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THE SINGLE-USE PLASTIC WASTE PROBLEM IN BANGLADESH: FINDING SUSTAINABLE ALTERNATIVES IN LOCAL AND GLOBAL CONTEXT

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ABSTRACT

Plastic-derived products are now an essential commodity for a variety of applications. A massive amount of used plastic creates environmental hazards that endanger marine life, reduces soil fertility, and pollutes ground water. Single-use plastics (SUPs) are a significant source of this pollution, though SUPs were introduced into society to make our lives easier, due to their low post-use value, they are found as litter in a variety of environments, from urban to rural and remote, natural environments. Management of this huge plastic waste is difficult, especially for developing countries like Bangladesh for having lack of facilities, inadequate infrastructure development, and an insufficient budget. A set of sustainable plastic alternatives has been proposed, as well as recommendations that would emerge from the implementation of these strategies. The successful implementation of the alternative products proposed would improve the quality of plastic waste management. The purpose of this study is to provide direction for future research into the potential alternatives for SUPs pollution in surrounding ecosystems, remediation strategies and this can be a first step toward eliminating sups to effectively protect the environment.
***Keywords**: Single-use plastics, Plastic Waste Management, Micro Plastics, Bio-plastics, Bangladesh.*

INTRODUCTION

Plastic is widely used worldwide due to its lightweight, high strength, applicability, ease of production, and lower production cost than other relevant materials. The human inhabitants of our planet rely heavily on the use of plastic products on a daily basis. Global plastics production has increased from 1.5 million tons in 1950 to 335 million tons in 2016 (Plastics Europe, 2018). Every day, approximately 3000 tons of plastic waste are generated, accounting for 8% of total waste produced (Mahmudul, 2019). Bangladesh's per capita plastic use in urban areas has tripled from 3.0 kg in 2005 to 9.0 kg in 2020, with Dhaka having three times the national average. However, it has a significant negative impact on soil, water, and the environment due to its poor biodegradability, persistence, mismanagement, and overconsumption. Every year, approximately 400 million tons of plastic waste are generated globally, with 50% of this being single-use plastic and only 9% being recycled (Hossain et al., 2020)

Plastic pollution has received significant global attention because it is the world's third most waste source, with the overall volume of plastic garbage increasing in combination with increases in global population and per capita consumption. Improper disposal of disused or abandoned items, combined with a throw-away culture, leads to the accumulation of plastic waste and pollution, as well as the loss of a valuable resource, that leads to the contamination of both terrestrial and aquatic ecosystems (Chen et al., 2021; Chae and An, 2018; Narancic and O'Connor, 2019). Furthermore, since most oil-based plastics are highly resistant to biodegradation, they will eventually accumulate in the environment, causing negative environmental consequences. Waste plastic accounted for more than 12% of total municipal solid waste (MSW) generated in various countries around the world, and there is a long-term risk of hazardous chemical release from plastic waste in landfills and even contamination of ground waters, along with concentrations of Micro Plastics in dry sludge dumped in landfills after wastewater treatment (Kaza et al.,2018; Talvitie et al., 2017; Nizzetto et al., 2016; North and Halden 2013; Sartorius, 2010).

The introduction of synthetic polymers has transformed the type of packaging as well as the materials used for containers and carrier bags, which are intended for single-use only (Nkwachukwu et al., 2013). Plastic packaging accounts for more than one-third of total plastic polymer production (Europe, 2016). and accounts for 42 and 40% of plastic demand in the United States and Europe,

respectively (Gourmelon, 2015). According to the United Nations Environment Programme (UNEP) (Giacovelli, 2018), the majority of plastic packaging is made up of SUPs such as grocery bags and containers. These plastics, which are intended for immediate disposal after use, are frequently discarded within the same year of manufacture. Their increased use has significantly contributed to the increased generation of plastic waste. According to Geyer et al. (2017), if current plastic consumption trends continue, there will be 12,000 million metric tonnes of plastic waste on Earth by 2050. The massive consumption of SUP products has created a major waste management challenge as well as serious environmental issues (Gall and Thompson, 2015)

