

What Can't We Live Without?

Exploring Essential Uses for Single-Use Plastics



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The working group of the Plastic Waste Partnership gratefully acknowledges GRID-Arendal for its role in leading the preparation of this publication. Prepared with funding from the Norwegian government.



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1. Introduction

Global plastic production has seen a massive increase since the 1950s, reaching 460 million tonnes in 2019 (OECD, 2022). Without significant interventions, global plastics use could nearly triple in 2060 from 2019 levels. The inexpensive, multipurpose, and lightweight nature has made plastics an integral part of everyday human life. However, the current levels of plastic production, use, and disposal have led to massive amounts of plastic waste and widespread plastic pollution. This has resulted in one of the most pressing global issues we face today, as well as posing a wide range of environmental and human health challenges.

About half of all plastic products are designed for single use (UNEP, n.d.). These are defined as plastic products that are designed and produced to be used once before being thrown away or recycled (UNEP, 2023), and include items such as plastic bags, bottles, food wrappers, cutlery, cups, and straws. Single-use plastics are commonly used for packaging, which accounts for about half of all plastic waste generated in the world (UNEP, 2018a). Addressing the issue of single-use plastics is therefore key to solving the wider issue of plastic waste and pollution and requires urgent coordinated action across all levels of society.

This spotlight brief aims to firstly provide an overview of widely implemented measures at the national, regional, and global level to address single-use plastic production, consumption, waste, and pollution, with related key findings and recommendations. Secondly, it will provide an overview of the “essential use concept,” presenting examples of how this concept is applied in existing international and national regulatory frameworks, as well as proposals made to apply the concept to plastics.



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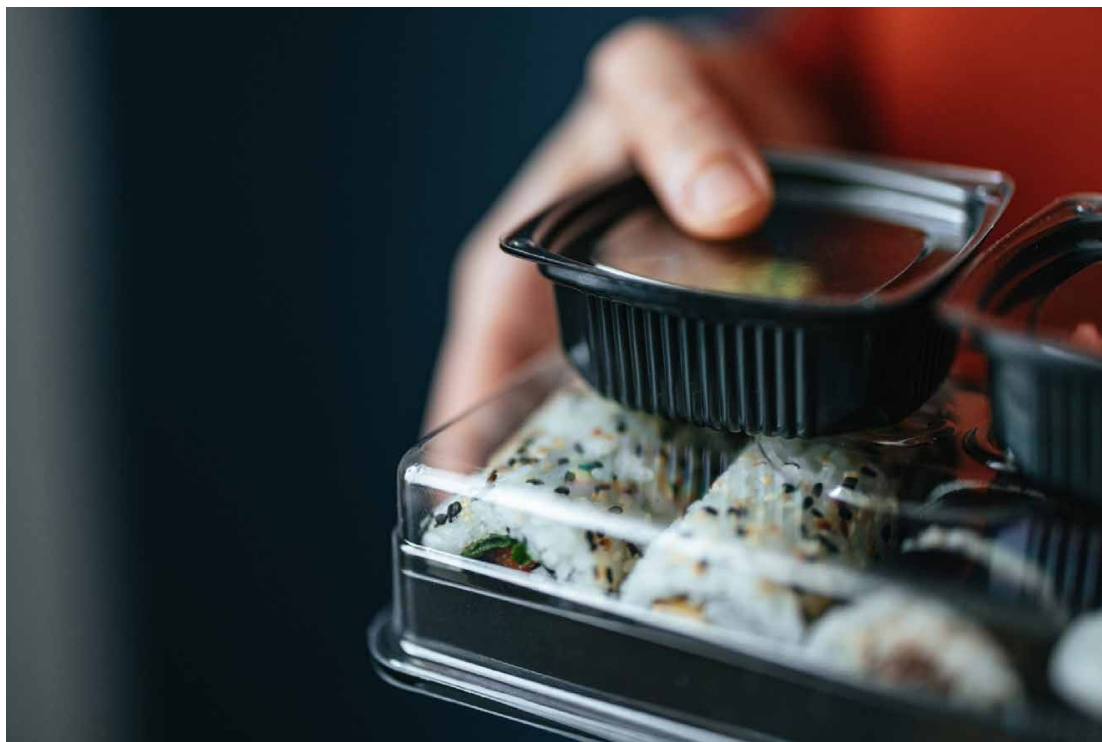
2. Background

