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POLLUTION REDUCTION THROUGH ALTERNATIVES TO USE OF PLASTICS – PAKISTAN CONTEXT

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By

Riaz Nazir Tarar[1]

Abstract

Due to progressively increasing manufacture of plastics and their use in everyday life since mid-20th century, the 'Plastic Pollution' has already gripped the entire global. Therefore, some alleviating measures are imminent to regulate / control this situation both at international and national levels.

At the international level, UN has already taken the initiative of developing / ratification of 'Plastics Treaty'. Five inter-governmental negotiation sessions have already taken place, while the sixth one is planned for August 2025. It is expected that sooner or later UN Plastics Treaty will be in place covering all facets of plastic pollution namely: manufacture; utilization; and sustainable disposal of the waste.

At the national level, Pakistan must develop a 'National Action Plan' both at governmental and public levels. This should cover the life-cycle of plastic pollution covering: manufacture; distribution; utilization including substitution through alternatives; and sustainable management till end of life. Obviously, its effective implementation will require conjunctive efforts by both the parties involving: appropriate legislation and its enforcement by the government; and wilful participation of the public aided by awareness, anti-plastic attitudinal behaviour, persuasion, and buy-back incentives.

1. Plastic Pollution

1.1 Historical

In the good old days before invention of 'Plastics', globally most of the producers / buyers utilized the alternate biodegradable materials for wrapping their products and commodities. Most common recyclable materials utilized for this purpose were: hand women baskets; cotton cloth bags; jute bags; and glass. But this scenario has now completely changed and the whole world is faced with a deluge of non-perishable plastic based: industrial products; fast food containers; beverages; and wraps for every day use domestic items.

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1.2 Emerging Scenario

Besides global population explosion, currently estimated around 8.3 billion, the main polluting factor has been the plastics. These are inexpensive, light weight and durable materials, which can be readily moulded into a variety of products that find use in a wide range of applications. Plastics industry has developed considerably since the invention of various routes for the production of polymers from petrochemical sources. These have substantial benefits in terms of their low weight, durability and lower cost relative to many other alternative materials.

Resultantly, production of plastics has increased manifold since around mid-20th Century. However, current levels of their usage and disposal generate several environmental problems. Around 4 per cent of world oil and gas production, a non-renewable resource, is used as feedstock for plastics and a further 3 – 4% expended to provide energy for their manufacture.

Plastics are also a main cause of climate change because of the large quantity of GHGs discharged during the production process, and in the near future its contribution is even expected to surpass that of the aviation industry. Furthermore, most plastics ultimately end up in the ocean, blocking sunlight and affecting the oxygen level in the water, leading to marine ecological catastrophes and decreasing the number of ocean carbon sinks. As a result, climate change is exacerbated and fresh seafood becomes increasingly scarce.

Current and Projected Annual Global Plastic Waste Generation' is Shown in **Table-1.**

Table-1: Current and Projected Annual Global Plastic Waste Generation

Sr. No.	Description	Global Plastic Waste Generation			
		Base Year	Population (Billion)	Per Capita Generation (kg)	Total (Million Tonnes)
1.	Current Trend:				
i.	2000	2000	6.2	28	172
ii.	2019	2019	7.8	41	320
iii.	2023	2023	8.1	43	350
iv.	2025	2025	8.3	48	400
2.	Projected Trend:				
i.	2050	2050	9.6	87	835
ii.	2060	2060	10.0	100	1000

Source: UN Environment Programme (UNEP) + 1

1.3 Plastic Products And Their Use

A major portion of plastics produced each year is used to make disposable items of packaging or other short-lived products that are discarded immediately within a single day or an year of manufacture. This indicates that our current use of plastics is not sustainable. In addition, because of the durability of the polymers involved, substantial quantities of discarded end-of-life plastics are accumulating worldwide.

Approximately 50% of plastics have single-use disposable applications, such as: packaging; agricultural films and disposable consumer items. Between 20 and 25% is used for long-term infrastructure such as pipes, cable coatings and structural materials. The remainder is used for durable consumer applications with intermediate lifespan, such as in electronic goods, furniture, vehicles, etc.