Considering the environment, Bangladesh became the first country in the world to effectively ban lightweight plastic bags and products in 2002. (PLPB, 2020). Regrettably, polybags and other poly items are gradually making their way back into the market, and Bangladesh is now ranked 10th in the world in terms of mismanaged plastic waste, with the majority of these used plastics being mismanaged and directly dumped into both the terrestrial and aquatic environments. It causes critical environmental issues such as degrading soil health, integrating with groundwater, and disrupting organisms and ecosystems, as well as public health issues such as eye irritation, respiratory problems, liver dysfunction, cancers, skin diseases, lungs problems, birth effect, reproductive, cardiovascular, genotoxic, and gastrointestinal problems, etc.

This study focuses on the negative effects of SUPs on the environment and eco-system, as well as potentially sustainable alternatives to reduce those threats in Bangladesh.

COMPREHENSIVE USE OF PLASTICS AND SUPs

Since 2000, the plastic manufacturing industry has grown at one of the fastest rates of any industry (GESB, 2011). Although the first synthetic plastics, such as Bakelite, were introduced in the early twentieth century, widespread use of plastics outside of the military did not begin until after World War II. The subsequent exponential increase in plastics production has outpaced that of most other man-made materials after steel and cement, which are widely used in the construction industry (World Steel Association, 2016; U.S. Geological Survey). There are seven different types of plastic (*Table 1)* that are commonly produced or found in the environment, and the vast majority of monomers used to make plastics, such as ethylene and propylene, come from fossil hydrocarbons.

Table 1. The Most Common Plastic Materials Found in environment (Hossain et al., 2020; Valavanidis et al., 2008; Simoneit et al., 2005; Rogers, 2015)

No.	Plastic types	Characteristics	Usage
1	High-density Polyethylene (HDPE)	Lightweight, super-strong, long lasting, weather resistant and impact resistant properties.	Trash bags, milk jugs, shopping bags, containers for oil, milk, shampoos, conditioners, detergent and soap, etc.
2	Low-density Polyethylene (LDPE)	Resistance to impact, moisture, chemicals, high durability and flexibility properties.	Plastic grocery bags, plastic film, sandwich bags, food wraps, and beverages bottles, etc.
3	Polyvinyl Chloride (PVC)	Lightweight, durable, cost effectiveness, corrosion resistance and easy process-ability. Contains chlorine as its key ingredient to biologically and chemically resistant.	Bottles, packaging, container, plumbing and sewage pipes, floor and furniture coverings, pipes, tiles and electronics parts, etc.
4	Polyethylene Terephthalate (PET)	Lightweight, high hardness, toughness and resistance to grease, oil and heat, and also non-biodegradable and susceptibility to oxidation.	Beverage bottles, clothing and carpet fiber, medicine pots, rope, sleeping bags, pillow and carpet fiber, and containers, etc.
5	Polystyrene (PS)	Thermoplastic polymer that is widely used to prepare solid plastic material as well as rigid foam material. Usually, take hundreds of years to decompose when not recycle.	Hot beverage cups such as tea-cups, coffee-cups, thermally insulated take-home boxes, food containers, e.g., trays for carrying meat and egg, insulating materials, plastic boxes and cutlery, egg cartons and packing foam.
6	Polypropylene (PP)	Water, soap, detergent, acid, and base resistance increases its strength and durability. Because it can withstand	Yogurt containers, diapers, straws, wrapping films, butter tubs, special bag, making lunch

		higher temperatures, it can be used for a variety of applications. During the manufacturing process, it can be made translucent, opaque, or a variety of colors.	boxes, butter containers, sauce bottles, ketchup bottles, plastic bottle caps and medicine packaging. Occasionally recycled and it can be recycled into car battery cases, lumber and manhole steps, etc.
7	Others	Code 7 denotes the remaining types of plastic. This category includes two types of recognized plastics: polycarbonate and bio-plastic polylactide. These types of plastics are rarely recycled.	Plastic lenses in eyewear, in medical devices, automotive components, protective gear, greenhouses, Digital Disks (CDs, DVDs, and Blu-ray), and exterior lighting fixtures, etc.

