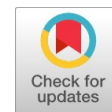


Challenges of Plastic Waste and It's Recycling, A Threat to Environment: A Case Study of Kanpur City



Arti Vishnoi, Akansha Dwivedi

Abstract: Materials and manufactured products process which fluctuate the balance of their production and rate of destruction are usually led to retrogression in the environment. Plastic products are considered one such material which gives rise to a big threat towards environment. A huge-huge amount of plastic in many forms is produced and dropped into the environment and naturally the homeostatic process of environment is itself unable to degrade the material produced with that's why plastic recycling is an important issue in present scenario of the society. Un-organized recycling and non-biodegradability of plastic products produce the degree of devastation to the environment and the consequences of devastation are directly proportional to the health and life expectancy of mankind. This paper tries to deal with the investigation about the challenges of plastic waste as well as plastic bags that turns into a threat to the environment. Mostly, plastic waste is considered recyclable, but with the passing of time it is noticed that recycled products are proved more harmful to the environment so it is crystal clear that recycling is not more sheltered and permanent solution for the plastic waste disposal.

Keywords: Retrogression, Unorganized Recycling, Reprocessing, Life Expectancy, Non-Biodegradability

I. INTRODUCTION

The chemical origin of Plastic that makes it a synthetic material is a burning point of discussion these days. Plastic in its lighter form can be transformed into multifarious shapes and sizes and in its harder form too it is partially stretchable or elastic.

Plastic is generated from various sources like natural gas, coal and petroleum. Plastic has certain distinctive properties for ex: its light weight, lower cost of manufacturing and selling, its durable, robust, renewable nature and since it contains versatile fabrication and designation properties, so it is widely used in marketing, household, economic and business activities like packing, construction, transportation, electronics and automobiles etc. And therefore because of its beneficial applications in varied arenas as mentioned above, its utility is unequivocally un-doubtable.

Putting aside the advantages of plastic material, the focus has now shifted to the challenges or the issue in relation to its disadvantageous consequences. Plastics have deleterious impact on health and environment. For instance, plastics are not ideally degradable, so they automatically lead to deterioration of environmental stability. Also, plastics contain venomous constituents which are immobile in nature; this further intensifies the problem of environmental degradation. Hitherto Management of plastic waste and finding out varied alternatives as its solution should be thought of and worked upon soon.

II. AIMS & OBJECTIVES

- To make people aware about recycling and its impact on environment
- To optimize the plastic waste collection and generation system
- To suggest ideas to handle the environmental issues caused by plastic waste
- To focus on health risks of mankind due to plastic pollution
- Purpose to identify the challenges and threats to atmosphere

III. REVIEW OF LITERATURE

(Hatem Alhazmi, 11 May 2021) [3] This journal aims to give an idea about the prospect of life cycling assessment of waste and help to manage the framework of waste management system because plastic has changed the essence of living standard at a very high level. (Khattak) [4] According to this report plastic products have been proved too risky to use in daily life routine it makes the ample of environment issues including lithospheric, atmospheric and hydro spheric as well.

IV. METHODOLOGY

Relevant information will be consulted from the different sources to collect literature, reports, publications and articles based on the topic of this paper. As the study is mainly based on empirical data it will be collected from various secondary and primary sources. To know the reality about the plastic waste and disposal system and its impact on human health & life expectancy.

