

Scenario of Single use Plastic Ban in some Hotels, Restaurants and Vegetable Market of Nagpur City - A Case Study

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In today's world plastic is a part of everyone's life. According to American Chemistry Council primary data source, plastics generation was 35.4 million tons in 2017 in the United States, which was about 13.2 percent of total Municipal Solid Waste generation. Plastics makes thousands of products that add convenience, comfort and safety. Due to its light weight, strength and easily mouldable ability it is used as an ideal packaging material. It is also used in many sports to increase athlete efficiency and safety. It increases the efficiency and hygiene of medicines. It is also used in making surgical instruments. In spite of its many advantages one of the biggest disadvantage is, it will take 1000 years to decompose in Landfills. When it burns, it produces toxic gases which adds to environmental pollution. Plastics, when it dumped in water bodies it threatens aquatic life. Plastic does not allow the rainwater to seep into the ground. However, the plastic bags negatively affects environment and human health. 18 states have banned single-use plastic bags such as Maharashtra, Tamil Nadu and Madhya Pradesh. In most of the countries, bags of thickness of less than 50 microns are banned. In order to study the awareness about single use plastic ban in Nagpur City, we conducted survey of some Hotels, Restaurants, Vegetable markets and Grocery shops. From the survey it has been observed that though people are knowing about plastic ban but still plastics bags are used in markets illegally.

Introduction

Plastics are usually synthetic or semi synthetic organic. Plastics has very high molecular weight and it can be mold into solid objects of many shapes and sizes. Plastics generally include a main chain organic; Side linked molecular groups, some organic, inorganic blends added as additives, plasticizers and fillers [1]. Plastic is used for packaging, household consumer products, electronics products, automobiles parts, agriculture, building construction, water transportation, telecommunication equipment's, transportation and medicine. Household plastic waste generated from carry bags, kitchen storage utensils, decorative items and other kitchen electronic equipment's which is non-biodegradable. Also, due to the abrupt development in electronic industry, the use of plastic has increased because of manufacturing of electronic integrated circuit, chips, printed circuit board and LED's [2]. If plastic waste is not properly managed then, it will have harmful effect on human life and animal's life. There will be clogging in the flow of river and ocean water. This is also very dangerous for aquatic life as it will cause direct ingestion and inhalation of chemicals coming out from plastic [3]. Population of India is almost the same as of China, but the demand of polymer in India is one-fifth than that of China, showing the potential growth of plastic industry in India [4]. According

to American Chemistry Council primary data source, plastics generation was 35.4 million tons in 2017 in the United States, which was about 13.2 percent of total Municipal Solid Waste generation [5].

In United States, even though they collect almost 100% of the most common type of plastic, polyethylene terephthalate, or PET (soda bottle), only about 30% is recycled. The situation is worse in developing countries, where the global economy has brought a flood of plastic into places without adequate waste management and finally plastic goes to a landfill [6].

History of the plastic

Bakelite is the first Synthetic plastic which is produced in year 1907 by Belgian born chemist, Dr. Leo H. Baekeland, by reacting phenol and formaldehyde under pressure using a catalyst as hexamethylenetetramine. Rapid growth in global plastic production was not realized until the 1950s. In next 65 years, annual production of plastics increased to 381 million tons in 2015 which is equivalent to two-thirds of the world population.

Advantages of plastics

Plastics makes thousands of products that add convenience, comfort and safety. Its light weight, strength and easily moldable ability it is used as an ideal packaging

material. It is used in making of Sports materials to increase athlete efficiency and safety. It is increasing the efficiency and hygiene of medicines [7].

Global plastic generation scenario

Global primary production of plastic was 270 million tons. Plastic waste generated within 50 kilometers in coastal regions which is amounted to 99.5 million tons. The Plastic waste which is improperly managed is 31.9 million tons and 8 million tons entered in the ocean. The amount of plastic in surface waters ranges from 10,000s to 100,000s tons.

How do we dispose of our plastic?

Before 1980, recycling and incineration of plastic was very less or negligible and 100 percent of plastic was discarded. From 1980, the rates of incineration and recycling are increased by about 0.7 percent per year. In 2015, about 55% of global plastic waste was discarded, 25% was incinerated and only 20% was recycled [8].

Which sectors used most plastic?

The largest field which uses plastic with a remarkable extent is Packaging industry which contributes to the new employment in many countries.

