



INTERNATIONAL PUBLIC POLICY INSIGHTS

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ARE PLASTICS THE ENEMY? PREVENTING THE ACCUMULATION OF PLASTIC WASTE IN THE ENVIRONMENT

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*PLASTICS ARE NOT THE ENEMY, AND SHOULD NOT BE
DEMONISED. THEY ARE VERY USEFUL PRODUCTS AND LIFE
TODAY WOULD BE IMPOSSIBLE WITHOUT THEM. THE ONLY
THING WRONG WITH THEM IS THAT THEY CAN LIE OR FLOAT
AROUND FOR DECADES IF THEY GET INTO THE OPEN
ENVIRONMENT.*

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This Policy Insights theme on the Year of Sustainability

The "2023 Year of Sustainability" theme in the United Arab Emirates (UAE) is a significant initiative aimed at promoting and advancing sustainability in various aspects of the country's development, in addition the hosting of the Congress of Parties (COP28), in Dubai. This theme underscores the UAE's commitment to addressing environmental, social, and economic challenges while working towards a more sustainable future. Here is a brief overview of the critical aspects of the 2023 Year of Sustainability theme in the UAE:

- 1. Environmental Stewardship:** The UAE has been actively pursuing sustainability in environmental practices. Initiatives such as renewable energy projects, sustainable agriculture, and conservation efforts are expected to be highlighted and expanded in 2023. The country aims to reduce its carbon footprint and conserve its natural resources.
- 2. Green Innovation and Technology:** The UAE is known for its investments in green technology and innovation. In 2023, there will likely be a focus on promoting research and development in sustainable technologies, energy-efficient solutions, and eco-friendly transportation.
- 3. Sustainable Urban Development:** As the UAE continues to grow and urbanize, sustainable urban planning and development will play a vital role in improving quality of life and reducing environmental impact. This theme is expected to emphasize the importance of smart cities and green infrastructure.
- 4. Conservation and Biodiversity:** The UAE is home to unique ecosystems and wildlife. The Year of Sustainability will likely include conservation efforts to protect these natural treasures and promote biodiversity through initiatives like wildlife reserves and habitat restoration projects.
- 5. Sustainable Business Practices:** Encouraging businesses to adopt sustainable practices is a key element of the 2023 theme. The UAE will likely support and incentivize businesses to



implement eco-friendly policies, reduce waste, and operate with a focus on environmental and social responsibility.

6. Education and Awareness: Promoting sustainability education and raising awareness among citizens, residents, and visitors is crucial. Educational programs and campaigns are expected to be an integral part of the Year of Sustainability, fostering a culture of responsible and environmentally conscious behavior.

7. International Collaboration: The UAE has a history of collaborating with international organizations and partners to address global sustainability challenges. In 2023, the country is likely to continue its efforts to contribute to global sustainability initiatives and share its expertise with the world.

The 2023 Year of Sustainability in the UAE reflects the country's dedication to sustainability, recognizing that a balanced approach to economic growth and environmental stewardship is essential for the well-being of current and future generations. This theme is expected to have a lasting impact on the UAE's policies, practices, and its position as a global leader in sustainability.

Abstract

To address plastic waste accumulation comprehensively, a combination of these policy tools within a coherent and adaptable policy framework may be the most effective approach. Successful implementation will depend on political will, stakeholder collaboration, robust enforcement, and ongoing evaluation to ensure the chosen policies achieve their intended environmental goals.

Ultimately, tackling the plastic waste crisis is a shared responsibility that requires the collective efforts of governments, industries, communities, and individuals. By employing a range of policy tools and fostering a culture of sustainability, we can work towards a cleaner and more environmentally friendly future.

Background

Policy Problem

The fact is that a large proportion of plastic waste does not get collected and cannot therefore be recycled. Collection can be improved, but for the foreseeable future there will still be a substantial amount of plastic waste accumulating in the environment. The problem affects everyone, including the creatures living in the environment on land or sea. The problem occurs everywhere, and has existed since the widespread use of plastics began, more than 40 years ago. This is a problem that the government should address because governments have a duty to protect the environment for their citizens and future generations.