Primary sources: - The primary data will be collected from personal observation

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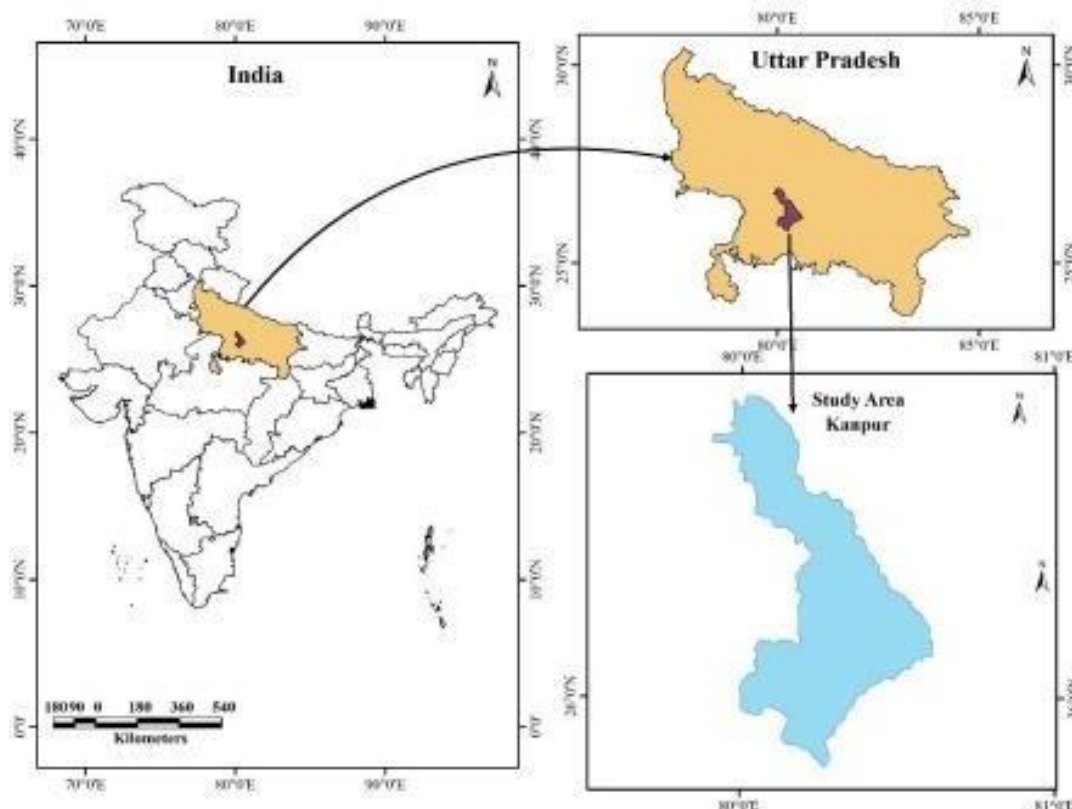
Secondary sources: - Secondary data related to plastic waste and its impact on environment will be collected from published and unpublished records, Government offices and private agencies. Published data, reports will be collected from the Census office, Nagar Nigam, NGO, CPCB and other government authorities, media and also through mobile applications.

Field verification and updating:

- 1) Fulfill the status of spatial temporal profile and all other framework in interview schedule. All parameters of urban planning and plastic waste management will be fulfilled through the answers of respondents on perception regarding the impact of these activities.
- 2) Identification of measures and solutions for the development of the city in keeping mind the environmental factor.

V. STUDY AREA

Kanpur city ($26^{\circ} 28' 15''$ N latitude and $80^{\circ} 23' 4''$ longitude), the industrial capital of Uttar Pradesh, occupies a very important position in Northern India. It is situated on the right bank of the River Ganga. It is located in upper Ganga Plain and covers an area of about 298.98 km². It is divided into three main physiographic Zone i.e., Central, Northern well drained zone along River Ganga and Southern ill drained zone). Administratively Kanpur city has been divided into 110 wards. Besides Municipal Corporation, Kanpur urban agglomeration includes Kanpur cantonment, Armapur industrial state, Northern railway colony (Census town), Rawatpur station yard (out Growth), Chakeri (Census town) and Indian Institute of technology.



VI. RESENT SCENARIO OF THE STUDY OF PLASTIC WASTE OF KANPUR CITY

The field study at Kanpur city was conducted at Panci Bhausing dumping ground. The total MSW generated at Kanpur was about 1600 MT/day. The average total plastic waste generated was about 66.86 Kg/MT given below during the field survey it is observed that the majority of plastic waste generated on HDPE/LDPE materials like carry bags, bottles and multilayer plastics. The minimum plastics waste generated of about 51.78Kg/MT and maximum of about 94.08 kg/mt.