1.4 Life Cycle of Disposable Plastics

Existing 'Life Cycle of Disposable Plastic' is shown in **Figure-1.**

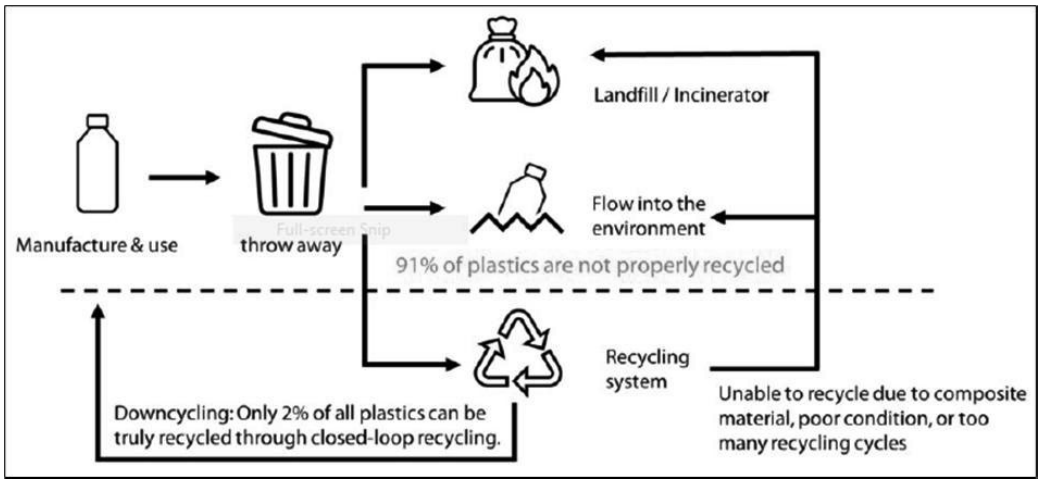


Figure-1: Existing Life Cycle of Disposable Plastic

2. Harmful Effects of Plastics

Plastic made goods and the extent of their 'Harmful Effects' are shocking as global plastic waste has already reached over 400 million tonnes (MT) annually (refer Table-1). Presently, about 90% of plastic waste remains unrecycled, while most of it ends up in: landfills; uncontrolled dumping; and fresh water bodies or oceans.

Though so far only about 2% of plastic waste pollutes our oceans seabed and marine life this is now arising a serious concern. This is illustrated by a 'Recent Bed Grab of Plastic Waste Pollution in Aegean Sea' as shown in **Photo-1**.



Photo-1: Recent Bed Grab of Plastic Waste Pollution in Aegean Sea

Plastic pollution clogs landfills, leaches into water bodies, and releases toxic smoke when burned in the open for disposal making it one of the gravest environmental threats. Not only that, but microplastics continue to infiltrate our daily lives. These tiny plastic particles find their way into the food we eat, the water we drink, and even the air we breathe. The exact number of plastic particles consumed annually varies, but the presence of hazardous additives in plastic products remains a serious concern for human health.

3. Longevity of Plastics

Because plastics have only been mass-produced since around 60 years or so their longevity in the environment is not known with certainty. Most types of plastics are not biodegradable and, in fact, extremely durable. Thus, majority of polymers manufactured today will persist at least for decades and probably for centuries if not millennia. Even degradable plastics may persist for a considerable time depending on local environmental / physical factors, such as levels of ultraviolet light exposure, oxygen and temperature.

Biodegradable plastics also require the presence of suitable micro-organisms. Therefore, degradation rates vary considerably between landfills, terrestrial and marine environments. Even when a plastic item degrades under the influence of weathering, it first breaks down into smaller pieces of plastic debris, but the polymer itself may not necessarily fully degrade in a meaningful timeframe. As a consequence, as already mentioned, substantial quantities of end-of-life plastics are accumulating in

landfills and as debris in the natural environment, resulting in both waste-management issues and environmental damage.

4. UN Initiatives on Plastics

4.1 Plastics Treaty

Alarmed by the above grave situation, UN has sprung into action to develop a 'Mandate for Plastics Treaty'.

4.1.1 Inter-Governmental Negotiations

At the conclusion of the United Nations Environment Assembly (UNEA-5.2) in March 2022, heads of states, environment ministers and other representatives from 175 nations agreed on a mandate to create a first-of-its-kind international legally binding instrument to end plastic pollution. Central to this agreement was establishment of an Intergovernmental Negotiating Committee (INC) tasked with producing an instrument of 'UN Plastics Treaty'. This will also address "the full life-cycle of plastics", which has yet to be defined for the purposes of the Treaty, but which could be considered to span from extraction to disposal.

Uptil end November 2024, following five INC sessions were held without achieving the object of preparing 'Zero Draft of Plastics Treaty'. INC-6 is now proposed to be convened in August 2025, with the hope that some tangible progress will be achieved.

4.1.2 INC-1

In December 2022, the starting negotiating session of the UN Plastics Treaty was convened by Inter-governmental Negotiating Committee (INC) in Punta Del Este, Uruguay. This was termed as INC-1, where delegates discussed procedures and foci to set the stage for forthcoming negotiations. There, it became apparent that despite widespread agreement that a 'UN Plastics Treaty' is urgently needed, there was disagreement over what that should look like? Major oil and gas producing nations like US, Saudi Arabia and some Asian countries proposed the creation of country-specific National Action Plans to set their own non-binding targets. At the other end of spectrum was a "high-ambition coalition" of countries led by Norway and Rwanda which called for a reduction in plastic production as well as a phase-out of certain plastic products and toxic chemical additives through alternatives. Other UN member states, including many African countries, as well as Costa Rica, Ecuador, Peru and Switzerland called for a more global approach to addressing the plastic pollution crisis.