Rationale for government intervention

Plastic products are very useful, and should not be banned, but if they escape into the open environment they are a persistent form of pollution. Government can easily intervene by ensuring that all short-life polyethylene (PE) or polypropylene (PP) products, made in the UAE or imported, shall be made with oxo-biodegradable technology (Agence Nationale de la Recherche, 2022; BPA, 2023a). Any of this plastic which gets into the environment would then biodegrade much more quickly, leaving no microplastics or other harmful residues. It could still be recycled if collected during its service-life. It is important to distinguish between oxo-biodegradable plastic and plastic marketed as compostable. The latter does



not address the problem, for the reasons given at BPA (2023b), Agence Nationale de la Recherche (2022) and Rose et al. (2020) . If the government does not intervene, businesses and consumers will continue to use conventional plastic, which will not be collected and accumulate in the environment for many decades before it eventually biodegrades.

Policy Issues

Policy Objectives

The policy objective of this policy brief is to protect the environment by ensuring that conventional plastic is replaced by plastic which will rapidly biodegrade if it gets into the open environment, leaving no harmful residues.

Policy Context

This would not be a new policy, because the UAE has already legislated (Cabinet Decree No. (420/3) for the year 26/12/2009 Session No. 13) to make oxo-biodegradable technology compulsory, and similar legislation has been enacted in Saudi Arabia, Bahrain, and Yemen. However, the legislation does not apply to all short-life PE and PP products, and is not sufficiently complied with or enforced.

Policy Scope

All that is needed is to fine some offenders and confiscate the goods. Also to confiscate offending imports at the border, and give these proceedings wide publicity. Also to widen the scope of the products which have to be oxo-biodegradable, to include all short-life PE and PP products, including plastic films used in agriculture.

The High Level Information Requirement is for the government to have always the relevant data.

Key Stakeholders

The key stakeholders in government are the Environment Ministry, the Trade Ministry, Emirates Authority for Standardization and Meteorology (ESMA), and the police and customs authorities; in addition to the public, retailers, and other business, plastic manufacturers and farmers.

The following diagram is the “issues’ tree where we interpret “issues” as the consequences of the policy problem.