Globally, single-use plastics are most used for: packaging (e.g. containers, wraps, bags), beverage containers (e.g. bottles, cups), food service (e.g. packaging, trays, utensils) healthcare (e.g. medical packaging, syringes, other disposable medical items), and retail (e.g. shopping bags, packaging) (Custom Market Insights, 2024). The most common types of polymers used to produce single-use plastic products are Low-density Polyethylene (LDPE, e.g. bags, containers, food packaging films), High-density Polyethylene (HDPE, e.g. freezer bags, ice cream containers, shampoo bottles), Polypropylene (PP, e.g. microwave dishes, potato chip bags, bottle caps), Polyethylene Terephthalate (PET, e.g. bottles, dispensing containers), Polystyrene (PS, e.g. cutlery, plates, cups), and Expanded Polystyrene (EPS, e.g. hot drink cups, insulated food packaging) (UNEP, 2018a). The different polymers vary in recyclability, of which PET and HDPE are easier to recycle.

The largest plastic producers in the world are China (32%) followed by North America (18%) and the rest of Asia (17%) (Plastics Europe AISBL, 2022). In 2019, global plastic waste reached 353 million tonnes, of which an estimated 9% was recycled, 19% incinerated, 50% went to sanitary landfills, and the remaining 22% was disposed of in uncontrolled dumpsites, openly burned or leaked into the environment (OECD, 2022). Globally, around 2.7 billion people lack access to waste collection services, and this access varies significantly both within and between regions. Generally, higher-income regions collect nearly

all municipal solid waste, while lower-income regions collect less than 40% (UNEP, 2024). In countries that have little or no municipal solid waste collection, unregulated handling of plastic waste (including dumpsites and unregulated landfilling), open burning, and leakage into the environment is typically widespread. In these contexts, informal waste pickers play a crucial role in plastic waste collection and recycling, commonly focusing on collecting plastic waste of higher value (e.g. PET and HDPE) from streets and uncontrolled landfill sites (Alliance to End Plastic Waste, 2023).





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In areas that have plastic waste collection and management systems in place, transitioning from a linear to a circular plastics economy that reuses and recycles single-use plastic waste remains a challenge. This is due to several barriers surrounding single-use plastics. Many single-use plastic products are not designed for reuse or recycling, are made from multiple materials or layers of plastic, and contain a wide range of chemicals. They also currently lack profitability for reuse and recycling, including a low market demand for recycled plastics (UNEP, 2020a).

A staggering 20 million tonnes of plastic litter is estimated to enter the environment every year, much of which are single-use plastic products (IUCN, 2024); the most commonly found litter in the environment (Ocean Conservancy, 2025). Mismanagement of plastic waste has led to widespread plastic pollution across the globe, driving biodiversity loss and ecosystem degradation, affecting all land, freshwater, and marine life, presenting risks to human health, and affecting food and water safety (IUCN, 2024). Most plastic litter does not biodegrade. Instead, it slowly breaks down into smaller pieces known as microplastics and nano-plastics which are able to find their way into food, water, and subsequently human blood (ibid.; Kopatz et al, 2023). Plastic waste can block waterways, exacerbate flooding, and provide breeding spots for mosquitos, increasing the burden of vector-borne diseases

like malaria (UNEP, 2018a). 98% of single-use plastics are made from fossil fuels, and the plastics life cycle from sourcing of raw materials to waste management contributes to greenhouse gas emissions driving climate change (GRID-Arendal, 2024). Moreover, more than 16,000 chemicals have been identified in plastic products, of which 4,200 have known links to human and environmental health risks (Wagner et al, 2024). Plastic pollution also has major costs to economies worldwide, negatively impacting economic sectors including tourism, fishing, and shipping, and presenting major cleanup costs (UNEP, 2018a).