4.1.3 INC-2

In May and June 2023, the second negotiating session of the UN Plastics Treaty (INC-2) was held in Paris, France. There the talks kicked-off with various challenges and delays including: last-minute attendance caps that limited the participation of members of civil society, particularly underserved frontline groups and Indigenous peoples; and procedural delays that hampered progress of discussion. After several days of little progress, delegates formed two parallel “contact groups” namely: one focusing on the Treaty objective and core obligations; and the other focusing on financial mechanisms, capacity building and national action and implementation plans. At the end of the negotiations, parties agreed that the Chair, with the support of the INC Secretariat, would produce a first “zero draft” prior to the start of INC-3 in Nairobi, Kenya in November 2023. It was also recognized that further informal intersessional work on the zero draft was necessary to keep negotiations on track.

4.1.4 INC-3

In November 2023, the third negotiating session of the UN Plastics Treaty (INC-3) was held in Nairobi, Kenya. It was held about 5 miles away from the Dandora dump site, a massive heap of plastic and other wastes including some imported from other nations as part of the globalized industrial waste trade. INC-3 concluded with some encouraging new developments including substantive discussions and a greater recognition for participation by indigenous and other non-civil society groups (hereafter referred to as “third-sector” groups). Negotiators also faced obstacles that continued to threaten the integrity of the agreement. Experts realised that plastic, petrochemical and fossil fuel industry presence and influences on the negotiations during INC-3 were a primary concern. Some countries proposed a national rather than global approach for binding treaty provisions, though binding rules were needed to significantly reduce plastic production. During INC-3 delegates dug into reading, substantially discussing and developing the Treaty’s, initial starting document i.e. Zero Draft. However, UN Member States failed to reach an agreement on intersessional work to revise the draft ahead of INC-4.

4.1.5 INC-4

In April 2024, the fourth negotiating session of the UN Plastics Treaty (INC-4) was held in Ottawa, Canada. During INC-4, there was increased acknowledgment of the harmful effects of plastics on human and planetary health. There was increased presence of fossil fuel, plastic, and petrochemical industry representatives at INC-4 despite attendee calls for

conflict of interest policies. On the other hand, indigenous and frontline groups were denied full and equitable participation in the session. Still, a handful of nations took an ambitious approach to limit plastic production at the source and eliminate through alternatives use of toxic chemicals throughout the full life-cycle of plastics.

While it was agreed to conduct intersessional work before INC-5, countries compromised to exclude upstream measures, which will make it challenging to include key extraction or production reduction measures in the Draft Plastics Treaty. This compromise was a missed opportunity to comprehensively address the root causes of plastic pollution resulting from fossil fuel based plastic production.

4.1.6 INC-5

INC-5, was set to take place in Pusan, Republic of Korea, as final planned session and thus a critical moment to deliver a strong Global Plastics Treaty. INC-5 was held as planned during late November 2024. While this was slated as the final session, negotiators from over 170 countries remained gridlocked on the final day (December 1), failing to agree on including measures to reduce plastic production. Most ambitious countries and observers emphasized that prioritizing a strong Treaty was more valuable than settling for a weak agreement now, unlike the industry's preference for voluntary commitments that exclude plastic production.

As in the previous four sessions, progress at INC-5 was mainly obstructed by fossil fuel and plastics industry influence, compounded by the exclusion of right holders disproportionately impacted by plastic pollution. Despite pressure from a handful of petrostates, the majority of countries rallied together for a strong Treaty, with more than 100 countries backing Panama's Proposal. It included: measures to reduce plastic production; and 95 supporting legally binding targets to regulate harmful chemicals. Consequently, over 120 nations called for a treaty with robust implementation measures. This INC also saw a record-breaking turnout – a total of 3,300 delegates – representing governments and observers, reflecting the treaty's growing importance on the global stage. Notwithstanding this, for preparation of 'Zero Draft of Plastic Treaty' need for further intersessional deliberations was recognized.

4.1.7 INC-6

The timeline for the forthcoming negotiation meetings (INC-6) for the UN Plastics Treaty has been tentatively planned from 5-14 August, 2025 in Geneva, Switzerland. However, going by the track record of such UN initiatives, it is unlikely that the instrument in the form a Zero Draft of the

Treaty will be available during INC-6 and the stalemate may continue further on.

4.2 UN Roadmap to Cut Global Plastic Pollution

While work on drafting 'Plastics Treaty' through INC was continuing, in 2023 UNEP issued a report on 'Roadmap to Cut Global Pollution'. This report was prepared in collaboration with plastic pollution experts from the University of Portsmouth, Global Plastic Policy Committee and other organisations.

This Report laid out the roadmap to dramatically reduce these risks through adopting a circular approach by keeping plastics out of ecosystems, our bodies and the economy.

The slash overall global plastic pollution to 80% by 2040, the Report proposed:

i. Eliminating problematic and unnecessary plastics to reduce size of the problem.

ii. Three marked shifts to reuse, recycle and reorient for products diversification.