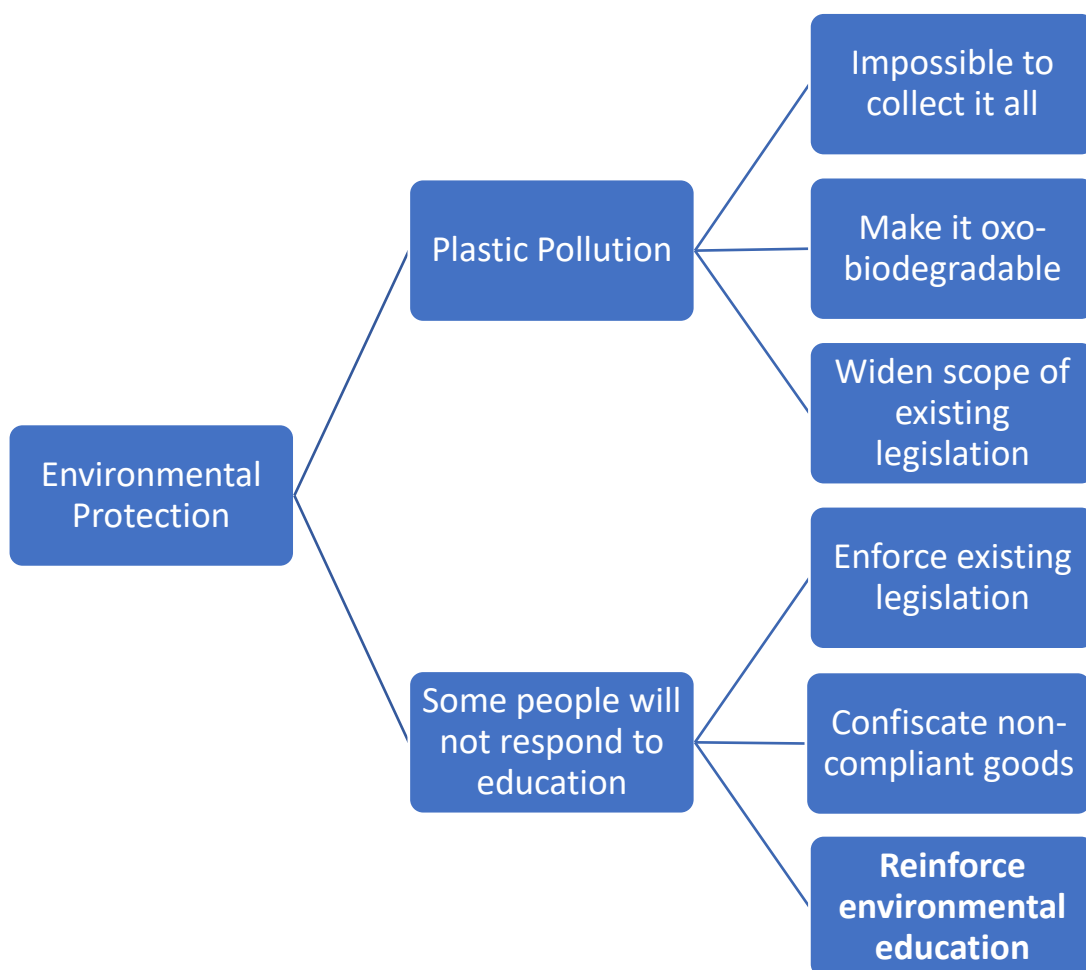


Figure 1: Plastic Policy Issues Tree



Stakeholder Analysis

Stakeholder Analysis for Environmentally-Friendly Plastic Policy in the UAE

Stakeholder analysis is crucial for understanding the interests, influence, and roles of various stakeholders in the implementation of an environmentally-friendly plastic policy in the United Arab Emirates (UAE). The following analysis identifies key stakeholders and their potential interests and roles in this policy initiative:

1. UAE Ministry of Climate Change and Environment:

Interest: The UAE Ministry of Climate Change and Environment is deeply concerned about environmental sustainability and reducing plastic pollution. They aim to protect the UAE's ecosystems and natural resources (MOCCA, 2023).

Role: The MOCCA plays a pivotal role in policy development, regulation, and enforcement related to environmental protection, including overseeing the transition to eco-friendly plastics. They can also promote environmental education in a proactive way.

2. Office of the Minister of State for Foreign Trade (within the Ministry of Economy):

Interest: This Ministry is interested in supporting economic growth while ensuring adherence to international trade standards (MOEC, 2023).

Role: They can facilitate the import and export of environmentally-friendly plastic materials and products, promote sustainable trade practices, and ensure compliance with international agreements.

3. Emirates Authority for Standardization and Meteorology (ESMA) (under the Ministry of Industry and Advanced Technology):

Interest: ESMA is dedicated to ensuring product quality and safety standards in the UAE.

Role: ESMA can establish and enforce standards and certifications for oxo-biodegradable plastics to guarantee their safety, quality, and compliance with environmental goals.

4. Police and Customs Authorities:

Interest: Law enforcement agencies are interested in maintaining law and order and preventing illegal trade in plastics.

Role: They can enforce regulations related to the use, import, and export of conventional and oxo-biodegradable plastics, thereby deterring illegal activities.

5. Public:

Interest: The general public is increasingly concerned about environmental issues and plastic pollution.

Role: Public awareness and support are essential for the success of this policy. They can also exert pressure on businesses and policy-makers to comply with eco-friendly practices.

6. Retailers and Businesses:

Interest: Retailers and businesses are interested in compliance with regulations while minimizing costs.

Role: They play a vital role in implementing the policy by using and promoting oxo-biodegradable plastics and ensuring proper disposal methods.