As a result of the COVID-19 pandemic, there was a major global increase in the use of some types of single-use plastic products. This includes plastic personal protective equipment in medical and non-medical settings (e.g. masks, gloves), single-use plastic packaging used in e-commerce (e.g. food take-away and delivery services), and single-use hygiene products (e.g. wipes), resulting in a surge in the levels of single-use plastic waste and littering (UNEP, BRS, 2023).

The environmental, social, and economic costs and risks of plastic waste and its associated pollution are vast and will continue to grow unless significant action is taken. In this context, addressing single-use plastics production, consumption, waste, and pollution is key.

3. Possible Measures for the Prevention and Minimization of Single-Use Plastics Waste

In the past decades, there has been a significant increase in measures taken by countries to prevent and reduce single-use plastics, the majority of which are bans, market-based instruments or a mix of the two (UNEP, BRS, 2023). Early adoption was led by developing countries, with Bhutan introducing a ban on single-use plastic bags in 1999. Today, 141 countries have banned or restricted one or more plastic products, and 33 countries have banned or restricted one or more plastic polymers (Nordic Council of Ministers, 2024).

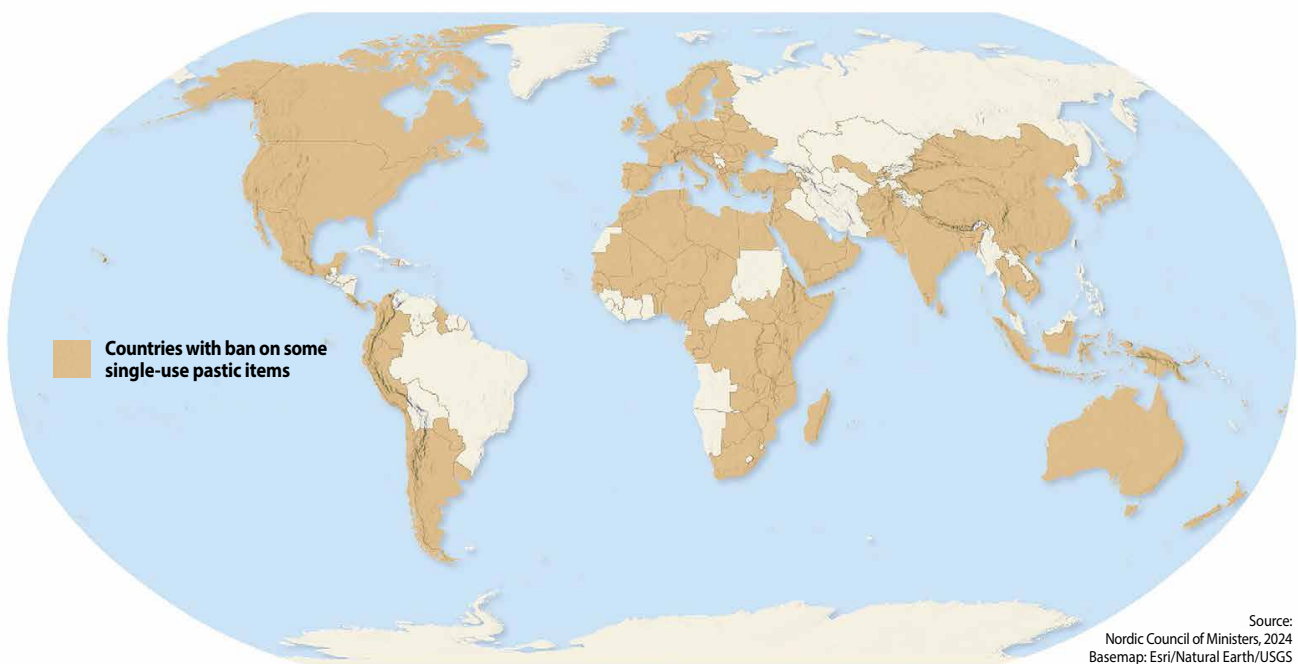


Figure 1: Map of countries with ban on some single-use plastic items.

