

# Plastic Pollution in Pakistan: Environmental and Health Implications

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## ABSTRACT

Plastic pollution is one of the prime and alarming issues in developing countries that have vast environmental and human health impacts which need to be addressed as a priority. Unfortunately, limited work has been done on the topic, especially on air and water pollution due to plastics in Pakistan. Informal solid waste management is being done by municipalities, which is not adequate, and the problem will increase with the upsurge in population and industrialization. There is a need to address the knowledge gap and improvements in the existing conditions to manage the issue of plastic pollution separately. In this chapter, causes; impacts of plastic pollution both on human and environmental health, plastic industries, and legislative context; and best practices to manage plastic pollution along with some important recommendations are discussed. It is expected the data presented may help the managers, environmental scientists, and policymakers to manage the problem of plastic pollution. Most plastic is Made from fossil fuels like oil and natural gas, which release toxic emissions when extracted from the earth. Plastic contribution has penetrated into all branches of human activity: everyday utensils to decorations, packing industry, construction and most importantly medical industry. Excessive use of plastics everywhere, on one hand has brought easy comforts while on the other hand its safe disposal has become a major issue that is leading to dangerous levels of environmental pollution. Soil, land, air and marine pollution has worsened due to unlimited use of plastic items. Pakistan is also facing health and other hazards being created due to extensive and widespread use of plastics in the country. Irrigations system of Pakistan is one of the largest gravity flow irrigations systems in the world comprising of dams, barrages, head-works, secondary and tertiary canals and water courses, bridges, syphons and other hydraulic structures. Plastic pollution starts from the catchment areas in the mountain ranges due to tourism, local population, agricultural, industrial and other activities which cause transportation of disposed plastic bags/ bottles etc. into streams/ rivers due to wind or water flow actions. In this paper a review of issues/problems caused by plastic pollution to our irrigation system has been outlined with some remedial steps.

**Keywords:** Radar reflectivity; Aerosol dust; Pollution; Visibility; Particulate matters

## INTRODUCTION

Plastic pollution is caused by the accumulation of plastic waste in the environment. The word plastic is from the Greek word “plastikos”, meaning ‘ability to be shaped or molded into different forms/shapes’. It can be categorized in primary plastics, such as cigarette butts and bottle caps, or secondary plastics, resulting from the degradation of the primary ones. It can also be defined by its size, from microplastics - small particles (<5 mm) of plastic dispersed in the environment - to macroplastics [1]. Plastic pollution can take different forms including:

- The accumulation of wastes.
- The accumulation of marine litter, fragments or microparticles of plastics and non-biodegradable fishing nets, which continue to trap wildlife and waste.

- Waste causing the death of animals by ingestion of plastic objects.
- The arrival of microplastics and microbeads of plastics from cosmetic and body care products [2].

Plastics have proliferated into all domains of life. Plastics have gained importance due to ease of handling and molding into various shapes and sizes. The characteristics of plastics can be varied from very soft to very hard retaining high volume to weight ratio. Strength along with lightness has given the polymeric materials a special value. Such properties coupled with long durable life have replaced some iron based materials. Addition of colors to plastics has brought artificial beauty and attractiveness at a cheap cost. Plastics have contributed even in the construction materials as