How plastic affects wildlife and human health

Plastic debris affects wildlife by three key pathways:

- ✓ Entanglement: Trapping of marine animals by plastic debris
- ✓ Ingestion: Unintentionally and intentionally ingestion of species containing plastic
- ✓ Interaction: It includes collisions, obstructions, abrasions or use as substrate
- ✓ Plastic bags containing toxic chemicals can damage the blood cells and tissues

The impact of China's ban

For managing global plastic waste, many developed countries export plastic to middle or low-income countries. High income countries sell their plastic waste to China like countries for effective waste management. China and Hong Kong have imported 72.4% of global plastic waste. In year 2017 China introduced a complete ban on the imports of non-industrial plastic waste [9].

How it affects environment

- Plastic bags are polluting land and water.
- Due to their lightweight, plastic materials can flow long distances by water and wind.
- Most of the plastic bags are made up of polypropylene which is derived from petroleum and natural gas. It contributes to global climate change and global warming.
- The production of nine plastic bags are equivalent to energy which is required to drive a car for a distance of one kilometer (more than 0.5 miles).

- Since plastic bags are non- recyclable, they finally end up into the oceans.
- When they reach upto the ocean, they break up into very tiny little pieces and which can easily be consumed by wildlife.
- Congesting their digestive system lead to health issues [10].

Issues related to plastic waste in India

1. Volume of Plastic waste produced
2. Involvement of Child Labor (Rag pickers)
3. Ineffective Legislation
4. Lack of infrastructure
5. Health hazards due to lack of awareness for processing
6. Poor awareness and sensitization
7. Reluctance of authorities' involved
8. High cost of setting up recycling facility
9. Lack of research
10. Plastic-waste policy and regulation

Plastic ban is not the solution to the problem but how to manage it is the biggest challenge. Most of the plastics are dumped into the environment and some end up in either landfills or oceans. Great Pacific Ocean is one such area which is negatively affected with all the plastic material. The more they are thrown into the oceans the more they increase causing the garbage patch to increase in size. In 2018, Arabian Sea of Mumbai omits 9000 tons of trash or waste which converts Mumbai beach to dumping yard [11]. Looking to this we with our first year students of G. H. Rasoni college of Engineering, Nagpur have conducted the survey of hotels, vegetable shops and grocery shops of Nagpur city to check the mentality of public towards plastic ban. Following are the questions asked during survey.

Experimental

Survey questions

1. From how many years you are involved in this field?
2. Are you aware of Ban on Plastic?
3. Are People bringing their own bags while visiting your shop?
4. Are you aware about the amount of fine charged for plastic use?
5. Approximate % of people bringing their own bag?
6. Approximate % of people demanding for plastic bag?
7. From where you purchased this plastic though it is banned.
8. Are you aware of harmful effects caused due to plastic waste?
9. Are you charging extra for plastic bag?
10. Ban on plastic is good or bad?
11. Do you know in which year ban was declared?
12. How many people are bringing their own water bottles coming to your hotel?
13. What you are doing with used plastic water bottles?

14. To whom you are giving plastic waste?
15. Though Plastic is banned by Government why you are using?

Data collection

The activity was planned after finishing the classes. The subject teacher explained the questionnaires, nature of the survey and how the data is to be collected. The data collections process was performed by the students. The students were invited in a 2-3 students group to participate in the survey and were told to collect the data of questionnaire by visiting home to home. As a project student's participation and their responses would be kept confidential. After survey questionnaires were handed to the teachers, for compilation of data from various locations of Nagpur city. The all information were the compiled in Google sheet.

Results and discussion

Table 1. Data analysis on plastic water bottle used in Hotels/Restaurants.

S.No	Hotels/Restaurants Visited	Use of own Water Bottle
1	Ashoka Imperia, Nagpur 1	10
2	Babbu Biryani, Nagpur	0
3	Bombay Biryani Restaurant	0
4	Bombay Chicken Biryani, Near Hingna T Point Nagpur	0
5	Cafe 8, Nagpur	0
6	Cafe Aeolus, Nagpur	10
7	Cookie, Nagpur s	0
8	Dominos (Sitabuldi Eternity Mall), Nagpur	100
9	Goli No. 1, Hingna Road, Nagpur	15
10	Guptaji Hotel	50
11	Gurudev Kirana Store	60
12	Haldiram Thaata Baat Restaurant (Sitabuldi)	30
13	Hotel Ganesh Sagar	0
14	Jagat Restaurant(Sitabuldi)	0
15	Khalsa Hotel(Sitabuldi)	40
16	Khichidi Wala, Nagpur	0
17	Kings of Thali, Nagpur	0
18	Median Grill, Nagpur	0
19	Mocha Cafe And Bar	0
20	Nisarg Hotel, Nagpur	20
21	Nusta Chai, Nagpur	0
22	Pav Bhaji Center, Nagpur	70
23	Pizza Hut (Eternity Mall Sitabuldi), Nagpur	30
24	Shankar Bhojnalaya (Sitabuldi), Nagpur	60
25	Sri Gowri Shankar, Nagercoil, Trivandrum Road, Nagpur	20
26	Suhana Kitchen, Nagpur	60
27	Swara Foods, Nagpur	0
28	Tomesh General Store, Hariganga, Nagpur	8
29	Truly Sandwich Club, Nagpur	0
30	Underground Hotel, Nagpur	0
Average		37.61%