SERIAL OF DAYS	PET	HDPE/LDPE	PVC	PP	PS	OTHER	TOTAL
DAY 1	4.3802	53.15	3.5102	7.0022	0.9582	2.9682	71.969
DAY 2	4.236	40.196	8.17	2.08	0.38	1.24	56.302
DAY 3	3.366	48.708	7.98	7.02	0.44	1.03	68.544
DAY 4	8.36	45.68	4.262	8.54	0.34	3.442	70.624
AVAERA GE	5.0856	46.934	5.9806	6.1606	0.5296	2.1701	66.86

SOURCES: - CPCB Ministry of environment, forest and climate change.

VII. CLASSIFICATION OF PLASTIC WASTES

Now-a-days plastic has become an age an era every aspect of life depends on products manufactured with plastic materials. Plastic is being used in many forms all of us are used to prefer plastic as a daily basis tool. The plastic constitutes two important categories that are Thermoplastics and Thermoset plastic. The material that shapes the plastic products can be divided into seven types which is basically based on properties and applications.

Sr. No.	Source Code	Name of Plastics	Few Applications
1	PET	Polyethylene Terephthalate	Drinking water Bottles, Soft drink Bottles, food jars, jelly pickles, Plastics films, sheets
2	HDPE	High Density Polyethylene	Plastic bags, Food containers, woven sacks, Bottles, Plastic toys, Milk pouches & Shopping bags, Metalized pouches
3	PVC	Polyvinyl Chloride	Pipes, hoses, sheets, wire, cable, insulations, multilayer tubes
4	LDPE	Low Density Polyethylene	Same as number 2 HDPE
5	PP	Polypropylene	Disposable cups, Bottle caps, Straws
6	PS	Polystyrene	Disposable Cups, Glasses, Plates, Spoons, Trays CD covers, cassette boxes, foams
7	OTHER	Thermoset, Polycarbonate Polyurethane FRP	CD, Melamine Plates, Helmets

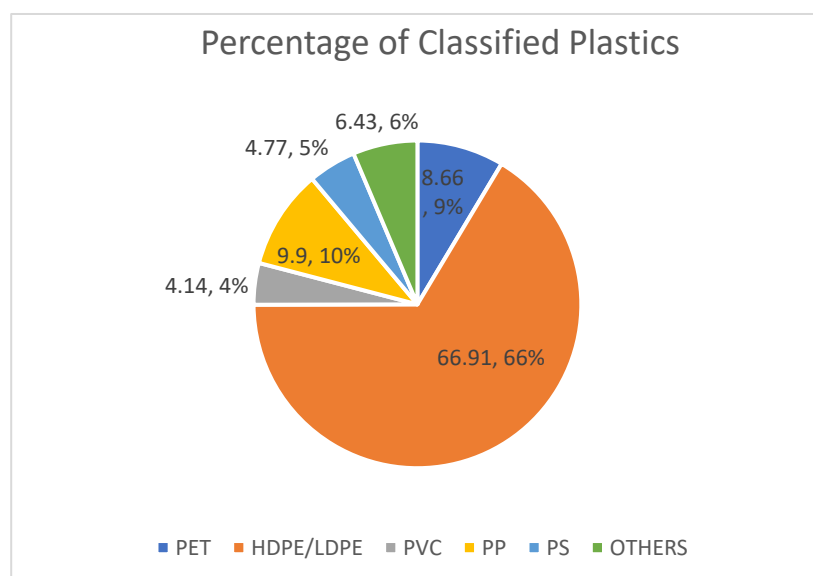
SOURCES: - CPCB Ministry of environment, forest and climate change

VIII. PERCENTAGE OF RECYCLABLE & NON-RECYCLABLE CONTENTS

As per the report of Central Pollution Control Board (CPCB) presents the assessment and quantification of plastic waste generation in MSW In 60 Cities of India including Kanpur suggests out of total plastic waste, thermoplastics content is about 94% (recyclable) and rest 6% belong to family of others including thermoset plastics (non-recyclable) [1] [2]. The details of classification of different constituents of plastics waste are given below.