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such and also as composite materials. Comprehensive literature is available on use and benefits of plastics [3]. Plastic pollution is globally distributed across all oceans due to its properties of buoyancy and durability, and the sorption of toxicants to plastic while traveling through the environment, have led some researchers to claim that synthetic polymers in the ocean should be regarded as hazardous waste. Through photodegradation and other weathering processes, plastics fragment and disperse in the ocean, converging in the subtropical gyres. The impact of plastic pollution through ingestion and entanglement of marine fauna, ranging from zooplankton to cetaceans, seabirds and marine reptiles, are well documented. Adsorption of persistent organic pollutants onto plastic and their transfer into the tissues and organs through ingestion is impact marine mega fauna as well as lower trophic-level organisms and their predators. These impacts are further exacerbated by the persistence of floating plastics, ranging from resin pellets to large derelict nets, docks and boats that float across oceans and transport microbial communities, algae, invertebrates, and fish to non-native regions, providing further rationale to monitor (and take steps to mitigate) the global distribution and abundance of plastic pollution [4]. One of the leading causes of increasing environmental pollution is the world's growing population. As the population rises, so does the amount of garbage that people produce. For a better lifestyle people need effortlessly disposable products, such as soda cans or bottles of water. We have become a disposable state and nation; however, it is a bitter reality that the hoarding of these products has led to increasing amounts of plastic pollution in Pakistan. According to a study, about 8 million tonnes of plastics are deliberately dumped into the oceans globally. It is shocking to know that the simplest plastic normally used in grocery stores have proliferated into all domains of life. Plastics have gained importance due to ease of handling and molding into various shapes and sizes. The characteristics of plastics can be varied from very soft to very hard retaining high volume to weight ratio. Strength along with lightness has given the polymeric materials a special value. Such properties coupled with long durable life have replaced some iron based materials. Addition of colors to plastics has brought artificial beauty and attractiveness at a cheap cost. Plastics have contributed even in the construction materials as such and also as composite materials. Comprehensive literature is available on use and benefits of plastics [3]. Plastic pollution is globally distributed across all oceans due to its properties of buoyancy and durability, and the sorption of toxicants to plastic while traveling through the environment, have led some researchers to claim that synthetic polymers in the ocean should be regarded as hazardous waste. Through photodegradation and other weathering processes, plastics fragment and disperse in the ocean, converging in the subtropical gyres. The impact of plastic pollution through ingestion and entanglement of marine fauna, ranging from zooplankton to cetaceans, seabirds and marine reptiles, are well documented. Adsorption of persistent organic pollutants onto plastic and their transfer into the tissues and organs through ingestion is impact marine mega fauna as well as lower trophic-level organisms and their predators. These impacts are further exacerbated by the persistence of floating plastics, ranging from resin pellets to large derelict nets, docks and boats that float across oceans and transport microbial communities, algae, invertebrates, and fish to non-native regions, providing further rationale to monitor (and take steps to mitigate) the global distribution and abundance of plastic pollution [4]. One of the leading causes of increasing environmental pollution is the world's

growing population. As the population rises, so does the amount of garbage that people produce. For a better lifestyle people need effortlessly disposable products, such as soda cans or bottles of water. We have become a disposable state and nation; however, it is a bitter reality that the hoarding of these products has led to increasing amounts of plastic pollution in Pakistan. According to a study, about 8 million tonnes of plastics are deliberately dumped into the oceans globally. It is shocking to know that the simplest plastic normally used in grocery store bags take over 100 years to collapse, though the complex ones take between 100 and 600 years or even beyond that to decompose. It is estimated that food wrappers and containers produce 31.15% of pollution in the environment. Bottles and containers cap produce 15.5% of pollution in the environment. Plastic bags cause 11.18% environmental pollution, straw and stirrers produce 8.13%, beverage bottles cause 7.27% pollution in the environment. There are countless environmental threats in Pakistan; from villages to small towns and big cities everywhere on the street corners, in the air, on the seashore, in the freshwater bodies, in the water channels, we find heaps of plastic waste. Such waste has stained what used to be our once beautiful seashore of Karachi [5].