At the regional level, the European Union (EU) adopted the Single-Use Plastics Directive in 2019, targeting the reduction of plastic waste and addressing marine litter from commonly discarded plastic items. Building on this and other related regulations, the EU has proposed the Packaging and Packaging Waste Regulation which includes a wide range of proposals that will affect all forms of packaging, including single-use plastic packaging. Key provisions include requirements around packaging minimisation, recyclability, labelling, and packaging composition (European Commission, 2022).

Global measures to address single-use plastics include mainly the Basel Convention provisions on

transboundary movements and technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal, and the ongoing United Nations negotiations to develop an international legally binding instrument to end plastic pollution.

a. Bans

A single-use plastic ban is a prohibition of a particular type or combination of single-use plastic products. These can be total (banning the product completely) or partial (e.g. banning plastic bags only of a certain thickness) (UNEP, 2018a). The most commonly banned single-use plastic item is plastic bags (Nordic Council of

Ministers, 2024). Other commonly banned items include plates and bowls, cutlery/utensils, cups/glasses and their lids, straws, and food containers and their lids.

Bans are a preferred approach to address single-use plastics that are difficult or impossible to recycle and that have the greatest pollution impacts (UNEP, BRS, 2023). One example of this approach is the EU Single-Use Plastics Directive which addresses the 10 single-use plastic items most found on European beaches (European Commission, n.d.-a).

There are many best practices and challenges to consider for optimal effectiveness and enforcement of single-use plastic bans. When designed and implemented well, bans can be effective instruments to prevent single-use plastics and have the additional benefit of lowering waste management costs as the banned items will no longer enter the waste stream (UNEP, BRS, 2023). This however depends on the banned item(s) being non-essential or that cheap, readily available, and suitable alternatives exist. Otherwise, bans of one single-use plastic item may lead to increased use of other types of single-use plastics. For example, a ban on thinner plastic bags may lead to increased use of thicker plastic bags, as has been observed in California (Environment America Research & Policy Center and U.S. PIRG Education Fund, 2024).

Enforcement of bans can be challenging as they may be perceived as less acceptable, at least at first, by consumers and industry fearing loss of income (UNEP, BRS, 2023). The effectiveness of bans depends on strong judicial backing and the existence of dissuasive penalties that law enforcement is both prepared and able to enforce. Even when these are present, challenges may persist due to smuggling of banned items across borders (UNEP, 2018b).

Data on effectiveness of bans is limited partly due to their recent implementation and partly due to insufficient monitoring. According to a UNEP (2018a) report, of the countries that do have data on ban effectiveness, 60% report dramatic drops in plastic pollution and consumption of single-use plastic bags within the first year. A literature review by Muposhi et al (2021), finds large variations in success rates of plastic bag bans, and connects limited success to the lack of suitable alternatives, insufficient regulatory

capacity for monitoring and enforcement, a thriving black market, and the influence of the plastic industry.

b. Market-based instruments

Market-based instruments can be effective measures to reduce single-use plastic waste and pollution through increasing the price of single-use plastic items and thus reducing their demand. Studies find that changing the price is the most effective behavioural intervention to motivate change in consumption behaviour (Heidbreder et al, 2019). Levies and taxes are examples of market-based instruments used to address single-use plastics. These can be imposed at various stages (e.g. production, imports, sale, use) and studies suggest that their effectiveness can be significant in both high-income and low-income countries (Heidbreder et al, 2019). A particularly successful example is the introduction of a charge for single-use plastic bags in Wales in 2011 which resulted in an 80% reduction in distribution of such bags in the first year (Poortinga et al, 2013). However, the effectiveness of market-based instruments can be difficult to maintain in the long term, especially when charges are lowered or not adjusted for inflation, leading to a rebound effect (UNEP, BRS, 2023). For example, some countries such as South Africa experienced that demand for plastic bags went down with the introduction of a charge, but then increased again about a year later, though to a lower level than before the charge was introduced (Heidbreder et al, 2019).