For implementing this roadmap, the Report suggested the following instruments:

i. Reuse: Promoting reuse options, including refillable bottles, bulk dispensers, deposit-return-schemes, packaging take-back schemes etc, to reduce 30% of plastic pollution. To realise its potential, governments must help build a stronger business case for reusables.

ii. Recycle: Reducing plastic pollution by an additional 20% if recycling becomes a more stable and profitable venture. This will require: removing fossil fuels subsidies; enforcing design guidelines to enhance recyclability; and measures to increase the share of economically recyclable plastics from 21 to 50%.

iii. Reorient and Diversify: Careful replacement of products such as plastic wrappers, sachets and takeaway items with products made from alternative materials (such as paper or compostable materials) that could deliver an additional 20% decrease in plastic pollution.

Even after the above measures until 2040, about 100 MT of plastics from single-use and short-lived products will still need to be safely dealt with

annually, together with a significant legacy of existing plastic pollution. This could be addressed by setting and implementing design and safety standards for disposing of non-recyclable plastic waste and by making manufacturers responsible for products shedding and microplastics, among others.

5. Waste Management

Industrial and human activities contribute to waste generation. Previously, the waste mostly consisted of bio-degradable materials. After collection it was dumped in areas located outside the habitations and allowed to get converted into compost or low carbon content fuels.

Presently, however, the waste contains large quantities of non-bio degradable plastics and presents serious problems for its safe and sustainable disposal.

5.1 Conventional Approach

Flow Chart of Conventional Life-Cycle Waste Management of Plastics' is shown in **Figure-2.**

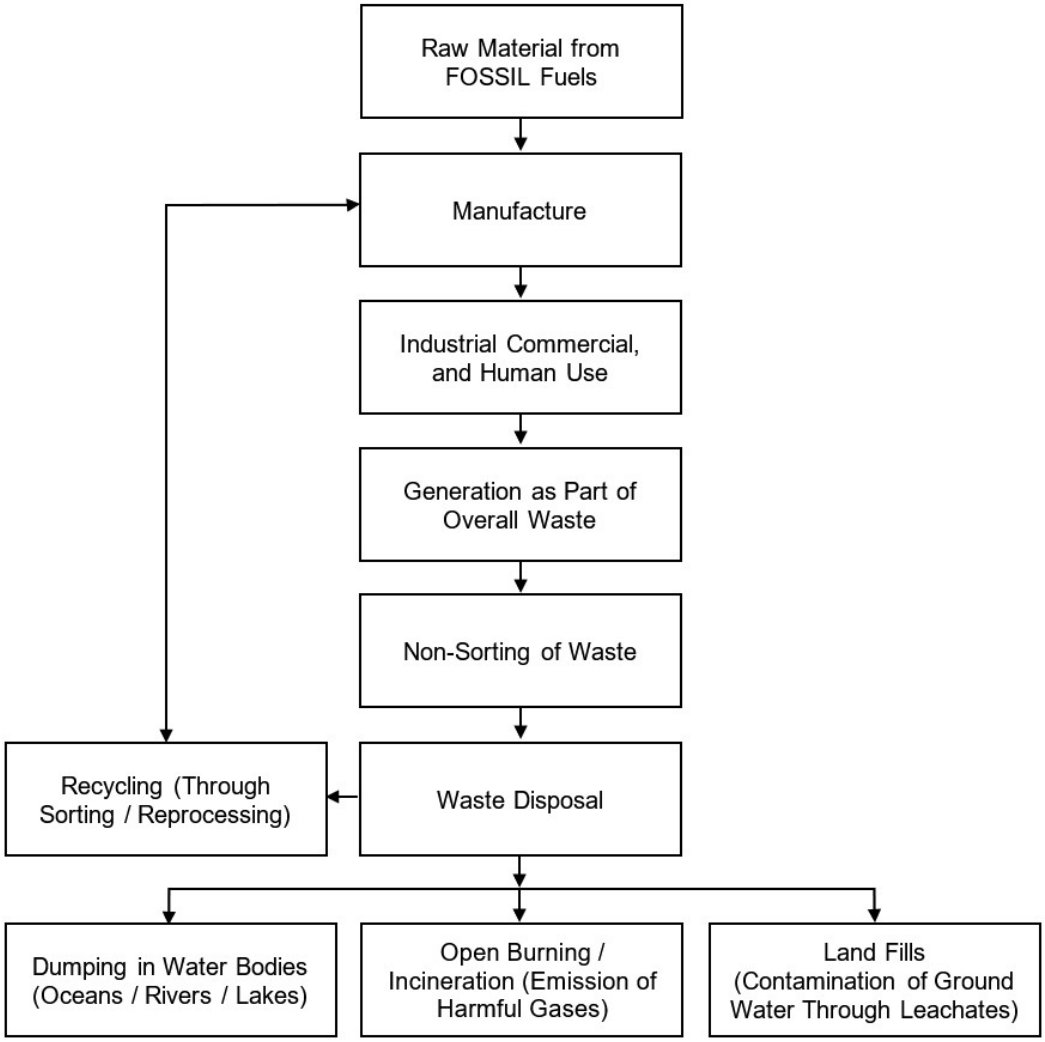


Figure-2: Flow Chart of Conventional Life Cycle Waste Management of Plastics.