7. Plastic Manufacturers:

Interest: Plastic manufacturers have a financial stake in producing and selling eco-friendly plastics.

Role: There is no need to invest in research and development to produce oxo-biodegradable plastics and adapt their production processes to align with sustainability goals, as the technology exists already. There is little or no extra cost and there is no need for new equipment or processes.

8. Farmers:

Interest: Farmers may be affected by changes in packaging materials and agricultural practices.

Role: They can adapt to new materials and farming techniques while contributing to sustainable agriculture and reducing plastic pollution. Farmers are causing plastic pollution by using conventional plastic for mulch film and other applications. This film fragments into persistent microplastics in strong sunlight in the UAE. Farmers should use oxo-biodegradable plastic so that the fragments are quickly biodegradable.

The success of the environmentally-friendly plastic policy in the UAE relies on the collaboration and engagement of stakeholders. Key government entities like the

Environment Ministry and ESMA are responsible for policy development and regulation, while law enforcement agencies ensure compliance. Public awareness, support, and the active participation of retailers, businesses, plastic manufacturers, and farmers are essential for implementing sustainable practices. Balancing environmental protection with economic interests will be a key challenge, making effective stakeholder engagement and cooperation crucial for achieving policy objectives.

PESTLE Analysis

Dimension	Description
Political	The political will exists in the UAE to reduce, re-use, and recycle where possible, but also to make sure that all short-life plastic products used in the Emirates will safely biodegrade if they get into the open environment
Economic	Oxo-biodegradable plastic is essentially ordinary plastic, upgraded with a special masterbatch at the point of manufacture. It can be made by existing plastics factories at little or no extra cost and with no loss of jobs. By contrast, bio-based plastic does not address the problem (EPA, 2023b) and is much more expensive, and has to be imported.
Socio-cultural	Most people will dispose responsibly of their waste, but plastic waste still gets into the open environment in unacceptable quantities by accident or by irresponsible disposal. There would be no detriment to the public or to businesses because an oxo-biodegradable plastic product has the same strength, transparency and other properties as ordinary plastic during its useful life.
Technological	Oxo-biodegradable plastic technology has been established for more than 50 years, and presents no technical problems (BPA, 2023a).
Legal	The legislation is already in place. It is necessary only to enforce it, and to increase the types of plastic product to which it applies.

Environmental	Plastic pollution is a hugely important detriment to the environment. The only way to prevent plastic in the open environment creating microplastics and persisting in the environment for decades, is to make it with oxo-biodegradable technology.
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Stakeholder mapping

Stakeholder Analysis			
Influence	High	<i>Manage</i> MOCCAÉ	<i>Involve</i> Government Businesses & Retailers The public Plastic Manufacturers
	Low	<i>Monitor</i> MOE ESMA Customs	<i>Acknowledge</i> Farmers Police
		Low	High
		Support	

Theory of Change

Theory of Change: Addressing Persistent Plastic Litter in the Environment

Problem Statement: The main cause of the problem is accidental, careless, and/or deliberate littering of plastic waste, leading to environmental pollution.

Desired Outcome: Reduce and eventually eliminate persistent plastic litter in the environment.

Theory of Change: Process

Step 1: Increased Awareness and Education

- **Inputs:** Resources for public awareness campaigns, educational programs, and advocacy efforts.

- Activities: Conduct educational campaigns, workshops, and awareness programs to inform the public about the environmental consequences of plastic litter.
- Outputs: Improved public knowledge and understanding of the issue.

Step 2: Public Engagement and Behavior Change

- Inputs: Efforts to engage the public, local communities, and businesses in sustainable practices.
- Activities: Encourage responsible disposal and recycling through incentives, partnerships, and community initiatives; re-examine the concept and policies on alternatives to single-use plastics (Bell & Cave, 2011; Li et al., 2022).
- Outputs: Increased adoption of responsible behaviors and practices.

