

# Sustainability of Single-Use Plastic



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## Abstract

Plastic, a miracle material is a hygienic, lightweight and resistant material which can be moulded in a variety of ways and utilized in a wide range of application. Plastics have been used in solar panels and wind turbines for the clean energy and in the health sector as well as for the storage of safe food.

Plastics have become one of our planet's greatest environmental threats even though it has made our day to day life convenient. It's cheap and ubiquitous. Accumulation of plastics on our beaches and oceans has become a global tragedy. Due to the human error plastics waste is clogging our drains, breeding diseases and also it is ingested by marine wildlife.

Plastics packaging is the major contributor of the globally generated plastic waste. Single-use plastics is not easily disposable. Many formats and types of plastic exist, almost all needing an average 1,000 years to decay; in other words, they will be floating around to see another millennium. The worst scenario is that we've only used many of these plastics a single time before throwing them away.

Now due to growing global awareness, many countries are coming forward and taking initiative to get rid of single use plastic pollution. Rwanda has become the first country to ban single-use plastic bags. Kenya has also banned the single-use plastic and there by cleaning its national park and saving its cows from swallowing the carry bags.

The global initiative and action against single-use plastics waste will be painless and more profitable comparing the costly downstream costs of pollution. This will also pave the way for the future global green economy for the world. This miracle plastics material needs to be use in a smarter way so that it should not become the global crisis.

The plastics production has increased by leaps and bounds over the last century because the plastics manufacturing process is easy, and plastics material is cheap. Globally the plastics waste generated is uncontrollable and we need to evaluate the processing methods, use and waste management. This will require innovation in plastics technology, more regulation through government and citizens to act smartly for prevention of single – use plastics pollution.

This paper will be handy and provide the guidance to the governments/Key decision makers for the strategic decision of regulation of single – use plastics production and waste management.

**Keywords:** Plastics, Plastic Bags, Single – use plastics, Plastics Waste.

## Introduction

Normally the Single – use plastics/ disposable plastics (used for plastics packaging) are used only once before throwing away them or recycling. The commonly used items are disposable cups, containers, plastics bottles, plastics straws, grocery bags, food packaging etc.

## Objective of the Study

Protecting the environment from single- use plastics without jeopardizing the economic growth of the country and providing the useful information to the key decision makers for regulation of the production and the use of single – use plastics.

There are two main categories of plastics:

## Thermoplastics

The most common Thermoplastics are: Polyethylene Terephthalate (PET), Polypropylene (PE), Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE), Polystyrene (PS), Expanded Polystyrene (EPS), Polyvinyl-chloride (PVC), Polycarbonate, Polypropylene (PP); Polylactic acid (PLA) and Polyhydroxyalkanoates (PHA). Thermoplastics are a family of plastics that can be melted when heated and hardened when cooled. It can be reheated, reshaped and frozen repeatedly.

**Thermosets**

Thermoset plastic is a polymer which turns into solid after heating, having primary bonds between molecular chains and held together by strong cross linking after curing and does not soften on heating.

Some examples of Thermoset plastics are

Urea-formaldehyde (UF) resins, Phenolic resins, Epoxy resins, Silicone, Polyurethane (PUR), Acrylic resins.

Main polymers used in the production of single-use plastic are as below:

**LDPE (Low density Polyethylene)**

Bags, trays, containers, food packaging film.

**HDPE (High density Polyethylene)**

Milk bottles, freezer bags, shampoo bottles, ice cream containers.

**PET (Polyethylene Terephthalate)**

Bottles for water and other drinks, dispensing containers for cleaning fluids, biscuit trays.

**PS (Polystyrene)**

Cutlery, plates and cups.

**EPS (Expanded Polystyrene)**

Hot drink cups, insulated food packaging, protective packaging for fragile items.

**PP (Polypropylene):** Microwave dishes, ice cream tubs, potato chip bags, bottle caps.

The plastics packaging is the major contributor (about half) of the plastics waste. America, Japan and European union are producing highest plastic packaging waste per capita. The plastics production has been highest among other material from last 69 years.

**The Plastics Age-Why We Need To Change**

As per the current scenario the plastics waste management system is imperfect. If we go by data then only 9% of the 9 billion tonnes of plastic has been recycled and most of the plastics will remain in environment which can not biodegrade and thereby turns into smaller particles which is called micro plastics which pollutes water, soil, marine life etc. if the present condition keep on then by 2050, 12 billion tonnes of plastics waste will be available to pollute our environment and 20% of world's total oil consumption will be used for plastics production.

Consumer behavior is also a major cause for polluting the environment. The throwaway culture has added the problem of pollution as the consumer need to understand that plastics waste can be converted into useful products.

There are many problems which are generated in the environment by the plastics waste. The carry bags chokes the city drainage system and water way and thereby city gets flood. Clogging of sewage system by plastic carry bags helps in generation of mosquitoes and pests which helps in increasing the vector-borne diseases like dengue, malaria etc. Many of the marine mammals, turtles and seabirds are being killed by plastics marine waste every year. In some of the countries the plastics waste is burned which releases toxic gases like furan and dioxin.

Economic impact of plastic waste on marine ecosystem is \$13 billion every year. The coastal municipality in Europe feeling the burden of €630

million per year and in asia pacific region plastics waste costs \$1.3 billion every year so this is now clear that due to above mentioned reasons of health, environment and economics we need to rethink on our plastics waste strategy and to act immediately.