Of 350 MT global plastic waste generation during 2023-24, the management status is shown in **Table-2.**

Table-2:Annual Average Global Plastic Waste Management Breakdown in 2023-24

Sr. No.	Disposal Method	Estimated Share (%)	Amount (Million Tons/Year)	Remarks
1.	Recycled	~9%	~31.5	Most recycling is mechanical and chemical recycling still limited
2.	Incinerated	~19%	~66.5	Used for energy recovery, but emits CO_2 and toxic substances
3.	Landfills	~50%	~175.0	Primary method in developed nations; though regulated but space intensive
4.	Dumping (Uncontrolled / Illegal Land Dumps)	~10%	~35.0	Common in countries with weak waste management infrastructure.
5.	Open Land (Littering in Open Spaces, Roadsides etc.)	~6%	~21.0	Includes roadside and agricultural land dumping.
6.	Water Bodies (Rivers, Drains, Lakes)	~4%	~14.0	With rivers acting as major conduits to the ocean
7.	Ocean (Marine Plastic Pollution)	~2%	~7.0	Enters via rivers, coastal mismanagement and fishing activities
8.	**Total**	**~100**	**350.0**	

It can be seen from Figure-2 that in the conventional approach, once the materials enter waste stream their further disposal is through dumping into designated landfills. In limited cases, the waste could be also burnt in open or incinerated. Lastly, due to paucity / cost of landfills a resort could be also made to dumping in oceans or natural water bodies of rivers and lakes.

5.2 Modified approach

As already highlighted, with excessive plastic contamination of the waste, all measures are hazardous and unsustainable besides being challenging. To cope with these challenges, the following 4 Rs strategy is now being propounded for waste management:

R1: Reduce (through alternatives and curbs at production source levels).

R2: Revise (through conversion to bio degradable plastics).

R3: Recycle (through salvage)

R4: Recover (through energy generation).

In case of constraints in implementation of above strategy, landfill could be adopted as least desirable option.

Hopefully, the above R4 strategy will find place in the upcoming UN Plastics Treaty with mandatory implementation commitment by the signatories. Being cost intensive a 'Plastic Waste Management Fund' many have to be established for easing financial constraints, particularly of developing countries like Pakistan.

As the issue has already assumed grave proportion, some immediate grass-root actions need to be initiated within each country not only to arrest but reduce the contribution of plastics to waste generation. This could be achieved through alternative/substitute materials such as bio degradable plastics or reduced plastic use.

5.3 Immediate Grass Root Actions

Biodegradable plastics, though involving significant cost, have the potential to solve a number of waste management issues, especially for disposable packaging in catering or from agricultural applications that cannot be easily separated from organic waste. However, bio-degradable plastics also have the potential to complicate waste management when introduced without appropriate technical attributes, handling systems and consumer education.

On the other hand, significant component of reduced plastic use can be achieved at the consumer level through creation of awareness, incentives and education. This mode of plastic use reduction through encouragement of alternatives seems plausible for developing countries like Pakistan. Here majority of population resides in rural areas with sizeable generation of throw away single-use plastic waste without any institutional arrangements for its collection and disposal.

6. Plastic Pollution Coping Strategy

To cope with deluge of plastic pollution, tandem priority global efforts are imminent both at international and national levels.

6.1 UN Plastics Treaty

As already mentioned, at international level UN has already taken initiative through drafting of Plastics Treaty. Five sessions of UNEP's International Negotiating Committee (INC) have taken place while the 6th is now scheduled in Geneva during August 2025.

Notwithstanding painstakingly low progress in preparation of such international instruments, it is anticipated that UN Plastics Treaty will be

developed/ratified soon by UN member nations with mandatory implementation.

It is also hoped that the Treaty will be comprehensive and cover all the life-cycle facets of coping strategy for plastic pollution.

6.2 National Plans

Depending upon its location, climate, development status, cultural, conventional waste management levels and public attitudes including level of awareness, each country should develop an individual national plastic plan.

7. Pakistan Present Waste Management Scenario

7.1 Urban

In the urban areas administrated by municipalities / corporations, the public waste, including significant proportion of plastics, to the end of life-cycle is managed in the following manner:

i. Mechanical collection from designated fifth depots or open dumps.

ii. Entry of dumped plastic wastes into sewerage system leading to choking.

iii. Further disposal of waste through:

   a. Open burning emitting toxic fumes.

   b. Landfills

   c. Dumping into natural water drainage of rivers, lakes and sea.

Position in Lahore, the second largest city of Pakistan with population of about 110 million, could be considered as reasonable representation of plastic waste management through dumping into surface drainage.

Historically fresh water Ravi River, even in the low flow periods, is now acting as raw sewerage disposal drain of the city. This sewerage water contains as substantial quantity of plastic waste. As an example, Photo-2 shows plastic waste clogged surface of ‘Sato Katla Drain’ passing through posh Phase VIII area of Defence Housing Authority (DHA).