This discarded waste contains a variety of plastics, the most common of which are listed in Table 1, None of the commonly used plastics degrade in nature. As a result, rather than decomposing, they accumulate in landfills or the natural environment (Barnes et al., 2009). Packaging is the largest market for plastics, and its growth has been accelerated by a global shift from reusable to single-use containers. As a result, the share of plastics in municipal solid waste (by mass) increased from less than 1% in 1960 to more than 10% in 2005 in middle- and high-income countries, while global solid waste generation, which is strongly correlated with GDP per capita, has increased steadily over the last five decades (Jambeck et al., 2015; Wilson et al., 2015; Hoornweget al., 2013)

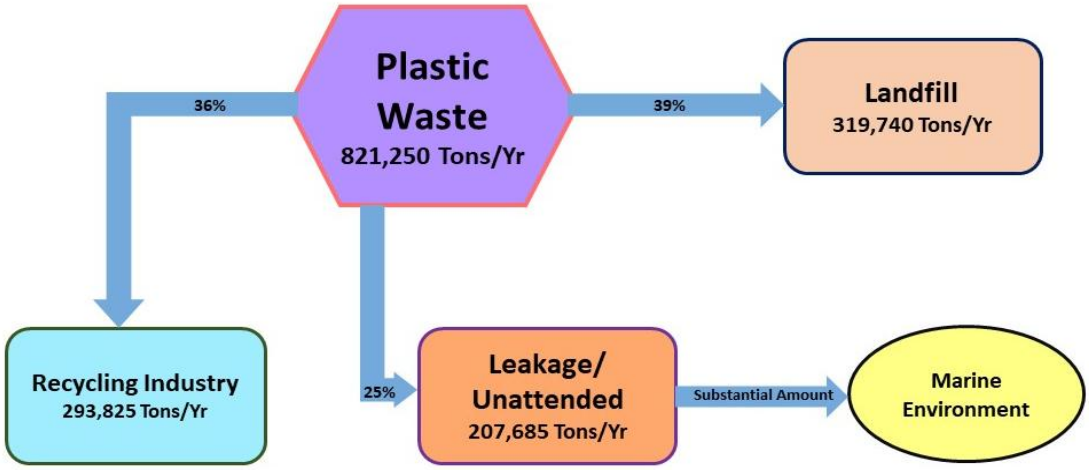

Figure 1. Situation of Bangladesh's Urban Plastic Waste (Waste Concern, 2019)

According to Waste Concern research, 36% of total plastic waste generated is recycled, 39% is landfilled, and the remaining 25% leaks or is left unattended and enters the marine ecosystem. According to a Waste Concern analysis, approximately 0.8 million tons of plastic waste are produced annually in Bangladesh, of which 36% is recycled, 39% is landfilled, and the remaining 25% is unchecked and ends up in the marine environment (Waste Concern, 2019)

PRODUCTION AND WASTE OF SUPs IN BANGLADESH

Bangladesh is a rapidly developing country with a population of 166 million people. Despite the constraints imposed by its dense population, Bangladesh has achieved satisfactory economic growth. It currently has over three thousand small and large plastic industries, and in the fiscal year 2017-18, plastics recognized as Bangladesh's 12th highest export earning sector (USAID, 2019).