**Recommendations and Key Findings**

Some of the recommendations which the govt. can use to improve the existing situation:

1. Improvement in the collection of the plastics waste management system.
2. Consumer behavior and habits need to change through incentive schemes.
3. Manufacturers should be held responsible to take back the plastics waste generated by their products.
4. Follow up of strong policy for the circular economy of the plastics.
5. More research and development activities should be initiated for the alternative of plastics material. In most of the world now (more than 60 countries) ban on the single-use plastics and products like Styrofoam have been started.

**Roadmap for Governments**

The governments can follow the 10 – step roadmap as given below:

1. Single-use plastics (Target the most problematic).
2. Consideration of the best action to root out the problem.
3. Assessment of the potential social, economic and environmental impacts (positive and negative) of the preferred short-listed instruments/actions.
4. Identification and engagement of key stakeholder groups.
5. Public awareness.
6. Promote alternatives.
7. Provide incentives to industry.
8. Use revenues collected from taxes or levies on single – use plastics to maximize the public good.
9. Enforce the measure chosen effectively, by making sure that there is clear allocation of roles and responsibilities.
10. Monitor and adjust the chosen measure if necessary and update the public on progress.

**Roadmap for Policymakers**

The 10-step roadmap draws upon the experiences from different countries that have already implemented bans and levies on single-use plastics (primarily plastic bags and Styrofoam)

1. Assess baseline conditions: An assessment of the baseline conditions can help to gain a clear understanding of the issue to be corrected.
  - Identify the most problematic single-use plastics that require government action.
  - Assess current causes
  - Assess extent
  - Assess impacts
  - Evaluate consumers' willingness to pay
2. Evaluate the appropriateness of possible actions
  - Regulatory
  - Voluntary
  - Economics
  - Combination
3. Assess sustainable development impacts
  - Social

- Economic
  - Environmental
  - Engage stakeholder
- Acceptance from the broadest range of stakeholders is of utmost importance and can be ensured through calls for early inputs, policy discussion meetings, and wide-reaching awareness campaigns.
4. Special attention should be paid to mapping the main stakeholder groups that will be affected by the new policy. The most common stakeholder groups that might be engaged from the onset include:
- National and local government entities
  - National waste management authorities
  - Local waste management officers
  - Trade and industry associations
  - Single-use plastic producers
  - Retailers
  - Individual citizens and organized civil society groups
  - Environmental NGOs
  - Tourism associations
  - Raise awareness
5. Evidence shows that resistance is likely to decrease if consumers are aware of the social, environmental and economic impacts of mismanaged single-use plastics. These can be communicated through a variety of methods, ranging from:
- Educational programmes
  - TV adverts
  - Extensive multi-media awareness-raising campaigns (TV, radio, newspapers, social media.)
  - Door-to-door campaigns (this type of awareness raising has proven particularly successful in small towns, communities and islands).
  - Development and distribution of information material.
  - Showcasing and/or distributing alternative options to single-use plastic (reusable bags, reusable bottles, etc.)
  - Campaigns should have a clear and simple message, relevant for a wide range of stakeholders.
- Campaigns should explain
- Why the policy being introduced?
  - What are the expected benefits?
  - Are here punitive measures?
6. Support uptake of eco-friendly alternatives
- Eco-friendly Affordable
  - Fit for purpose
7. Provide incentives to industry
- Allow enough time for the transition
  - Offer tax rebates
  - Keep certain eco friendly material tax free
8. Ringence revenues
- For introducing a levy on single-use plastic products, consideration should be given to how revenues from that economic instrument will be used. For maximizing public benefits, the revenues from the levy could be ringfenced and reinvested to:
- Environmental projects

- Boosting the local recycling industry
  - Creation of the job opportunities in the plastic recycling industry
  - Finance awareness initiatives promoting the instance waste minimization
9. Enforcement of policy
- Set roles and responsibilities
  - Ensure sufficient human power for enforcement
  - Communication the enforcement process
  - Prosecute offenders in line with policy revisions
10. Monitoring and adjustment

As conditions change over time, it is important to monitor the progress and effectiveness of the policy introduced and adjust the policy accordingly. It is important for government to keep the public updated on the progress and benefits achieved to continue building consensus and demonstrate accountability.

1. Audits and Surveys
2. Studies and interviews

#### **Actions to Minimise Plastic bags and Styrofoam Products**

Due to common problem of the entire world and the strong will power to fight against the plastics pollution (reduction in production and use of plastic bags and Styrofoam items) following are the actions which are taken by the governments (through ppp and voluntary agreements):

- a. Waste management system improvements
- b. Promotion of eco-friendly alternatives
- c. Social awareness and public pressure
- d. Voluntary reduction strategies and agreements

#### **Conclusion**

Consumer behavior (low awareness) with inadequate plastic waste management system & non biodegradable (Plastics) are the key reasons for the problem of single-use plastic pollution. In order to stop the use of plastics carry bags, strong policy with alternative solution is important.

It will be a lengthy process to opt for eco-friendly alternatives. In the meantime, strengthening circular economy (plastic) and waste management systems can successfully help in reducing plastics pollution. Progress should be analysed in several ways, including audits, surveys, impact assessments and focus-group interviews. It would be advisable to review to policy instruments on a regular basis (for instance with a 6 months frequency for the first three to five year, and afterwards every year or as deemed necessary).

India's environmental health is seriously impacted by the plastics-waste scourge which includes contamination of our fresh water and chain. If there will be no global and local action with immediate effect, then there will be more plastics than fish by weight in oceans by 2050.

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