Photo-2: Plastic Waste Clogged Surface of Sato Katla Drain Passing Through Phase VIII of DHA

Obviously, the above waste management measures are hazardous and unsustainable.

7.2 Rural

The situation is more alarming in the rural areas where about 60% of population is presently residing.

One-time plastic use in everyday life is rampant and without any control. The situation is further aggravated by the fact that, unlike the urban areas, there are no arrangements for waste collection and disposal. This is evident from the fact that all along inter-city and farm-to-market roads in Pakistan, there is an unending stream of single use plastic waste. Due to wind blowing, a large part of this plastic waste gets into the agricultural area to the extent that even the animal / compost manures are contaminated by plastics.

8. Pakistan's Plastic Management Plan

8.1 Approach

With due consideration all aforementioned aspects, it is felt that the best strategy for Pakistan will be to regulate both plastic manufacture, distribution and its public use through: appropriate legislation including its enforcement; creating awareness among public including education; and incentives where feasible.

Most cost effective approach with immediate dividends will be to encourage 'Alternatives to Use of Plastics'.

8.2 Alternatives to Plastic Use

Following long-lasting plastic alternatives are now available

i. Stainless steel
ii. Glass
iii. Platinum silicon
iv. Bees Wax – coated cloth
v. Wood
vi. Bamboo
vii. Pottery and other ceramics
viii. Paper
ix. Card board

8.3 Plastic Management Through Reduced Use

In pursuant of above suggested approach, the main thrust of this Plan should be to 'Reduce Plastic Use and Go Plastic Free'.

8.3.1 Plastic in Common Life

Before thinking about this Plan, it is important to know as to where are plastics in our life?

This versatile material is in our appliances, computers, clothing, and so much more. Some of the most common places we find plastic is wrapped around the things we buy every day. After all, it is an effective way to keep food and cosmetics clean and fresh.

Presence of plastic is in every day life is best illustrated by the following global list:

i. Food packaging: Cereals, crackers, snacks, and many teas and coffees come in plastic.

ii. Most cheese, meat, and yogurt is packed in plastic, as are many condiments.

iii. Milk (including soy and nut milk) cartons comprising waxed cardboard with about 20% plastic and 80% paper.

iv. Metal cans lined with plastic.

v. Personal care products coming in plastic bottles and tubes. Many shampoos, gels, creams, moisturizers, and make up contain synthetic polymers (plastic) and some may also contain microbeads.

vi. Dental floss and disposable razors made from plastic based materials.

vii. Synthetic fabrics such as polyester, nylon, rayon acrylic yarns and fabrics made from plastic. When washed, these materials shed millions of microscopic plastic fibres that eventually wind up in waterways.

viii. Baby wipes and diapers. From their inner layer to their waterproof outer cover, disposable diapers are made from plastic. Super absorbent polymer makes up the absorbent inner core, while the outer layer is usually a petroleum-based plastic or a plastic-treated fabric.

ix. Wrapping paper is often a mix of plant fibres and laminated plastic while tape, glitter, and stickers also contain plastic.

x. Chewing gum where one common ingredient included in the “gum base” is polyvinyl acetate.

xi. Cigarette filters containing cellulose acetate, a form of plastic.

xii. Glues, including school glue and wood glue, containing polyvinyl acetate, a type of plastic. The glues used to seal tea bags include polypropylene, another plastic.

xiii. Coffee cups with those that appear to be made from paper often have plastic in the lining.

8.3.2 Need for Reducing Plastic Use

Since plastics are a type of synthetic chemical product, they will release harmful substances such as Dioxin, Bisphenol A (BPA), Phthalates, or other additives into the environment and even into the human body due to

physical wear and tear and changes in temperature or pH value. Reducing plastics will have a direct benefit to our health.

8.3.3 Current Level of Plastic Waste Generation

Current population is about 225 million. Even assuming global annual for capita generation 48 kg in 2025 (refer Table-1) the estimated plastic waste generation is over 10 MT. conservatively adopting 25% as single use throw away plastic, about 2.5 MT is being annually dumped into the environment without any possibility of degradation.

8.3.4 Thrusts for Reducing Everyday Plastic Use

The first focus should be to introduce / encourage alternatives to use of plastics.

Normally, plastic reduction is a progressive process, hence we must try simple methods to reduce everyday plastic use to achieve “zero plastic” in the long run. Guides both for beginners and veterans are highlighted in the following:

i. Simple “Plastic Reduction” Methods for Beginners:

   a. Avoid dining out: Dining out often entails the use of single-use plastic foodware. By dining out less frequently or at least choosing restaurants that offer reusable tableware, we can help to reduce plastic.

   b. Choose commodities that claim to use “natural materials” which partially replace plastic content of products.

   c. Bring your zero-plastic eco-friendly cup, tableware, and bags.

ii. More “Zero Plastic” Ideas and Techniques for Veterns:

   a. Choose commodities that claim to use zero plastics. As the plastic-free lifestyle becomes more popular, more manufacturers are unveiling plastic-free products for consumers.

   b. Reuse plastics: If you are already using plastic products, make sure to extend their lifespan and avoid purchasing new plastic products to solve the problem at its source.