Step 3: Advocacy and Policy Reform

- Inputs: Resources for advocacy efforts, policy research, and stakeholder collaboration.
- Activities: Advocate for comprehensive legislation and technical standards comprehensively addressing plastic litter, including more substantial penalties to encourage compliance.
- Outputs: Reduced amount of persistent plastic pollution

Step 4: Strengthened Enforcement and Penalties

- Inputs: Investment in law enforcement resources, monitoring technologies, and compliance mechanisms.
- Activities: Strengthen enforcement of anti-littering laws, implement fines and penalties for violators, and employ surveillance and monitoring tools (such as compliance measurement tools).
- Outputs: Enhanced enforcement leading to a reduction in littering incidents. Furthermore, Enhanced enforcement reduces the use of conventional plastic where oxo-biodegradable plastic would be better.

Step 5: Reduction of Persistent Plastic Litter

- Inputs: Ongoing efforts and resources for clean-up initiatives and recycling infrastructure.

- Activities: Conduct regular clean-up drives, promote recycling, and support innovative solutions to remove existing litter. Ensure that short-life plastic products are oxo-biodegradable, so they will quickly biodegrade if despite these efforts they do get into the environment.
- Outputs: A gradual reduction in the amount of persistent plastic litter in the environment. Strengthened enforcement will deter littering and ensure that the plastic will not lie or float around for decades if it gets into the open environment.

Step 6: Continuous Monitoring and Adaptation

- Inputs: Resources for ongoing assessment, data collection, and stakeholder engagement.
- Activities: Monitor the effectiveness of policies and initiatives, gather data on littering trends, and adapt strategies as needed.
- Outputs: Informed decision-making and adaptive strategies for long-term success.

Step 7: Sustainable Behavior Change and Plastic Pollution Reduction

- Outcomes: Persistent plastic litter significantly reduced or eliminated.
- Impact: Improved environmental sustainability, reduced harm to ecosystems, and enhanced public well-being.

Through increased awareness, behavior change, advocacy, enforcement, and continuous monitoring, the goal of reducing and eventually eliminating plastic litter in the environment can be achieved, leading to a more sustainable and cleaner ecosystem, and in the meantime ensuring that the plastic is oxo-biodegradable so as to reduce its environmental impact.

Assumptions:

- Increased awareness and education will lead to changed behaviors.
- Advocacy efforts will result in stronger laws and improved compliance.
- Strengthened enforcement will deter littering.
- Continuous monitoring and adaptation will ensure long-term success.

Risks and Challenges:



- Resistance to behavior change or slow behaviour and attitude changes.
- Political and economic pressures.
- Budget constraints for enforcement and clean-up efforts.
- Limited public engagement and support.

The theory of change outlines a comprehensive approach to addressing the persistent plastic litter problem by targeting its root causes. Through increased awareness, behavior change, advocacy, enforcement, and continuous monitoring, the goal of reducing and eventually eliminating plastic litter in the open environment can be achieved, leading to a more sustainable and cleaner ecosystem.