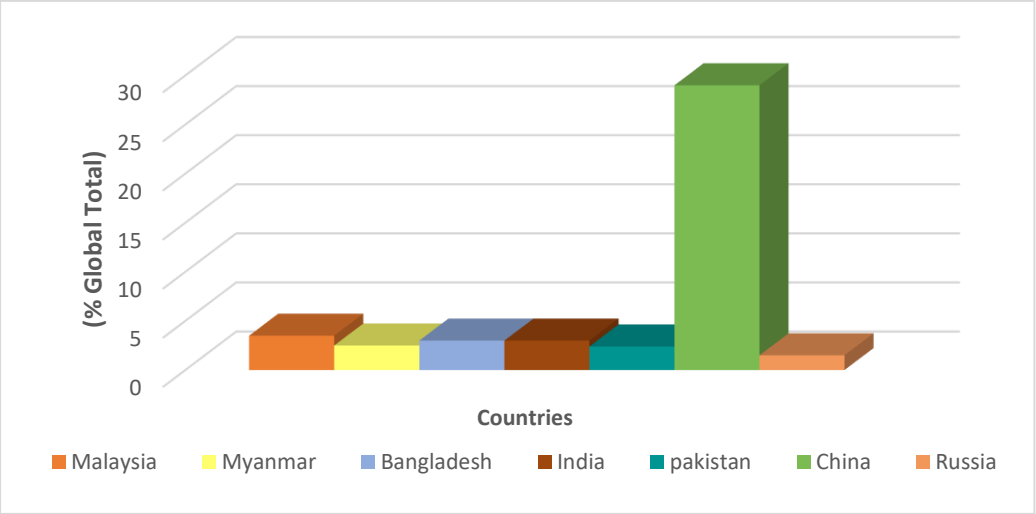

Figure 2. Percentage of global mismanaged plastic waste contributed by different countries in some Asian Countries (Hannah and Max, 2018)

With rapid development, per capita plastic consumption in Bangladesh has risen dramatically from 2.07 kg in 2005 to 3.5 kg in 2014 (Mourshed et al., 2017), with a daily production of 3000 tons of plastic waste, accounting for 8% of total generated waste (Mahmudul, 2019).

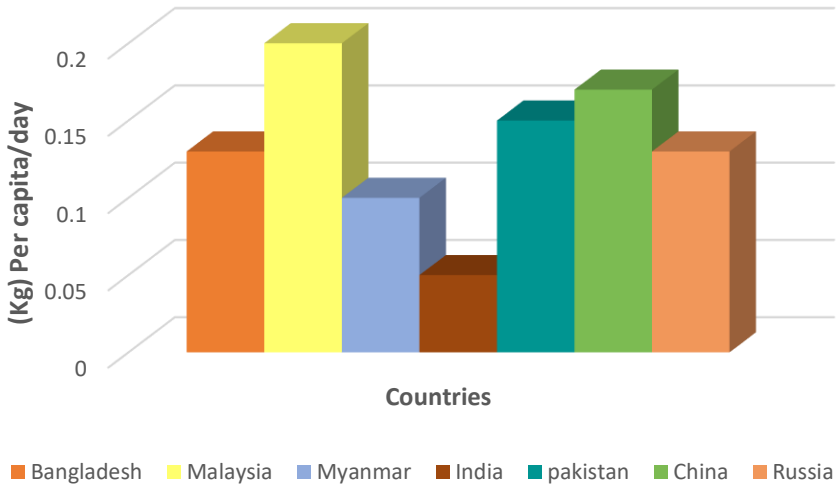

Figure 3. Plastic waste generated by per person per day in different countries in Asia (Hannah and Max, 2018*)*

Figure 2 and 3, depict the percentage of plastic waste directly released into the environment and the amount of plastic waste produced per person per day in major Asian countries (Hannah and Max, 2018) Though Bangladesh's per capita plastic consumption is low in comparison to other developed and neighboring countries, the percentage of mismanaged plastic waste in the global total is very high (Based on 2010 data).