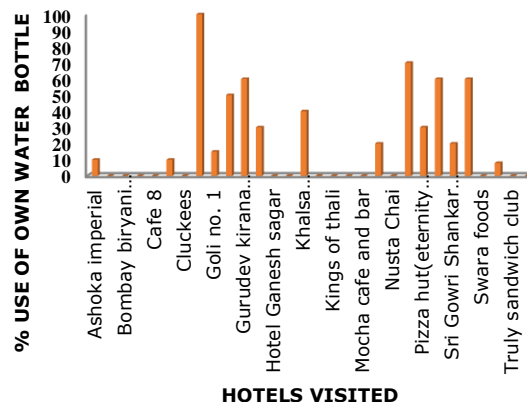


Fig. 1. Data analysis on plastic water bottle used in Hotels/ Restaurants

Table 2. Data analysis of Single Use Plastics in Grocery.

S.No	Names of Grocery Shops Visited	% Carrying Own Bags	% Demanding Plastic Bags
1	Hariganga Market	65	30
2	Aaryan Grocery Shop	75	20
3	Waghmare Grocery Shop	55	30
4	Om Grocery Shop, MIDC	1	20
5	Lanje Grocery Shop	50	40
6	Priya Grocery Shop, Hingna	15	75
7	Laxmi Grocery Shop	50	50
8	Lanje Grocery Shop	50	30

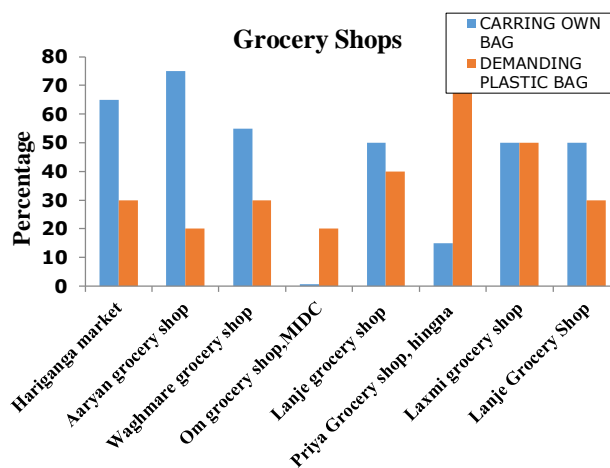


Fig. 2. Data analysis of Single Use Plastics in Grocery Shops.

Table 3. Data analysis of Single Use Plastics in Vegetable Shops.

Sr. No	Names of Vegetable Shops Visited	% Carrying Own Bags	% Demanding Plastic Bags
1	Jagdish Vegetable Shop	0	55
2	Hingna Vegetable Market.	90	10
3	Vegetable Shop	95	10
4	Vegetable Shop	99	1
5	Vegetable Market Bardi.	75	25
6	Vegetable Shop, Bardi	1	10
7	Kamla Vegetable Market	90	10
8	Road Side Vegetable Shop	90	10
9	Gokulpeth Vegetable Market	20	90
10	Digdoh Vegetable Market	30	70

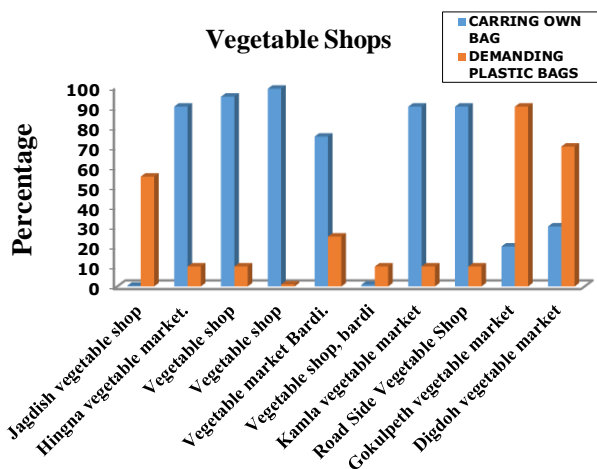


Fig. 3. Data Analysis on Single Use Plastics in Vegetable Shops.