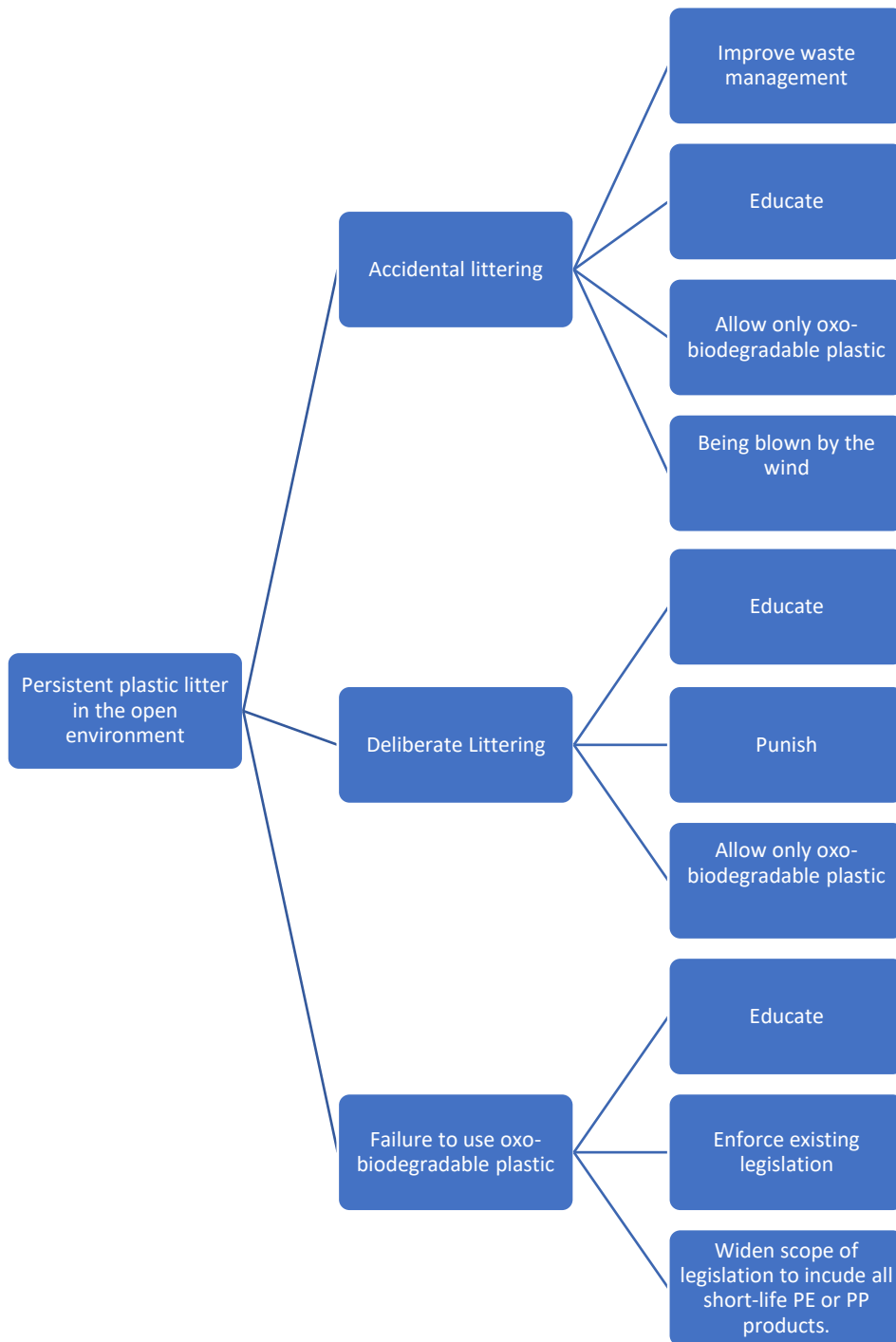


Figure 2: Theory of Change Diagram: An example

Policy Options & Recommendations

Identifying and Appraising Policy Options for Preventing Plastic Waste Accumulation in the Environment

The issue of preventing the accumulation of plastic waste in the environment is a critical global challenge. Policy-makers must consider a range of policy tools to address this issue effectively. Here, we describe and appraise policy options:

Policy Option 1. Extended Producer Responsibility (EPR)

Description: Shifting the responsibility for managing the life-cycle of plastic products, including collection, recycling, and disposal, to the producers (Leal Filho et al. 2019; Lorang et al. 2022).

Appraisal:

- Effectiveness: EPR encourages producers to design products with recycling in mind and invest in recycling infrastructure.
- Feasibility: Feasible with appropriate regulations and collaboration between producers and recycling facilities.
- Acceptability: May face resistance from producers initially but can gain acceptance with time. Resistance to oxo-biodegradable technology is unlikely if it is understood that there is no change in the quality of the product, no disruption to supply chains, and little or no extra cost.
- Economic Impact: May increase product costs initially, but long-term savings can be achieved through efficient recycling. Oxo-biodegradable technology will not increase product costs to a significant extent. Improvements in waste management will incur costs, but long-term savings may be achieved through efficient recycling and lower clean-up costs.
- Environmental Impact: Promotes recycling and reduces plastic waste accumulation. Education and improvements in waste management will promote recycling and reduce plastic waste in the medium to long term, and in the meantime oxo-biodegradable technology will significantly reduce the accumulation of plastic in the environment.