Deposit return schemes is another market-based instrument which can support single-use plastic waste minimisation and recycling. The scheme provides a financial incentive for consumers to return used products, typically including plastic bottles. Consumers pay a small deposit when purchasing the product, which they get back when they return the empty container. The 2021 'What We Waste' report (Reloop, 2021) analysing the impact of deposit return schemes across European countries and American, Canadian, and Australian states, found an average return rate of 79% in 2018-19. Furthermore, it finds that in territories with a deposit return system, wastage levels of beverage containers per person were on average 78% lower in 2017 than comparable territories without deposits. For example, the adoption of deposit return in 2015 in Lithuania

led to a decrease in beverage containers wasted per person from 113 to 14 per year within the first full year of the system's operation.

c. Standards and labels

Standards and labels aim to promote environmentally friendly practices among manufacturers, retailers, and consumers by providing clear guidelines and information. Single-use plastic standards set specific environmental criteria for the production, use, and disposal of single-use plastics, such as recycled content, materials, and recyclability, and whether they are compostable and/or biodegradable (UNEP, 2020a). There are three main standard-setting bodies that govern sustainable plastic packaging: The International Organization for Standardization (ISO), American Society for Testing and Materials (ASTM) International, and the European Committee for Standardization (CEN). Single-use plastic legislation can incorporate or reference standards, making them mandatory or incentivizing voluntary compliance with them (UNEP and World Resources Institute, 2020). By voluntarily adopting such standards, companies can demonstrate their commitment to becoming more sustainable, which in turn can enhance their brand reputation and meet consumer demand for sustainable products. Standards can, however, have certain limitations, such as being disconnected from real-world conditions. For instance, a product that meets a recyclability standard does not guarantee that the necessary infrastructure will be available to recycle the product once it becomes waste.

Single-use plastic labels communicate compliance with standards, aiming to empower consumers to make environmentally responsible choices. Labels can raise awareness through educating consumers and encouraging behaviour change. Many labels, however, lack clarity and transparency, posing a risk of greenwashing, where companies make misleading claims about the environmental sustainability of their products (UNEP, 2020a).

d. Voluntary instruments

Voluntary reduction strategies and agreements are examples of voluntary instruments. These are softer instruments than bans and market-based instruments as they do not force sudden changes in the market but encourage change that is voluntary and based on choice (UNEP, 2018a). An example

of a reduction strategy where the choice lies with the consumer is the promotion and adoption of reusable bags as an alternative to single-use plastic bags. Such strategies rely on adequate levels of consumer awareness to be successful. Another approach involves voluntary agreements between governments and businesses. A notable example is the 2017 initiative by New Zealand's Ministry for the Environment, which encouraged the country's two largest supermarket chains to either impose charges on or voluntarily eliminate single-use plastic bags. This led both chains to commit to completely phasing out single-use plastic bags by the end of 2018 (ibid.).

The Plastics Pact Network (Ellen MacArthur Foundation, n.d.) is a voluntary agreement coordinated by the Ellen MacArthur Foundation, uniting businesses, governments, and organisations across the world to tackle plastic waste and pollution. Participants commit to shared targets, such as reducing unnecessary plastic, increasing recycled content, and enhancing recycling infrastructure. The initiatives rely on the voluntary efforts of participants to drive progress and achieve sustainability goals through collective action.

While offering flexibility in implementation, voluntary reduction strategies and agreements for single-use plastics may suffer from a lack of accountability and can involve the risk of greenwashing, undermining their overall effectiveness.

e. Extended Producer Responsibility

The growing volume and complexity of waste presents major costs for financing and physically operating waste management services. Extended Producer Responsibility (EPR) aims to address the growing burden of waste management by extending the responsibility of the producer to the post-consumer stage of the life cycle of a product (OECD, 2024). EPR is a key element of waste management policy in many countries, applied to various waste streams, including plastic packaging waste, much of which consists of single-use items. However, many single-use plastics, particularly non-packaging single-use plastics, are still not covered by EPR. In 2020, more than 40 countries had EPR systems in operation and more than 20 countries were planning to adopt them (Alliance to End Plastic Waste, 2023). EPR has also been implemented at the sub-national level (e.g. six states in the U.S).