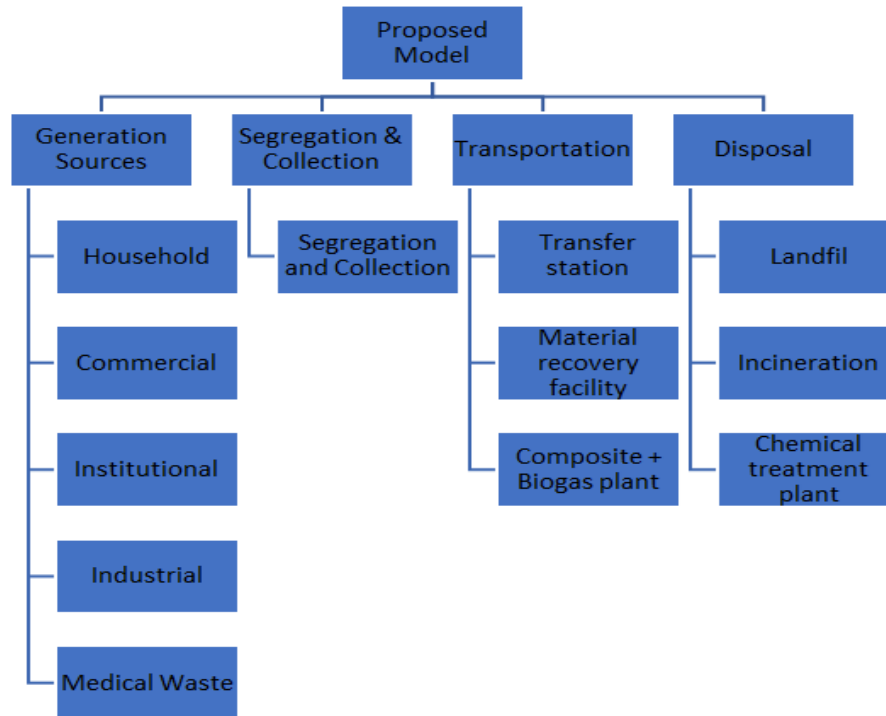
Sr. No.	Description	Total Percentage Obtained
1	PET	8.66
2	HDPE/LDPE	66.91
3	PVC	4.14
4	PP	9.9
5	PS	4.77
6	OTHERS	6.43

Percentage of Classified Plastics



IX. COMPONENTS OF PLASTIC WASTE COLLECTION, TRANSPORTATION & DISPOSAL

To reduce the noxious effects of plastic wastes on the environment and human health it is high time to pay attention on the waste management and make all the efforts to strengthen the mindset of public towards management of wastematerials. For universal reduction of plastic litters, oceanic pollution all of us should focus on to the improvement in proper plastic waste collection, treatment and disposal. Inappropriate behavior and unsystematic management of dumping sites. The study through this research paper observed that the main technique used for waste collection is that municipal authorities and hired vehicles operated in all over the city on daily basis to collect the waste from the bins which are located for the whole community. Residents of a particular deposit the waste in their community bins that process runs into the whole city municipal vehicle collect the material from community bins and transport it to the dumping sites. Landfills and dumping sites weigh the waste and categories before disposal. The above discussion reveals that now-a-days it is very common in few cities that prefer house to house collection system. For Kanpur city it is better to keep in mind the present scenario of the city faces no organized management of landfill sites in most sensitive area of Kanpur even that main highway road is suffering from the damage of dumping in open areas.



X. RECYCLING OF PLASTIC WASTE AND IT'S DAMAGE TO THE ATMOSPHERE

The recycling of plastic waste has always been considered as the best solution for the betterment of plastic waste. Dimensions of recycling in plastic industry increasingly increased. The famous quote, "Excess of everything is harmful." Fits on the process of recycling rapidly growing recycling process presents a lot more challenges to our atmosphere the recycled products have long durability and theyproved more dangerous to the environment than former product. Plastic is discarded once it will remain on earth surface for several years. Most of the plastic waste already has the quality of recycling and uses 4R method at least but recycled products of plastic are more toxic to the environment as thus contains and harmful findings. It is noticeable that many times of recycling reduces the life span of the product and deduct its quality. The mechanical and chemical process of recycling emits harmful gases in the environment that lessens the life expectancy of mankind put human health in risk. Recyclable waste that contaminated is typically too difficult to clean such a greasy product. Recycling procedure emits methane, carbon dioxide that make the atmosphere suffer suffocation and result into the

destruction of human life, so this is high time to find the substitute of recycling for long term survival and safety of environment as well as of human being.