Single-Use Plastic Bags (SUPBs) have a variety of economic, social, and environmental implications. Matter of fact, the difficulties in addressing this issue are rooted in globalization, current economic models, and consumption levels, among other things. Increased economic power in many global markets has resulted in individual customers purchasing goods in large retail stores, and purchased goods are frequently carried home in large plastic shopping bags. The convenience for consumers to receive SUPBs for free at stores and for distributors to facilitate them at very low cost resulted in a widespread availability and use of plastic bags for shopping, to the point where the use of plastic bags became a habit and is no longer a conscious decision. (Danner et al., 2008). Waste mismanagement and low recycling rates (Geyer et al., 2017) increase the likelihood of SUPBs leaking into the environment. The most problematic aspect is that, after being littered in the environment, SUPBs can easily travel through air and water due to their light weight and parachute-shaped structure (Knoblauch et al., 2018) Bottles, bags, packaging, wrapping, flyers, food storage, and home products are all examples of single-use plastic in our everyday lives. Figure 4, shows fast-moving consumer

goods (FMCG) companies, in general, contribute significantly to single-use plastic pollution because the majority of their products use plastic packaging in the form of food wrappers and sachets. Restaurants, airlines, hotels, and supermarkets are the primary sources of *plastic* trash generation in the service sector. Regardless of plastic type, SUPs, such as packaging materials, contribute significantly to environmental pollution, accounting for approximately 36% of global plastic consumption (Kapinga and Chung, 2020).

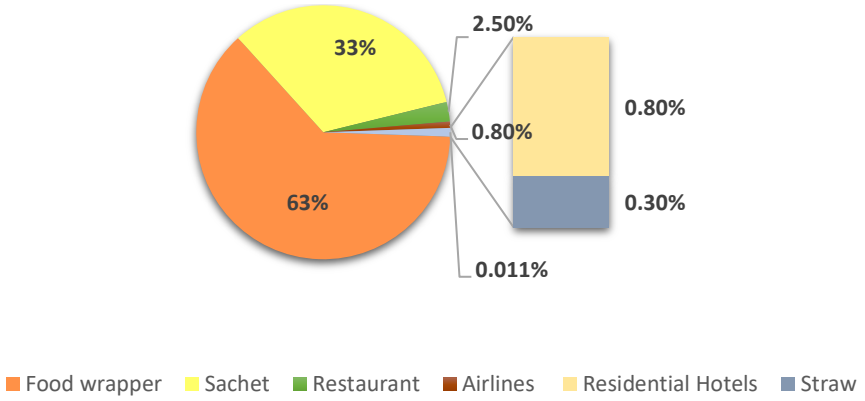

Figure 4. SUPs Generation Scenario in Bangladesh, 2020 (Source: ESDO)

Plastic bags made of polyethylene are primarily blamed for the current increase in plastic waste generation. Every day, 14 to 15 million polythene bags are used in Dhaka alone, and they are discarded in trash, garbage, or litter after their first use (Mohammad ZK, 2019). In Bangladesh, the extensive use of single-use plastics and their indiscriminate management in suburban areas, combined with improperly managed landfills lacking waste separation procedures, have been identified as primary and secondary sources of Micro Plastic (MP) in agricultural soil (Ahamad, 2019).

EFFECTS ON ECOSYSTEM OF BANGLADESH

According to recent research, there is a risk of MP transfer from terrestrial agriculture to the human food chain. As a result, MP should be regarded as a potential threat to food safety and sustainable agriculture (Sarker et al., 2020). The presence of various plastic debris in coastal and oceanic waterways, as well as their toxic effects on marine animals, has been documented for the Bay of Bengal (Hossain et al., 2019; Hossain et al., 2020). Some pilot projects led by the United Nations Development Program (UNDP) and the Environment and Social Development Organization (ESDO) have revealed the presence of MP pollution in both the terrestrial and marine ecosystems of Bangladesh. Furthermore, the number of marine species reported to be impacted by anthropogenic litter has increased significantly over the past decades and continues to rise; additionally, it is estimated that at least 17% of the species ingesting or becoming entangled in marine debris are classified as near threatened, vulnerable, endangered, or critically endangered on the IUCN Red List (Gall and Thompson, 2015; ESDO, 2016; UNDP -BD, 2018). Plastic bags, balloons, and plastic beverage bottle caps, as well as fishing nets and gear, are among the 20 most common marine litter items that are considered harmful to wildlife due to the risk of entanglement (Hardesty et al., 2015).