Pakistan has the highest percentage of mismanaged plastic in South Asia. There are several countries that have duly banned the use of plastic bags such as Bangladesh, France, and Rwanda. Pakistan learning from these countries' initiatives has issued a (Statutory Regulatory Order) SRO to ban the plastic bags in Federal Capital Islamabad and other cities including Lahore and Hunza. Currently, the policy framework is non-existent at the federal and provincial levels that address the aspects of single-use plastics and plastic waste management in a broader domain. Through the systemic lens brought in by our solutions mapper to explore the entry of plastics back into the environmental channel, it was found to be a double-edged sword: the benefit being that this can be channeled into the circular economy where the recycle, reuse and up cycle are the venues; however, this puts the ecosystem in grave environmental hazards if not channeled into the circular economy [6]. The problem of plastic is complicated, as climate change is complicated. Plastics are cheaper, durable and accessible in the country, with a struggling economy a blanket ban will put many people out of jobs or reduce their customer footfall if no alternative bag is available. While PET bottles and other plastics of higher economic value get scavenged, most of the single-use non-biodegradable plastic finds its way to open garbage sinks, landfill sites or municipal sewers, choking sewage disposal systems. Through systems exploration in Lahore and ethnographic work done in Islamabad by the solution mapper, they found that current municipal waste management practices add to the scale of problem, since the major focus is on picking waste from communal bins and disposing of it in urban fringes without segregation, material recovery or recycling, and also by not making communities act responsibly. Waste management companies can't solve this complex problem alone as they require extensive advocacy and infrastructure support from both the public and private partners. In Pakistan, each year, 30 million tons of solid waste is produced, out of which nine percent are plastics. Here, 55 billion plastic bags a year are produced. These single-use non-biodegradable bags mostly find their way to open garbage dumps, landfill sites or municipal sewers, thus making sewage disposal systems less efficient by choking, thus adding to the costs of utility operations. Current urban waste management practices are partners to this crisis, since they only focus on picking waste from communal bins and disposing of it in urban fringes

without segregation, material recovery or recycling, and also by not making communities act responsibly are usually above 30 microns. The shopping bags of 30 microns are thicker, they do not fly with air pressure and are also reusable. However, there is no implementation on these sanctions from the authorities as bags without D2W, are openly used everywhere in Pakistan, including Karachi [7-9].

## PROBLEMS AND CAUSES OF PLASTIC POLLUTION

### Disasters by Plastic Pollution

Indication albeit limited of demonstrated influences to marine wildlife support immediate execution of source-reducing measures to decrease the potential risks of plastics in the marine ecosystem [10].

According to United Nation, 80% of oceanic pollution comes from land and it constitutes 8 million tons of plastic waste each year, and causes death to more than 1 million and 0.1 million of sea birds and sea mammals annually. Plastic pollution, apart from other dangerous pollutions, is damaging major part of marine resources of water world. Major increases in the fishing and tourism industry has been associated with the continuous disturbance of the marine species like turtles and birds, whales and dolphins, and finally entering to remote areas of the world and especially occupying the food chain. In the ocean, where plastic cannot be easily removed, it gets accumulated in organisms and sediments, and persists much longer than on land [11].

### Plan old trash

Plastic is everywhere, even on those items you may not expect it to be. Milk cartons are lined with plastic, water bottles are handed out everywhere, and some products may even contain tiny plastic beads. Every time one of these items gets thrown away or washed down a sink, the toxic pollutants have more of a chance to enter the environment and do harm. Trash dumps and landfills are unfortunate major problems, as they allow pollutants to enter the ground and affect wildlife and groundwater for years to come [12].

### It is overused

As plastic is less expensive; it is one of the most widely available and overused items in the world today. Rapid urbanization and population growth increase the demand of cheap plastics. Since it is an affordable and durable material, it is utilized in every other way possible, from packaging materials to plastic bottles and containers, straws to plastic carry bags. And also because they're so cheap, we have a disposable mentality. We don't value them to hang on to individual items. When disposed of, it does not decompose easily and pollutes the land or air nearby when burned in the open air [13].

### Plastic particulate matter in air

The chemical bonds that make-up plastics are strong and made to last. The decomposition rate of plastic typically ranges from 500 to 600 years, depending on the type. According to the EPA (Environmental Protection Agency), every bit of plastic that ever made and sent to landfills or dumped in the environment still exists [14]. Burning of different types of plastics produce particles of variable sizes. Such suspended particles produced different ill effects in lungs and may enter the circulatory system. The VOC's emitted from the recycling units increase nasal congestion and

cause mucocutaneous and respiratory problems. Birds inhale particles and also eat micro beads and nurdles and fly with plastics in their stomach needing excess energy for the flight when already feeble with digestive problem. Micro plastics have ruined marine species. For example, the worms have been found to have restrained feeding activity and more stay of food in gut. Inflammation occurs and energy reserves are reduced effecting reproduction, growth [15].