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Some common principles have been linked with the successful implementation of EPR. These include setting clear definitions for producers to identify which companies are responsible for complying with the policy, and clearly defining responsibilities of stakeholders and the scope of the targeted products (OECD, 2024). Setting incremental collection, recycling and recovery targets strengthens the effectiveness of EPR, these should be informed by a cost-benefit analysis as well as various stakeholders. EPR also requires the capacity of governments to provide oversight and enforcement, transparency to allow for monitoring and evaluation, and the involvement of the informal recycling sector.

EPR schemes currently in place typically focus on downstream measures from collection to disposal, improving waste collection and recycling, but have so far not been effective in providing incentives for upstream waste prevention, and eco-design requirements typically focus on recycling rather than prevention (UNEP, BRS, 2023). Another challenge is that EPR does not cover the costs of single-use plastic waste that ends up as mixed waste or as litter in the environment.

f. Global frameworks

At the global level, the global governance framework to address plastic waste and pollution is fragmented and includes mainly the Basel Convention provisions on transboundary

movements and environmentally sound management of plastic wastes. Recognizing the need to address the current gaps in global plastics governance, on March 2022, UNEA Resolution 5/14 established and mandated an international negotiating committee (INC) to develop a global, legally binding instrument to end plastic pollution.

g. Hybrid approaches

Policy options to address single-use plastics can be used together as complementary tools and appear to be the most successful when combined within a broader policy package (UNEP, BRS, 2023). For example, bans and market-based instruments can be used together to avoid a situation where the ban of single-use plastic bags leads to an increase in the consumption of single-use bags made of other materials, encouraging behavioural change rather towards reuse including practices such as consumers bringing their own reusable bags to stores. Such an approach has been implemented at the local level in the USA and been found to be more effective than bans alone. Bans and market-based instruments could also be combined to address different types of a single-use plastic items, such as banning thinner plastic bags while introducing a levy on thicker plastic bags, to avoid the ban of thinner plastic bags leading to an increase in the consumption of thicker plastic bags (Environment America Research & Policy Center and U.S. PIRG Education Fund, 2024).

4. Essential Uses of Single-Use Plastics

A key consideration when developing measures to address single-use plastics, in addition to which type of measure(s) to implement, is the question of which single-use plastic items are to be covered by the measure(s). To guide the response to this question, efforts to address single-use plastics could draw inspiration from existing international and national regulatory frameworks that identify and manage substances of concern and apply the concept of essential use. Applying this to single-use plastics could guide the prioritisation of which single-use plastic items to regulate by determining which are the most harmful, and whether their uses are non-essential, substitutable, or essential.

The concept of essential use was first applied under the Montreal Protocol which effectively phased out the use of substances that deplete the ozone layer, except for certain uses considered essential. The protocol defines essential use this way: “Use of a controlled substance should qualify as essential only if: (i) it is necessary for health, safety or is critical for the functioning of society (encompassing cultural and intellectual aspects); and (ii) there are no available technically and economically feasible alternatives or substitutes that are acceptable from the standpoint of environment and health” (Decision IV/25) (UNEP, 2020b). Based on this definition, uses of ozone-depleting substances that came to be considered essential and exempted from phase-out under the protocol include medical uses (e.g. inhalers), laboratory and analytical uses, aerospace applications,

firefighting, and some processing agent uses (Cousins et al, 2021).