Plastics continue to contaminate our environment, lakes, ponds, rivers, and marine waters, affecting marine life biodiversity. MP abundances in the surface waters of the Bay of Bengal ranged from 500 to 20,000 items/km, with higher abundances observed near Nicobar Island, exceeding 100,000 items/km (Eriksen et al., 2018). A total of 443 MP items were recently identified in the intestines of marine fish species in the Bay of Bengal, supporting the notion that MP in marine fish should be considered a public health risk (Hossain et al., 2019). MP quantification in shrimp from the Bay of Bengal was also documented, with diverse MP found in the range of 3.40 -3.87 items/g GI tract of shrimp. Black fibers and filaments were the most frequently identified MP particles. The study found that if the shrimp were eaten without removing the intestines, the MP could be transferred to humans (Hossain et al., 2020).

It was reported that 821,250 tons of plastic waste were generated in urban areas in one year, while 207,685 tons were dumped in the marine environment during the same time period. 36% of the plastic waste was recycled in noncommercial sectors, while 39% was dumped in landfills; 25% of the latter leaked into the environment and eventually reached the waterways (Ahamad, 2019). In this regard, the extreme depletion of soil organic matter in Bangladesh should be investigated in relation to the deposition of massive amounts of MP in soil and terrestrial ecosystems. Despite the fact that soil has been identified as a major carrier for MP deposition and transportation, the direct use of plastic mulch

and the indiscriminate use of various plastic products in agricultural activities for the decomposition of plastics in Bangladesh farmlands has largely been ignored.

THE DEMISE PHASE: REGULATION TO LIMIT OR PROHIBIT SUPs

Recently, the Bangladesh High Court directed concerned authorities to prohibit single-use plastic products in coastal areas, hotels, motels, and restaurants, citing them as health and environmental hazards. This ban goes into effect in 2020. (BSP, 2020). Single-use plastic products (e.g., LDPE bags) from hotels, restaurants, and suburban centers have been banned in Bangladesh because they are secondary sources of MP deposition (BSP, 2020). The Bangladesh government banned lightweight plastic bags in 2002 and encouraged the use of jute fiber bags as an alternative (MJPA, 2010). In recent years, reuse-recycle-repress-recover (4R) technologies have been used to reduce plastic pollution in Bangladesh (Mourshed et al., 2017). However, plastic pollution in rivers has recently reached alarming levels, making dredging extremely difficult for authorities due to nonbiodegradable waste. Dredging in the Karnaphuli River has been slowed due to a thick layer of polyethylene in the riverbed. Another reason the government prohibited the indiscriminate use of plastics (SEBP, 2020). The direct primary sources of MP, on the other hand, were neither studied nor targeted. In Bangladesh, ESDO is the only non-governmental organization that acts as the responsible authority for dealing with the identification and quantification of MP. The new public laws targeted secondary sources (e.g., single-use plastics, disposable LDPE bags, unplanned dumping, and ineffective municipal waste management) (BSP, 2020; Karim et al., 2019)

These widespread concerns have resulted in an increase in the number of policy and legislative initiatives aimed at reducing the amounts of plastic bags in the environment and the likelihood that they will end up in the ocean (Xanthos and Walker, 2017). In fact, 39 countries have imposed a tax on the sale of plastic bags since 1991, while 51 countries and states have prohibited their manufacture, sale, or use (Knoblauch et al., 2018). Despite the fact that few studies have been conducted to assess the efficacy of these strategies (Xanthos and Walker, 2017), regulation of plastic bags has been viewed as an opportunity to raise public awareness and foster pro-environmental behaviors (PEB) (Jakovcevic et al., 2014). According to Kollmuss and Agyeman (2002), PEB is determined by several intrinsic (e. g. knowledge, attitudes, and feelings of responsibility) or extrinsic (e. g. laws and social and cultural circumstances) factors. Reduced use of SUPBs can be a decision made by consumers who actively engage in pro-environmental behavior and avoid SUPBs in their daily lives. The main challenge remains determining the factors that influence environmental behavior and devising effective methods to encourage PEB (Steg et al., 2018).