### Disposing of plastic and garbage

The disposal of plastic is often mismanaged; it ends up in landfills. This may sound a bit confusing, but because plastic is meant to last, it is nearly impossible to break down. Burning plastic is incredibly toxic and can lead to harmful atmospheric conditions and deadly illnesses. Therefore, if it is in a landfill, it will never stop releasing toxins in that area. Even recycling doesn't cut down on plastic, as it essentially uses the existing plastic, albeit in a new form. The process of recycling plastic can also lead to plastic irritants being released in a number of ways. As new plastic items are manufactured every day, the cycle keeps repeating. Until businesses start using more environmentally-friendly, alternative materials (such as paper), this cycle of producing and disposing of plastic will continue [16].

## PROBLEMS OF PLASTIC POLLUTION

### Negative effects on human health

We eat plastic-contaminated seafood. Scientists have found microplastics in 114 marine species, and around one-third of these end up on our plates. We consume plastic via packaging. BPA's present in many plastic objects that come in direct contact with food is metabolized in the liver to form Bisphenol A, and it remains in our body through our urine. We drink microplastics via bottled water. The WHO published shocking research in 2018 that exposed the presence of microplastics in 90% of bottled water, the test of which revealed only 17 were free of plastics out of 259. We absorb plastic through our clothes, 70% of which are synthetic and worst fabric for the skin. Humans can be exposed to these chemicals through the nose, mouth, or skin. Although the level of exposure varies depending on age and geography, most humans experience simultaneous exposure to many of these chemicals. Average levels of daily exposure are below the levels deemed to be unsafe, but more research needs to be done on the effects of low dose exposure on humans. A lot is unknown on how severely humans are physically affected by these chemicals. Some of the chemicals used in plastic production can cause dermatitis upon contact with human skin. In many plastics, these toxic chemicals are only used in trace amounts, but significant testing is often required to ensure that the toxic elements are contained within the plastic by inert material or polymer [17].

### It upsets the food chain

Because it comes in sizes large and small, polluting plastics even affect the world's tiniest organisms, such as plankton. When these organisms become poisoned due to plastic ingestion, this causes problems for the larger animals that depend on them for food. This can cause a whole slew of problems, each step further along the food chain. Plus, it means that plastic is present in the fish that many people eat every day [18].

### Ground water pollution

Water conservation is already a concern in places ranging from Pakistan to parts of India, but the world's water is in great danger

because of leaking plastics and waste. If you've ever seen a garbage dump, imagine what happens every time it rains then imagine that being present in your drinking water. Groundwater and reservoirs are susceptible to leaking environmental toxins. Most of the litter and pollution affecting the world's oceans also derives from plastics. This has had terrible consequences on many marine species, which can lead to consequences for those that eat fish and marine life for nutrients including people [19].

### Land pollution

When plastic is dumped in landfills, it interacts with water and forms hazardous chemicals. Landfill areas contain many different types of plastics. In these landfills, there are many microorganisms which speed up the biodegradation of plastics. The microorganisms include bacteria such as *Pseudomonas*, nylon-eating bacteria, and *Flavobacteria*. These bacteria break down nylon through the activity of the nylonase enzyme. Breakdown of biodegradable plastics releases methane, a very powerful greenhouse gas that contributes significantly to global warming [20].