8.3.5 Easy Ways to Reduce Plastic Use

As per latest (2023) guidelines, there are following 26 ways for reducing plastic wastes:

1. Carry a shopping bag with you.

2. Choose beverages with containers that have less plastic.
3. Purchase cooked food with non-plastic packaging.
4. Purchase non-plastic food jars for your home.
5. Purchase eggs with paper cartons.
6. Use cleaning products more sparingly.
7. Use compostable food waste bag.
8. Choose cornflakes with paper packaging.
9. Combine trash from different trash bags into one trash bag.
10. Open the windows for ventilation or use candles to keep the air fresh.
11. Purchase pure cotton dishcloths.
12. Purchase toothbrushes with bamboo handles alternatively 'Miswak').
13. Purchase milk in glass bottles.
14. Refuse plastic straws.
15. Purchase toilet paper with paper packaging.
16. Use dishcloths in place of wet wipes.
17. Use handkerchiefs instead of paper napkins.
18. Use matches or metal lighters.
19. Avoid single-use plastic tableware
20. Purchase wooden cutting boards.
21. Purchase cotton toys.
22. Avoid purchasing products with excessive plastic packaging.
23. Purchase digital music albums.
24. Use a loofah instead of manmade sponges.
25. Wear clothing with a higher natural fibre content.
26. Purchase coffee in aluminium cans.

8.4 The Plan

In the light of foregoing considerations, the National Plastic Management Plan should comprise:

i. Governmental Level Activities.

ii. Public Level Activities.

8.4.1 Government Level Activities

These should cover:

i. Creating public awareness through media.

ii. Including plastic management in the curricula of education starting from secondary level.

iii. Introducing, similar to urban areas, institutional waste management in rural areas through local bodies.

iv. Creating binding legal instruments and their strict enforcement for regulating manufacturing and distribution of plastics, particularly single-use or throw-away categories.

It may be worth mentioning that Federal / Provincial Environmental Protection Agencies (EPAs) are trying to enforce some essential regulation regarding 'Single-use Plastic Items. Recent example was as reported in Daily Dawn of May 26, 2025 (refer **Annex-01**). Accordingly, Pak-EPA and Islamabad Capital Administration are intensifying enforcement of 'Single Use Plastics (Prohibitor) Regulations, 2023'. However, this is a sporadic action and need to be made part of regular enforcement of such regulations at all levels including provinces and administratively controlled Jammu and Kashmir Areas.

8.4.2 Public Level Activities

These are crucial activities as entire generation of plastic waste takes place at this level. Further, the aforementioned guidelines for reducing the plastic use need to be implemented through collaborative efforts of: creating awareness; education; persuasion; financial pay-back incentives; and involvement of public at large through intellignatia and NGOs. In turn, this will encourage adoption of 'Alternatives to Plastic Use' thus significantly facilitating sustainable 'Life Cycle Management of Plastic Waste in Pakistan'.

9. Conclusions And Recommendations

9.1 Conclusions

i. Plastic waste deluge is now gripping the globe at an alarming rate. This is evident from the following 21st Century Global Plastic Generation Indices':

   a. Annual generation in 2000 was around 170 million tons (MT).

b. As of 2023 about 350 MT of plastic was produced annually. Out of this, about 50% was single-use plastic and then discarded into the environment with dire consequences.

c. With the projected trend, by 2060 the annual plastic generation may approach 1000 MT.

d. Even the current level of plastic generation raises environmental problems as about 4% of world's fossil fuels are used as feedback for plastics and another 3-4% expended to provide energy for their manufacture.

ii. a. Life-cycle plastic disposal comprises manufacture and use; throw away of single-use plastic; and remaining through disposal landfills incineration and dumping into natural water bodies including oceans.

b. Plastic dumping into oceans, though still a small portion of the total generation, has already started serious degradation of marine environment and seabeds.

c. Most plastic types are not biodegradable and extremely durable. Thus many of the plastics manufactured today will persist at least for decades, if not centuries.

d. This disposal is unsustainable and its dumping into the environment is creating adverse socio-economic effects.

iii. a. Industrial and human activities contribute to waste generation.

b. Previously the waste, mostly comprising bio-degradable materials, was dumped in areas outside human habitations and allowed to get degraded into composts.

c. Presently, however, the waste contains large quantities of non-biodegradable plastics and presents serious problems for its safe and sustainable disposal.

iv. To enable sustainable plastic waste management, immediate priority actions are imminent at both international / national levels.

v. At the international level, since 2022 UN is working on preparation / ratification of a 'Plastic Treaty'. So far five intergovernmental discussion sessions have been convened but without much progress due to hindrance caused by the oil producing cartels. However, the efforts are continuing and the 'Plastic Treaty' may be established / ratified in the not too distant further.

vi. a. At the national an 'Action Plan' should be immediately developed through conjunctive efforts by the Government and Public.

b. At Governmental level, the Action Plan should:

– Primarily focus on consolidation of plastic waste management regulations, existing as well as required, and their strict enforcement at production and marketing level including distribution and retailing.