Many countries, including Bangladesh, India, Morocco, and some states in the United States, Australia, and Canada, have completely banned SUPBs; the reasons for choosing ban schemes appear to be related to the ease of implementation and enforcement (Clapp and Swanston, 2009; Xanthos and Walker, 2017) Plastic bag perceptions have shifted in recent years, with many citizens now recognizing them as hazards to the environment. As a result, anti-plastic bag social norms (i.e., ideas and beliefs about appropriate behaviors; Bernstein, 2001; Clapp and Swanston, 2009) have emerged, spread rapidly, and been translated into policies in a variety of ways in many countries (Nielsen et al., 2019). This phenomenon provides new insights into the dynamics of norm adoption and policy implementation, as the regulation of SUPBs has frequently been based on local and regional concerns, leading to ad hoc bottom-up initiatives (Clapp and Swanston, 2009). Furthermore, many African, Asian, and European countries have imposed fees on the use of plastic bags (Zero Waste Scotland, 2014; Poortinga et al., 2013). Legislation was passed in 2002 to prohibit the use of bags 20 m thick. This was followed in 2005 by a 50-meter bag ban. The state of Karnataka banned plastic bags entirely in 2016Bans were implemented to keep bags from clogging municipal drainage systems, especially during the monsoon season. Bans were also enforced to prevent the nation's sacred cows from ingesting plastic bags while eating food inside bags, which can result in death (Clean Up Australia, 2015).

ENVIRONMENTAL BEHAVIOR: LESSONS LEARNED, FUTURE STRATEGIES, AND SCOPE OF STUDY

Bangladesh was a pioneer in banning LDPE bags in 2002. (PLPB, 2020). Furthermore, solid-waste recycling of plastic products has long been practiced in Bangladesh (Bari et al., 2012). However, secondary sources of MP deposition in farmland must be reduced. A recent review looked at MP pollution in Bangladesh, but the methods of deposition and transportation to and from farmland and suburban soils were ignored (Karim et al., 2019). Pilot activities and studies on MP deposition and its impact on human health have begun in Bangladesh (ESDO, 2016). However, much more research is required. The following recommendations are made for future research and policy strategies to reduce MP pollutants in Bangladesh's suburbs and farmland areas:

- Implement and strictly enforce the use of jute fibers rather than LDPE bags. To reduce secondary sources, the government should promote the use of Sonali bags (SB, 2018).

- Plastics has negative environmental consequences and introduce health risks into the food chain, compromising food safety. Bangladeshi scientists should conduct MP toxicology research on the distribution of toxic plastics in the soil-food chain.
- Identify and employ potential organisms to degrade plastics. Bioremediation technologies are required for MP alleviation in Bangladesh soils and surrounding environments, as per biodegradation studies.
- Determine, separate, and reduce MP sources in ecosystem. According to current studies, MP can be produced through plastic mulching, sewage sludge spreading, and wastewater irrigation. MP sources could be reduced by establishing separate landfills for different types of plastic waste and recycling mega plastics. SUPs should be strictly forbidden immediately.
- For the qualitative and quantitative assessment of MP in Bangladesh's suburban soils and terrestrial ecosystems, quantify, screen, and isolate MP from soil samples using standard reported methods such as filtering, density separation, and flotation (Talvitie et al., 2017).

WHY IT IS IMPORTANT TO USE ALTERNATIVES OF THE SUPs PRODUCTS

We have a responsibility to protect the environment for a wide range of reasons, including:

- This will definitely contribute to the achievement of the United Nations' 2015 Sustainable Development Goal (SDG) of creating a poverty-free, peaceful future by 2030.
- Many municipal, soil, water, and environmental issues caused by plastic pollution will be alleviated.
- Contributes to a healthier environment for future generations
- It will reduce the contamination of various plastic wastes.
- This could inspire a variety of research projects among universities and research institutions to find effective alternatives to plastic.
- It will generate many entrepreneurs and job opportunities in Bangladesh for the production of tools and appliances for the production of products and businesses related to the production of biodegradable alternatives to plastics, thereby reducing the country's unemployment problem.