### Effects on ocean

In 2012, it was estimated that there was approximately 165 million tons of plastic pollution in the world's oceans. One type of plastic that is of concern in terms of ocean plastic pollution is nurdles. Nurdles are manufactured plastic pellets (a type of microplastic) used in the creation of plastic products and are often shipped via cargo ship. Many billions of nurdles are spilled into oceans each year, and it has been estimated that globally, around 10% of beach litter consists of nurdles. Plastics in oceans typically degrade within a year, but not entirely. In the process, toxic chemicals such as bisphenol A and polystyrene can leach into waters from some plastics. Polystyrene pieces and nurdles are the most common types of plastic pollution in oceans and combined with plastic bags and food containers make up the majority of oceanic debris. Almost 90% of plastic debris that pollutes ocean water, which translates to 5.6 million tons, comes from ocean-based sources. Merchant ships expel cargo, sewage, used medical equipment, and other types of waste that contain plastic into the ocean. Naval and research vessels eject waste and military equipment that are deemed unnecessary. Pleasure crafts release fishing gear and other types of waste, either accidentally or through negligent handling. The largest ocean-based source of plastic pollution is discarded fishing gear (including traps and nets), estimated to be up to 90% of plastic debris in some areas [21-24].

### Air pollution

Burning of plastic in the open air leads to environmental pollution due to the release of poisonous chemicals. The polluted air, when inhaled by humans and animals, affects their health and can cause respiratory problems. Burning plastic waste is a serious health concern because the smoke from the fire creates black carbon [21]. When black carbon is emitted, there also tends to be other particulate matter emissions, which can have a significant impact on health, causing respiratory problems, heart disease and brain cancer.

### It kills animals

Millions of animals are killed by plastics every year, from birds to fish to other marine organisms. Nearly 700 species, including endangered ones, are known to have been affected by plastics. Nearly every species of seabird eats plastics. Most of the deaths to animals

are caused by entanglement or starvation. Seals, whales, turtles, and other animals are strangled by abandoned fishing gear or discarded six-pack rings. Microplastics have been found in more than 100 aquatic species, including fish, shrimp, and mussels destined for our dinner plates. In many cases, these tiny bits pass through the digestive system and are expelled without consequence. But plastics have also been found to have blocked digestive tracts or pierced organs, causing death. Stomachs so packed with plastics reduce the urge to eat, causing starvation. Plastics have been consumed by land-based animals, including elephants, hyenas, zebras, tigers, camels, cattle, and other large mammals, in some cases death. Tests have also confirmed liver and cell damage and disruptions to reproductive systems, prompting some species, such as oysters, to produce fewer eggs. New research shows that larval fish are eating nanofibers in the first days of life, raising new questions about the effects of plastics on fish populations [22].

### Microplastics

Once at sea, sunlight, wind, and wave action break down plastic waste into small particles, often less than one-fifth of an inch across. These so-called microplastics are spread throughout the water column and have been found in every corner of the globe, from Mount Everest, the highest peak, to the Mariana Trench, the deepest trough. Microplastics are a major part of the issue. Microplastics are tiny pieces of plastic which come from larger plastics that have degraded over time. Sea animals often eat microplastics because of their small size. And plastic contains toxic chemicals, which can increase the chance of disease and affect reproduction. After ingesting microplastics, seals, and other animals, may suffer for months or years before they die. In 2014, an estimated 15 to 51 trillion microplastic particles were floating in the world's oceans, weighing between 93,000 and 236,000 tonnes [23].

### Microplastic pollution in the soil environment

Diverse sources of plastics that contaminate environments have been reported. These include domestic sewage, containing fibers from clothing and micro plastic beads from personal care products, biosolids, fertilizers, landfills from urban and industrial centers, irrigation with wastewater, lake water flooding, littering roads and illegal waste dumping, vinyl mulch used in agricultural activities, tire abrasion, and atmospheric particles transported over long distances. These various plastics enter the soil environment, settle on the surface, and penetrate into subsoil [23].