– Launch, a vigorous 'Public Awareness Campaign' through media and institutional level education on plastic waste management.

– Upgrade existing urban waste management facilities through corporations and municipalities and establish appropriate rural waste management facilities with ensured O&M by the local bodies of: District Councils, Tehsil Councils, and Union Councils.

c. At public level, implementation of 'Plan for Sustainable Plastic Waste Management' be ensured through awareness and willful participation and cover:

- Social mobilization through NGOs and influential groups including intelligentsia for Plan implementation at grass-root level.

– Persuasion through media campaigns.

– Development of pro-plastic waste management attitude.

- Encouraging adoptions of alternatives to plastic use to reduce the quantum of disposable waste.

- Offering financial incentive in form of buy-back of recyclable plastics through a mandatory obligation at the distribution points (specially beverages, fast foods, etc.).

9.2 Recommendations

i. At the international level Pakistan should activity participate in INC discussions for taking the UN Plastics Treaty to the stage of early finalization and rectification.

ii. At national level the 'Plastic Management Plan' be prepared through Integrating both Government and Public level activities as highlighted under foregoing 'Conclusions'.

iii. Governmental level part of the Plan be implemented through appropriate regulations and their enforcement through EPA's and local bodies at both urban and rural levels.

10. References

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ANNEX – 01

Enforcement of Single Use Plastics (Prohibition) Regulations 2023

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Pak-EPA, capital admin go after single-use plastic items as usage remains rife

EPA DG says anyone found using polythene bags will be fined

By Jamal Shahid

ISLAMABAD: As single-use plastic items continue to be used in the federal capital despite a 2023 law to curb their use, the climate ministry has claimed they have stepped up a crackdown on such items and imposed fines on several violators.

In a statement, its spokesperson Saleem Sheikh said the Pakistan Environmental Protection Agency (Pak-EPA) in collaboration with the Islamabad Capital Territory (ICT) administration had "intensified" its enforcement of the Single-Use Plastics (Prohibition) Regulations 2023.

The official recalled that on May 23, a Pak-EPA's enforcement team conducted a targeted inspection in the G-6 Sector and seized over 15 kilogrammes of banned single-use plastic products. Six shopkeepers were fined and issued warnings for non-compliance, he added.

In a separate operation on May 22, Pak-EPA teams carried out inspections in key markets, including G-9 Peshawar Mor Market, Safa Gold Mall (F-7 Markaz), and Rana Market (F-7/2).

These raids led to the confiscation of over 300 kilogrammes of banned items and Rs45,000 in fines on seven violators, the spokesperson added. On May 16, inspections in G-7 Markaz and adjacent markets resulted in the seizure of 150 kilogrammes of single-use plastics and Rs10,000 in fines, he added.

Lauding the joint crackdowns by Pak-EPA and the ICT administration, Pak-EPA Director General Nazia Zeb Ali emphasised the agency's firm stance against plastic pollution.

"This crackdown is part of our sustained efforts to enforce the Single-Use Plastics (Prohibition) Regulations 2023," she highlighted.

She said further that such plastics release toxic chemicals as they degrade, adding that these microplastics enter soil, water, and even the air, posing long-term health risks. Open burning of plastic waste, still a common practice, produced harmful fumes that directly impacted respiratory health, especially among children and the elderly, she added. It may be noted that in the absence of a proper waste disposal system in the capital, particularly in some of its rural areas, waste burning has become a common practice.

Nazia Zeb Ali also urged the public to support the government's efforts to rid the city of the growing burden of single-use plastics and its adverse impacts on the environment, public health and the city's sewerage system.

city and its adjoining areas for overall protection of the environment and public health," she remarked. She highlighted that stringent actions would continue at all levels against those disregarding the ban, contaminating the city's environment and harming public health.

The Single-Use Plastics (Prohibition) Regulations 2023 banned the manufacture, import, distribution, sale, and use of single-use plastics, including polythene bags and disposable beverage containers, within the Islamabad Capital Territory.

DG Nazia Zeb Ali warned that anyone found using, selling and manufacturing polythene bags would be liable to pay fines. In case of violation of law, an individual would be fined Rs5,000, a manufacturer Rs100,000 and a shopkeeper Rs10,000.

Highlighting the environment and public health burden of single-use plastic items, Nazia Zeb Ali remarked that single-use plastics, such as polythene bags, disposable utensils, and plastic straws, are among the leading contributors to urban pollution.

"In Islamabad alone, a significant portion of municipal waste is composed of polythene bags. Besides being known as a major cause of deleterious impact on the environment and public health, these plastics clog drainage systems, contribute to urban flooding and take centuries to decompose," she highlighted.