Table 4. Data Analysis on Single Use Plastics in Grocery Shops.

Sr. No	Names of Kirana Shops Visited	% Carrying Own Bags	% Demanding Plastic Bags
1.	Sahi Kirana Store	1	5
2.	Gupta Kirana, Gayatri Nagar, Nagpur	100	0
3.	Shubham Kirana Stores	15	85
4.	Khapre Kirana Stores	95	5
5.	Jamal's Bai Kirana Stores	80	20
6.	Purushottam Kirana Stores.	5	90
7.	Shrikrishna Kirana and General Stores	60	40
8.	Jaiswal Kirana Stores	75	25
9.	Umesh Kirana and General Store Hingna	75	25
10.	Gopal Kirana Stores	10	90
11.	Vishnu Kirana Store	10	90
12.	Yash Kirana Store	30	75
13.	Ashok Kirana	80	10
14.	Mansi Kirana Stores	60	5
15.	Dia Kirana Shop	70	20
16.	Jain Kirana, Hariganga	30	65
17.	Shakti Kirana Store	80	15
18.	Aditya Kirana Store	90	5
19.	Lalit Kirana Store, Krishna Nagar	15	85
20.	Pooja Kirana, Sarkar Nagar	60	35
21.	Singh Kirana Store	20	60
22.	Shivam Kirana Store	75	20
23.	Gurudev Kirana Store	40	50

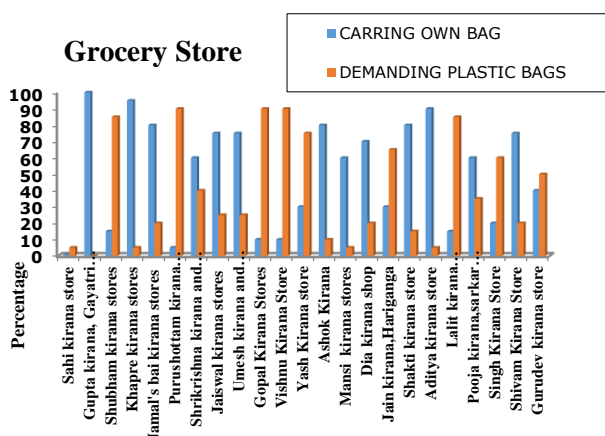


Fig. 4. Data Analysis on Single Use Plastics in Grocery Shops.

Conclusion

- On the basis of survey study it has been conclude that, most of the Hotels, Restaurants, Grocery, Vegetable and Grocery shops owners are aware about the ban of plastic, also about the amount of charged fine for plastic use in Nagpur City.
- Around 40% of people are bringing their own water bottles while coming to Hotels and Restaurants in Nagpur City.
- Approximate 45-66% of people bringing their own bag in market while shopping and approximate 30-40% of people demanding for plastic bag in Grocery, Vegetable, and Restaurants in Nagpur City.
- Peoples are aware about the adverse effect of Plastic, hence are happy with ban on plastic. As there is no alternative to plastic they are using plastics. Plastic should be banned by Government strictly in every City, also should provide the alternative to plastic.

Suggestions

1. As people are not segregating waste, particularly plastic waste intentionally or unknowingly, they should be charged/fined so that, they will take this issue seriously and should understand its future consequences.
2. NMC (Nagpur Municipal Corporation) should start accepting plastic waste separately as it is non-biodegradable waste and this should be strictly followed.
3. Special printed instructions are available on most of the plastics now a days. The printed instruction is, one can return 1Kg of such plastic at the rate of 15 Rs.
4. NMC should conduct awareness programmes on regular basis not only in different areas but also in schools, colleges and organizations. So that, if our youth is aware then they will make our country aware.
5. Vendors, those are still using plastic should be fined or Government should cancel their licence.
6. Government should take project making competitions for college students on this current issue i.e. technology for management of plastic waste.
7. Government should work on new technologies for recycling of plastic waste.

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Keywords

Single use plastic, plastic bags, bioaccumulation, environment.

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