### Solutions of plastic pollution

The reality is that the only way this problem can be addressed is by individuals and companies around the world, agreeing to implement practices that reduce waste on every level. The top tips for reducing plastic waste are:

#### Plastic degradation

In last few years a remarkable pressure on disposal of plastic waste has been observed on authorities. Some technological advancement has been made in biodegradation disposal of plastic as it is shown by many researchers that some type of plastic such as thermoplastic which is derived from polyolefins are biodegradable through photo degradation [24]. Any change, either physical or chemical can occur in polymer as a result of environmental influences, such as light, heat, moisture, chemical conditions or biological action. Polymer degradation can be defined as processes that



induce changes in the physical, chemical or biological reactions resulting in breaking of bonds and subsequently results in chemical transformations. Degradation has been reflected in changes of material properties such as mechanical, optical or electrical characteristics, in crazing, cracking, erosion, discoloration, phase separation or delamination. The changes include bond scission, chemical alteration/transformations and formation of new functional groups. As our environment and especially oceans are heavily polluted by plastics, so there emerges a need for its degradation. Conventional methods of polyethylene degradation include incineration, landfill and chemical treatment. All such techniques are lethal to the neighboring environment by causing hazardous effects on living organisms. Incineration effects on the environment are more hazardous in a way that different gases are released into the atmosphere thus causing severe health concerns. Incineration involves heating plastic waste at a high temperature and thus degrading it. Approximately 11% of the plastic has been incinerated till date. This is a very small fraction as remaining huge portion still persists in the environment in one form or another [25].

### Plastic biodegradation

Different polymers with high molecular weight combine to form a broad term named as plastic and it can be degraded by many processes but microbial degradation of plastic seems to be most effective process due to bioavailability and abundance of microorganisms and enzymes in the environment. For plastics, being utilized by microorganisms as their substrate doesn't require only chemical properties of plastic but also its physical characteristics like melting point, glass transition temperature, crystallinity and modulus etc. [26]. Many researchers showed their keen interest in the microbial degradation of plastic as many organic and inorganic materials like lignin, starch cellulose and hemicelluloses are biodegraded by microbes. Some bacteria present in soil consume polyester polyurethane as solitary source of carbon and nitrogen. Similarly, recent research revealed that many microbes present in mangrove soil culture are capable of biodegradation of plastic in efficient way but at a slow rate. Likewise, bacteria many fungi are also able to degrade plastic by penetrating in the polymer solids. Biodegradation of plasticized polyvinyl plastic in in-situ and ex-situ has been observed through fungal colonization. Microorganisms discharge many enzymes into soil water which start the breakdown of polymers. Microbes secrete Intracellular and extracellular polymerases enzymes which breakdown the complex polymers and results into monomers which are minor and can easily be penetrated into cell wall hence used as the source of carbon and energy and the process is called depolymerization. Furthermore, this process when ends up on the products like carbon dioxide, water or methane then it is known as mineralization [27].

### Shop friendly

Plastic bags were once a modern convenience but can be efficiently replaced by reusable bags, many of which fold up compactly to be portable. Just think about how many bags you typically carry out of a grocery store, and multiply that by the number of times you visit the grocery shop. That's a lot of plastic! Carry a bag and always reuse plastic bags as much as possible if you have them.

### Get rid of bottled water

People are meant to drink lots of water each day, and plastic water bottles have become a great way to stay hydrated throughout the day. However, most of these are only recommended for single-

use, and that means that every time someone finishes a bottle, it goes into the trash. As these plastic bottles are typically made from polyethylene terephthalate (Pet), it takes over 400 years to decompose naturally. Many companies now sell reusable water bottles as a substitute, reducing plastic waste and exposure to leaking bottles. The best thing you can do is carry a reusable metal bottle in your bag.

### Forget to-go containers

The plastic is involved in the making and packaging of food containers. The coffee shop's drink cup is plastic. It's likely lined with plastic for insulation (pour a cup of coffee on some cardboard and see what happens). Plastic food containers, lids, and utensils are all easily replaced by reusable containers, which will cut down significantly on even a single meal's waste.