Policy Option 2. Deposit-Return Systems (DRS)

Description: Introducing a deposit fee on plastic beverage containers, which is refunded when consumers return the containers for recycling (Benyathiar et al. 2022; Suter, 2019).

Appraisal:

- Effectiveness: DRS incentivizes recycling and reduces littering, leading to decreased plastic waste accumulation.
- Feasibility: Feasible with effective collection infrastructure and stakeholder cooperation.
- Acceptability: Generally well-accepted as it offers financial incentives for recycling.
- Economic Impact: May increase product costs slightly but can be revenue-neutral with the return of deposits.
- Environmental Impact: Encourages recycling and reduces plastic waste pollution.

Policy Option 3. Plastic Taxation

Description: Implementing taxes on plastic products, packaging, or raw materials to discourage their use and generate revenue for environmental initiatives (Desalegn & Tangl, 2022; Walker et al. 2020).

Appraisal:

- Effectiveness: Taxes can deter plastic consumption and encourage sustainable alternatives; however, may lead to the adoption of less sustainable alternatives (Bell & Cave, 2011; Li et al., 2022; Denkstatt Report; BPA Plastic v Paper).
- Feasibility: Feasible with appropriate tax structures and enforcement mechanisms.
- Acceptability: May face resistance from industries but can gain support if the revenue is earmarked for environmental causes, but who decides what is a suitable cause?
- Economic Impact: This will significantly increase the cost of plastic products and increase the cost of living, but generate revenue for environmental projects.
- Environmental Impact: Discourages plastic use and reduces waste accumulation.



Policy Option 4. Plastic Recycling and Circular Economy Policies

Description: Implementing policies that promote plastic recycling and the development of a circular economy, where plastics are reused, remanufactured, and recycled (Wagner & Schlummer, 2020; Walker et al. 2020).

Appraisal:

- Effectiveness: Encourages sustainable plastic use and reduces waste by keeping materials in circulation.
- Feasibility: Feasible with investments in recycling infrastructure and industry collaboration; however, not all plastics can or should be recycled (Sang et al., 2020). If plastics are collected, sorted and washed they can be recycled once - through melting and molding - but physical and chemical properties decay quickly during recycling. In practice, mechanically-recycled materials are limited to around 10% when mixed with virgin resin [*resin manufactured from natural resources such as petrochemical feedstock, crude oil, natural gas, etc].
- Acceptability: Generally supported as it aligns with environmental goals and resource conservation.
- Economic Impact: This can stimulate the growth of the recycling industry and reduce long-term waste management costs.
- Environmental Impact: Promotes resource efficiency and reduces plastic waste accumulation.

Policy Option 5. Public Awareness and Education Campaigns

Description: Implement campaigns to raise public awareness about the environmental impact of plastic waste and promote responsible consumption and disposal (Afroz et al., 2017; Phan et al., 2022).

Appraisal:

- Effectiveness: Increases public knowledge and encourages behavior change, potentially reducing plastic waste; however, it will not in the medium-term, if ever, prevent the escape of a significant amount of plastic into the environment by accident or by irresponsible behavior. Hence, there is a need for all plastic packaging to be oxo-biodegradable.
- Feasibility: Feasible with appropriate funding and collaboration with media and NGOs.

- Acceptability: Generally well-accepted, but long-term impact may require sustained efforts.
- Economic Impact: Costs associated with campaign development and maintenance.
- Environmental Impact: Promotes responsible plastic use and reduces litter.

Each of these policy tools has its strengths and weaknesses, and their effectiveness depends on the specific context and the level of implementation and enforcement. Combining several of these tools in a comprehensive policy framework may be the most effective way to address the issue of plastic waste accumulation in the environment.

