survey also shows that some of the conscious citizen of Guwahati uses other alternative to plastic bags. But the percentage that supports this fact is not satisfactory with only 38% uses such alternative while 62% are least bother. In this survey people have also highlighted another aspect of using plastic bags as the alternatives to plastic bags or other

bio-degradable are quite expensive in comparison to polythene bags.

Table 3

Responses	% of responses
Uses alternative to plastic bags	38%
Does not uses any alternative to plastic bags	62%

## 7.1 Cases Studies

### Case 1

A joint family of 10 members resides in Guwahati. The family usually does monthly shopping of grocery and weekly for their fruits and vegetables. They carry jute and other alternative bags for shopping in the market. However they do use plastic bag (often less than 40 microns) while buying bread, milk and sometimes fruits from the market. On weekly basis 35 plastic bags (on average) are used by the family. In fact they throw their garbage both organic and inorganic in plastic bag which is again less than 40 microns. On the average the family uses 4 plastic bags daily to throw their garbage in a day that make 28 bags/ week and 1,460 bags/year. This is the case of one family residing in the city Guwahati.

### Case 2

Another nuclear family residing in Guwahati with only 4 members has minimized the used of plastic bag by regular use of jute and other bio-degradable bags. In fact they throw their garbage separately (organic and inorganic) in garbage bag which is eco-friendly in nature. In spite of this they have to use plastic bag while purchasing certain fruits and vegetables which make 4/week i.e., around 200/year.

### Case 3

In another case, a family of one mother and two children in spite of the knowledge regarding harmful effect of plastic still continues to use plastic bag in their daily life. From shopping in daily basis to grocery and disposing of garbage the family use plastic bag for all purpose. In daily basis, the family uses 7 plastic bags/ day which make up to 49 bags / week. In fact the family disposes the garbage in the cheap quality polythene bags which is not bio degradable in nature.

## 8. Findings

- It has been found that people in Guwahati city use plastic bag in their day to day life. In fact it is regularly used with an average of 7 polythene bags a day. The study conducted by an NGO in the year 2014 had found that the amount of plastic waste generated in the state had increased from 1.8 crores kg per year in 2004 to 5.4 crores kg per year in 2014. but only plastic grocery bags used and disposed in 2016 found to be 34 lac kg(excluding plastic bottle, plastic sheets etc)
- Plastic bags are prefer to and used in every household in Guwahati basically for being easily available and convenience. Even the light in weight is also the cause behind its uses. Another interesting fact is that the elite sections of Guwahati are aware of its harmful effects and have reduced its uses and replace it with eco-friendly bags.
- From the study it has been observed that it is highly used for throwing garbage and shopping purpose. Some of the respondents have confessed that though they are aware of harmful effect of polythene bags still they used it. Some of them also claim that the vegetables or fruit vendors often give the things in plastic bags. The people have said that they don't use it for storing food materials
- From this study it can be concluded that people are still under the grip of using plastic bags. Even they can correlate the cause behind the throwing garbage in

plastic bags and pollution (land and water) and sewage problems. It has been seen that people have specify artificial flood as the main effect of polythene wastes followed by sewage problems, water pollution, land and air pollution. Lightweight plastic grocery bags are additionally harmful due to their tendency to be carried away on a breeze and become attached to tree branches, fill roadside ditches or end up in public drains, rivulet and river

- The case study of three families reveals an interesting fact that in spite of awareness regarding harmful effect of plastic people do use it. Case study 1 reveals that the family uses 35 plastic bags per week for various purposes and for disposing garbage the family uses 28 plastic bag /week. Although the family also use of jute and bio-degradable bags.
- In another case it shows that the small nuclear family uses 4 plastic bags /week. They stress on the use on bio-degradable bags like jute bag or cloth bags. In fact the family disposes the organic and inorganic garbage separately. However another nuclear family with only 3 members use 7 polythene bags per day on average (i.e., 49 bags per week) and use the polythene bags to dispose the garbage. They in fact do not dispose the garbage separately. This shows that where joint family use a maximum number 63 plastic bags (shopping and garbage disposal purpose) per week, a small family uses 49 plastic bags per week. This reveals usage of 4-5 bags on average by the 10 family member of joint family while the small family uses 15-16 bags by only 3 family members. Thus from this we can justify that the size of the family do not matter regarding use of plastic bags.
- Plastic especially that used in plastic bags is one of the major toxic pollutants of our times. Being composed of toxic chemicals and most importantly, being a non-biodegradable substance, plastic pollutes the air, water and soil. The noxious substances emitted from plastic bags seriously impairing the fragile ecosystem, these chemicals can cause an array of maladies ranging from birth defects, cancer, and nerve and immune disorders, to blood and kidney ailments.
- City officials blamed the destructive floods on plastic bags which clogged gutters and drains, preventing the rainwater from leaving the city through underground systems. By clogging sewer pipes, plastic grocery bags also create stagnant water; stagnant water produces the ideal habitat for mosquitoes and other parasites which have the potential to spread a large number of diseases, such as encephalitis and dengue fever, but most notably malaria.
- It has also been found that old and unwanted plastic bags are not always easy to dispose of. Plastic bags defy any kind of attempt at disposal, be it through recycling, burning or land filling. Plastic bags decompose very slowly, if at all. In fact, a bag can last up to 1000 years, inhibiting the breakdown of biodegradable materials around or in it
- A slow but encouraging trend has been seen that the people are opting for the eco-friendly and reusable bags like cloth bags, fiber or jute bags etc. The following are some of the feasible alternatives like Reusable bags and Biodegradable plastics. This is an alternative which can be reused many times for shopping. These come in

canvas, woven plastic fiber, hemp, cotton and even leather.

### 9. Suggestions

- The first and the best option for reducing plastic waste is to minimize single use plastics in your daily life.
- It is essential to reuse old plastic bags for multiple shopping trips. Even people should make habit to refuse a bag for things that you can easily carry.
- People should try to reduce the use of plastic bags by using reusable bags or eco-friendly bags. Use cotton, canvas and jute shopping bags as substitutes for shopping or any other purpose. In fact brown paper bags can be use to buy things such as rice, pulses, bread etc.
- Administration must make strict rules to get rid of these plastic bags. Government should make shops charge heavily for every plastic bag given out and collect it from them as addition tax on plastic. Furthermore the tax collected from these can be used to make bio-degradable bags.
- Educating the people regarding harmful effect of plastic in its any form is the best way to overcome the menace. Further creating awareness as how these harmful bags are deteriorating the environment and reducing the life shelf of the planet.

### 10. Conclusion

Plastic grocery bags have been a part of daily life. Unfortunately, the most common final resting place for garbage bags is the garbage bin, resulting in countless numbers of bags filling land and spilling over every other surface of the planet. In Guwahati the people are aware of its harmful effect to both health and environment but are still using it. The reason behind it is multi farious-the authority concerned has not been successful in imposing the ban, availability of lower grade plastic bags, and also in availability of eco-friendly bags. It is high time to think about our planet Earth for our survival. Plastic bags are creating various problems like sewage problems, flash flood, air and land pollution in Guwahati and in times to come these problems will became unmanageable if necessary measure are not taken. Thus the question of plastic bags ultimately comes down to the issue of use. If people are willing and able to use environmentally-friendly alternatives, such as reusable cloth or plastic bags, the use of plastic bags will reduce which will be way to safe and green environment.

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