### Recycle everything

Try and select items that come in non-plastic recycled and recyclable packaging, to do your best to handle items that can't be reused properly. Check everything before you put it in the trash, as more and more items are able to be recycled these days. Remember that because plastic doesn't break down easily, recycling plastic means that it is still plastic, just being used for a different purpose. Therefore, you're not actually reducing plastic amounts or exposure, even in the recycling process.

### Make better cookies at home

Choose products with less plastic packaging. Avoid cosmetics and personal hygiene products having microbeads, the little dots in your toothpaste, and facial scrubs, which are actually a type of microplastic. New research shows increasing damage from microbeads to marine life and human health. Avoid clothes that have synthetic microfibers. When these items are washed, they often release microfibers into the water, finally making their way to oceans, and then ingested by fish and other marine creatures.

### Educate businesses

Speak to local restaurants and businesses about options that they can switch to for packaging, storing, and bagging items. Many companies are starting to come up with excellent low-cost replacements, such as bamboo utensils in place of plastic ones. Speak to lawmakers and get involved with government on any level, and you'll see how many special interest groups have made it so that we are dependent on plastic without needing to be. Encourage the development of items and propose alternatives when applicable.

### Other ways to solve the plastic pollution

- Collecting segregated waste at door steps by cleaners and rag pickers.
- Earning from waste. Picking and selling
- Awareness programs at slums
- Banners on road sides and especially in front of schools
- Media awareness
- Seizure of plastic items using hazardous chemicals as additives.
- School education
- Seizure of plastic materials at shops
- Penalty for adding plastic pollution

- Excellence awards for plastic controllers
- Compelling the super markets to limit giving plastic bags to consumers
- Use of green bags
- Start using paper or cloth bags for shopping
- Critical examination of the end-of-life role of every plastic item
- Sustainable materials management
- More policy discussions
- Replace of all Disposables with Re-usable plastics
- Check Personal Products for Micro beads
- Avoid synthetic wearing
- Limit/reduce waste production
- Recycle plastics.
- Molecular redesign of plastics.
- Green Chemistry i.e., greener routes for the production of plastics.
- More emphasis on biopolymers.
- Avoid plastics whenever you can and replace with glass bottles and containers.
- Controlled Incineration
- Check and re-check the existing strategies and incorporate more incentives.
- Funding relevant academic research and Technological Developments.

## WWF –PAKISTAN LAUNCHES PROJECT TO TACKLE PLASTIC POLLUTION

LAHORE - In order to cope with plastic pollution in the country, World Wildlife Fund (WWF) for Nature, Pakistan chapter, in collaboration with the Coca-Cola Foundation on Saturday launched a month-long pilot project for collecting plastic and its recycling. Three major commercial areas of the city including Packages Mall, Fortress Square and Emporium Mall have been allocated for plastic recovery facility. Citizens will deposit their used PET bottles to the recovery facility and the collected bottles will then be sent to WWF's partner waste collector, Amal for recycling. A recent report, No Plastic in Nature: Assessing Plastic Ingestion from Nature to People, based on a study commissioned by WWF carried out by the University of Newcastle, Australia showed that people on average could be ingesting about five gram of plastic every week, equivalent to the weight of a credit card, through the air they breathe, the food they eat and, especially, the water they drink. It suggests that people are consuming about 2,000 tiny pieces of plastic every week. That's approximately 21 grams a month, just over 250 grams a year. Speaking on the occasion, Muhammad Rizwan, Minister for Environment Protection Punjab, urged the public to conserve natural resources by reducing their use of plastics in their daily life. He further said that it was the most important duty of every citizen to play their part in tackling plastic pollution that was plaguing the environment. He also spoke about the measures taken by the provincial government to cope with plastic pollution. He emphasized that a strong will is required by people to reduce their use of plastic. 'People should shift from

disposable plastics to reusable material like cloth bags', he said. If, we do not take up this issue now, the situation might soon be out of control, he added.