XI.DISPOSAL OF PLASTIC WASTE AND USAGE OF PLASTIC BAGS: A THREAT TO ENVIRONMENT

Plastics present many problems beside being non-biodegradable. These include: They are incombustible, pollute the atmosphere at a staggering rate, and cannot be safely burned. Plastics are killing wildlife when they are mistaken for food, and stick in the body until the bird or animal dies of starvation. There are many harmful effects of plastic bags:

- Dangerous to animals
- Non-Biodegradable
- Drainage blocking caused by plastic bags
- Plastic pollutes marine resources
- Plastic releases harmful gases & toxicant to the environment
- Resort many diseases for human being

- Fertility of soil is also affected by the unsystematic disposal of plastic waste
- Process of product manufacturing releases harmful gases such as Carbon monoxide, Formaldehyde etc.
- Multilayer pouches and other thermoset portray disposal problems
- Indiscriminate dumping of plastic waste leaches toxic metals into underground water.

In a study it is found that 100,000 animals are killed annually by the usage of plastic bags and more often oceanic animals confused for their food with plastic bags and ingest them as their meal and the worse condition is that ingested plastics will remain intact even after the dead animal decomposes those harms other animals as well. A 2016 Ellen MacArthur Foundation's The new Plastics Economy Report points that continue dumping of plastic bags into the environment which end up into the water bodies will make the ocean to have more plastic bags than fish by 2050. Plastic takes up many years to get completely decomposed. In fact, all the plastics which has ever been manufactured still lingers in the environment. Studies have also shown that plastic bags are being used for the packaging of food releases harmful effects on food that causes lots of diseases like asthma, diabetes, toxicity, obesity, ulcers and cancer too.

XII. SUGGESTION

- As we all know that households are the biggest generators of plastic waste material, so we should first begin to segregate plastic from our home and office waste.
- Wanderers should sell all dry-waste, papers and reduce the usage of single use plastic.
- All the office or college going persons including daily travellers are required to carry their water bottles.
- Environmental education and awareness about our green planet can play vital role to save it from damage caused by plastic scrape to the atmosphere.
- The coastal state or cities situated on the bank of rivers are throwing their waste in water bodies that reciprocate many waters borne diseases so that is necessarily required not to dump waste material into sea or river water.
- We are on the stage where it is very important to find an alternative of recycling because recycling is not a safer and permanent solution for plastic waste.
- Landfills & dumping sites where plastic degrades and leaches into soil and make harmful step to the food chain.
- We can be saved from the retrogression of plastic only by reducing its use and lessens dependency on it.
- We should not burn a large amount of plastic waste burning of this material release GHG emissions into the atmosphere.

XIII. CONCLUSION

The above study ends with the concluding remark of how plastic should be disposed and recycled products have what type of deterioration and their impact on environment through destruction of mankind. As we all are getting the fact by and by that plastic products whether it is recycled or of single used all have a very high intensity of poisonous gases to toxic the atmosphere. The whole world not only a

city like Kanpur needs the public support and awareness about their environment and factors causing damage to it. Reducing the usage of single used plastic and find eco-friendly alternative of recycling as well as of plastic products is as important as living and breathing on this planet. This paper consists of all the information and awareness about usage and disposal of plastic waste and its harmful impact's on environment as well as on earth surface.

REFERENCES

1. (Jan 2015). *Assessment and Characterization of plastic waste generation in sixty major cities*. CPCB Ministry of environment, Forest and Climate Change.
2. (n.d.). *city sanitation Plan For kanpur*. Kanpur Nagar Nigam.
3. Hatem Alhazmi, F. H. (11 may 2021). Plastic Waste Management: A Review of Existing Life Cycle Assessment Studies. [CrossRef]
4. Khattak, D. M. (n.d.). *Plastic Waste Literature Review*. Internet Public Library.

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