Policy Option 6. Plastic Bans and Restrictions

Description: Implementing bans or restrictions on specific single-use plastics, such as plastic bags, straws, and utensils, or on plastic packaging for certain products (Macintosh et al. 2020).

Appraisal:

- Effectiveness: Bans and restrictions can reduce the use and disposal of single-use plastics, thereby reducing plastic waste, but focusing on these few categories will not solve the problem of microplastics. This is because persistent microplastics are created by all conventional plastics when exposed to sunlight unless they are oxo-biodegradable.
- Feasibility: Implementing and enforcing bans requires political will and resources, but it is feasible with effective planning.
- Acceptability: Public support is often high, especially when environmental concerns are highlighted.
- Economic Impact: This may lead to the development of alternative products and industries, creating economic opportunities
- Environmental Impact: Reduces plastic waste and its associated environmental harm. may lead to the use of less suitable materials for the job, and have a worse LCA than plastic.
- The use of oil as a raw material for plastic materials is much more noble than its use as a fuel, and should be encouraged. Furthermore, the use of arable land for the production of plastics has much greater environmental impacts, and is not a viable solution for large quantities.



Conclusion

Concluding Remarks:

Addressing the issue of preventing the accumulation of plastic waste in the environment is paramount to safeguarding the planet's ecosystems and human well-being. Policy-makers face a complex challenge that requires thoughtful consideration of various policy tools. In this appraisal, we have examined six policy options, each with its unique strengths and considerations *in order of priority*.

1. **Deposit-Return Systems (DRS):** DRS encourages recycling and reduces littering through financial incentives. Implementing effective collection infrastructure and stakeholder cooperation is critical to its success. It is suitable for bottles and some other rigid containers, but not for films. Films are very difficult to be collected, classified, cleaned and mechanically recycled. They are probably the most environmentally polluting form of plastic, degrading faster than larger pieces, and resulting in the formation of microplastics. However, they are the kind of product for which the oxobiodegradable technology is most useful.
2. **Plastic Taxation:** Taxation can discourage plastic use and generate revenue for environmental initiatives. Acceptance may grow if revenue is earmarked for environmental causes, but industry resistance could be a challenge. However, the public should not in principle, be prevented from using plastic products where they are the best for the job, and the cost of living should not be increased.
3. **Public Awareness and Education Campaigns:** These campaigns raise awareness and encourage responsible behavior. While generally well-accepted, long-term impact requires sustained efforts and resources. However, it cannot be relied upon to prevent the escape of all plastic into the open environment. All consumer-plastics should therefore be oxo-biodegradable.
4. **Plastic Recycling and Circular Economy Policies:** Promoting recycling and a circular economy can reduce waste by keeping plastics in circulation. Investing in recycling

infrastructure and fostering industry collaboration are critical for success, however, not all plastic can or should be recycled.

5. **Extended Producer Responsibility (EPR):** EPR incentivizes producers to take responsibility for plastic waste throughout its lifecycle. While it can drive recycling efforts and promote sustainable design, its success depends on cooperation between producers and recycling facilities. However, recycling is not always the best option for dealing with waste plastic.
6. **Plastic Bans and Restrictions:** These measures can reduce the use of single-use plastics and can potentially gain public support. However, they require careful planning, enforcement, and the development of alternative products. Plastic is, however, a very useful material, and the public should not in principle be deprived of the option to use it. The only problem is that it can lie or float around for decades, but not if it is oxo-biodegradable. Oxo-biodegradable products should therefore be exempted from bans and restrictions.

To address plastic waste accumulation comprehensively, a combination of these policy tools within a coherent and adaptable policy framework may be the most effective approach. Successful implementation will depend on political will, stakeholder collaboration, robust enforcement, and ongoing evaluation to ensure the chosen policies achieve their intended environmental goals.

Ultimately, tackling the plastic waste crisis is a shared responsibility that requires the collective efforts of governments, industries, communities, and individuals. By employing a range of policy tools and fostering a culture of sustainability, we can work towards a cleaner and more environmentally friendly future.



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