## Pakistan's strategy to counter plastic pollution

Pakistan adopted Oxo-biodegradable technology as a strategy to resolve the issue of plastic pollution in 2017. Oxobiodegradable plastics completely biodegrade in the environment after their useful life without any harmful impacts on the environment. Hence, providing a solution to all the above-stated issues. The regulation was formed after careful considerations of all the alternative options & based on scientific pieces of evidence. In 2019, another model was implemented in Islamabad Capital Territory by banning polyethylene bags and promoting biodegradable bags. The initiative was taken by the Ministry of Climate Change in light of the Prime Minister's Clean and Green Pakistan vision. MoCC is working to ensure full implementation of the ban by strict punishments & heavy fines to the violators. Polypropylene bags are non-biodegradable; as major commercial polymers, polyethylene and polypropylene are extremely resistant to biodegradation i.e. degradation by micro-organisms. In the current scenario; most of the suppliers are misusing the appearance of non-woven PP bags. Federal Authorities should devise a fair strategy to confront the issue of plastic pollution. If the decision is to ban; it should be implemented to all types including WPP, BOPP, PP non-woven bags & all single-use plastics and scientifically proven biodegradable options should be promoted. Authorities have neglected a crucial fact that polyethylene is not the only contributor to pollution in the country. Polypropylene and other single-use plastics are also major sources of plastic pollution. Non-woven PP, BOPP, CPP, Metalized films, WPP, and shrink wraps are widely used in products that are discarded in the environment after single time usage. The harmful effects caused by plastic waste accretion are drastically increasing day by day. Henceforth, their removal from the environment is very vital. Non-woven polypropylene bags like fabric; however, they are purely manufactured from polypropylene-a plastic. These polypropylene bags in the market are falsely claimed as biodegradable & disintegrate into fragments to create micro plastics. Micro plastics become part of the food chain affecting life of thousands of terrestrial and marine animals. Due to their small size, micro plastics cannot be collected and even seen by the naked eye. Hence, these bags will elevate the issue of plastic pollution instead of solving it.

## CONCLUSION

Plastic waste is a real threat to environment and ultimately to civic life. Waste management is extremely imperative in addressing the concerns of plastic waste. It requires community awareness and participation in systematic collection. The systems vary from country to country and region to region. Although international and European legislation exists, it necessitates better monitoring to guarantee complete implementation. There is also a need for better education and awareness around plastic waste. Plastics waste has large potential to be converted into profitable products. Plastic footprints and labeling on products are likely but need the appropriate education to make them meaningful. Better knowledge is needed on the actual influence of chemicals associated with plastic waste on the environment and human health. Plastic pollution in the environment is currently receiving worldwide attention. Improper dumping of disused or abandoned plastic wastes leads to contamination of the environment. In particular, the disposal of municipal wastewater effluent, sewage sludge landfill, and plastic

mulch from agricultural activities is a serious issue and of major concern regarding soil pollution. Compared to plastic pollution in the marine and freshwater ecosystems, that in the soil ecosystem has been relatively neglected. In this study, we discussed plastic pollution in the soil environment and investigated research on the effects of plastic wastes, especially micro plastics, on the soil ecosystem. The perils of plastic pollution have already started to show the distressing shadows on future. Every passing day is adding to the huge burden on planet earth. The challenges of this important issue are not easy to deal with. It requires stringent efforts from all sectors to leave a greener biosphere for all to exist and enjoy the blessings of nature. Biodegradable plastics (BPs) have become the focus of recent research due to their potential biodegradability and harmlessness, which would be the most effective approach to manage the issue of plastic waste environmental accumulation. BPs can effectively protect and improve the environment, and greatly promote the development of environmental protection. However, the production of BPs seems to be much easier than their treatment. There is no single solution to solve the problem of plastic accumulation in the environment, it is important to determine the effective combination of solutions. Just for now, BPs should be a part of the solution, albeit a very small part. The effect of BPs on plastic accumulation should not be underestimated. In addition, under the severe situation of energy conservation and emission reduction, the development of BPs is of strategic significance.

## CONFLICT OF INTERESTS

Authors have no conflict of interests.

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