AUTHORS' RECOMMENDATIONS FOR ALTERNATIVES TO SINGLE-USE PLASTIC

While 78% of the SUPs waste are generated in urban areas of Bangladesh, a significant portion of 22% comes from rural areas. Plastic is used in almost every part of our life from bottles, bags, packaging, wrapping, flyers, food storage to household items. According to DATABD.CO (2020), fast-moving consumer goods (FMCG) companies contribute significantly to single-use plastic pollution because they use plastic packaging in the form of food wrappers and sachets on the majority of their products. Restaurants, airlines, hotels, and supermarkets are the primary sources of plastic waste generation in the service sector. In order to reduce the uses of plastic we have to find out such products that can be used as the alternative to it. Sustainable plastic waste management for the present and future can be envisioned and implemented. To reduce the usage of plastic, we must identify goods that can be used as an alternative to it. Plastic alternatives include bio-plastics, stainless steel, glass, platinum silicon, wood, bamboo, cardboard, paper, cotton, pottery, ceramics, etc. For instance, use jute polymer or eco-friendly poly bags, paper bags, cotton bags, jute bags, and other alternatives to polythene and plastic bags. As an alternative to single-use plastic bottles, consider using a sustainable plant-based bottle, paper bottle, biodegradable water bottle manufactured from algae, tiny edible water bottles, biopolymer bottles, bamboo bottles, stainless steel and metal bottles. Food wrappers and sachets are made from biodegradable polymers. Eco-friendly kitchen and household items. In addition, this review recommends the following possibilities for future studies on plastic pollution and the adverse effects of plastic waste, providing a direction for such research:

- Stainless steel, glass, platinum silicon, wood, bamboo, cardboard, paper, cotton, pottery, ceramics, and bio-plastic are some potential substitutes for plastic.
- Jute polymer or eco-friendly poly bags, paper bags, cotton bags, jute bags, and other options are available as alternatives to polythene and plastic bags.
- As an alternative to single-use plastic bottles, we can use sustainable plant-based bottles, paper bottles, biodegradable water bottles made from algae, tiny edible water bottles, biopolymer bottles, bamboo bottles, stainless steel or metal bottles.
- Plastics that are bio-based or biodegradable should be employed (European Bioplastics, 2017)
- Biodegradable replacements for food packaging and sachets.
- Eco-friendly household and kitchen products.
- Single-use plastics manufacturing and distribution, as well as other harmful practices, should be completely controlled.
- Prioritizing active research that focuses on single-use plastic management options and those materials' services, goods, uses, and—most importantly—possible development alternatives.
- Judiciously intervening is needed to reduce the consequences.

- An efficient "Integrated Plastic Pollution Observation Committee" should be established by the Department of Environment.
- Reforms that are realistic and practical should be made to existing laws or new laws that can be implemented in order to fit the current situation.
- To conceptualize the need for our own cause as well as the protection of our environment, a widespread public awareness building program for all age groups, both educated and layman class, must be implemented

CONCLUSIONS

Global plastic waste generation has reached a sky-high extent and this phenomenon has become a curse to the environment and the overall ecosystem. The heightening production and usage of plastic have compelled us to use it in every sector of our life without paying any attention to the upcoming deleterious upshots. Environment are already the victims of plastic ingestion, entanglement, and additional disastrous phenomenon and the day is not very far when the malediction will fall upon us due to the hazardous effect of plastic waste. And single-use plastic wastes are the most malicious to the environment because of their above-illustrated inherent characteristics. Though it is nearly impossible to avoid using Single-Use Plastic entirely, it is feasible to gradually reduce the use of plastic while increasing the use of alternative bio-degradable materials with no or little environmental impact. We hope that someday soon, we will be wise enough to recognize our mistakes and take appropriate action. Then, as it should be, the environment will be healthy, and Bangladesh will serve as a model for the rest of the world. As a result, both policymakers and individuals should work to decrease our reliance on single-use plastic products in modern life necessities by developing effective alternatives.

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