The idea of allowing specific exemptions for certain uses of a chemical is also included in other Multilateral Environmental Agreements (MEAs) such as the Stockholm Convention and the Minamata Convention, in EU legislation including the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH) regulation, and the EU Biocidal Products Regulation (Cousins et al, 2021), as well as national legislation such as the Chemical Substances Control Law in Japan (Zhou, 2024). Specifically, the European Commission proposes to apply the essential use concept in its Chemical Strategy for Sustainability (CSS) and the concept is proposed for the regulation of per- and polyfluoroalkyl substances (PFAS) (Cousins et al, 2021).



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In the proposed application of the essential use concept to uses of PFAS, a framework of three categories of uses have been recommended (Cousins et al, 2019):

- Non-essential uses that are convenient and ‘nice to have’ but do not have a critical function for health, safety, or the functioning of society.
- Substitutable uses: uses that provide essential functions for health, safety and society but are considered unnecessary due to existing suitable alternatives. This situation requires a thorough assessment of the alternative(s) to ensure substitution will not lead to regrettable substitutions.
- Essential uses: Uses that have a necessary function for health, safety or is critical for the functioning of society that currently do not have any suitable alternatives. These essential uses could have time-bound exemptions with regular re-evaluations of alternatives, while innovation is stimulated to find suitable alternatives.

To assess which of the three categories applies to a certain use, three aspects are to be considered (Cousins et al, 2021):

1. The function provided by the use.
2. Whether the function is necessary for health, safety or critical for the functioning of society.
3. If the function is necessary, whether there are suitable alternatives available.

In the case of plastics, the application of the essential use concept has been proposed by the Scientist’s Coalition for an Effective Plastics Treaty (2024) for the global plastics treaty. The coalition proposes the development of essentiality assessment criteria for plastics and a four-step approach:

1. Initial list of priority items (plastic chemicals, polymers, and products) based on national, regional, and international regulation or on scientific consensus.
2. Assessment of whether the function of each item listed is essential for health, safety, or society.
3. Assessment of whether there are safer and more sustainable alternatives or substitutes.
4. Regular review of time-bound applications for exemptions.

To identify a list of priority items, there is a need for defined criteria for inclusion. In the case of substances of concern, the EU CSS defines these as substances that are harmful for human health or the environment, but also those which hamper recycling for safe and high quality secondary

raw materials (European Commission, n.d.-b). A recent report by the Nordic Council of Ministers (2024) proposes the following definitions based on a determination of the function of plastic items and their essentiality:

- “Unnecessary plastic products refer to products with a function that is not essential because they do not provide significant added value to society.”
- “Problematic plastic products refer to products which have adverse impacts across the life cycle of the products (environmental and human health).”
- “Avoidable plastic products refer to products with a function that is essential, but demand for the product can be reduced through non-plastic substitutes, alternate designs and alternate practices.”

Problematic plastics can overlap with unnecessary or avoidable plastics. Furthermore, the report provides a decision hierarchy to determine actions to address identified unnecessary, problematic, and avoidable plastics, proposing ‘removal from market’ of unnecessary plastics, replacement of avoidable plastics, and redesign of problematic plastics that are not unnecessary or avoidable (ibid.).

The above examples, definitions and recommendations for the application of the essential use concept provide a framework that could help guide national, regional, and international efforts to address the issue of single-use plastics. Identifying a list of ‘single-use plastic items of concern’ and assessing the essentiality of these items would determine which single-use plastic items and uses are most important and effective to regulate, in terms of their non-essential uses and human health and environmental impacts and risks. This could help policymakers make regulatory efforts more targeted towards the most harmful single-use plastics, while ensuring that critical functions for human health, safety and the functioning of society are maintained through suitable substitutions or time-bounded exemptions. Time-bounded exemptions for essential uses must be accompanied by regular monitoring and re-evaluations of alternatives to ensure that the risks of the continued uses are mitigated and re-assessed as research evolves, and innovation of suitable alternatives is encouraged. Finally, the essential use concept does not have to be considered exclusive to regulation; the private sector (e.g. product manufacturers and retailers) and the public sector (e.g. procurement) may also apply it to their operations (Cousins et al, 2021).

5. Key Messages and Recommendations

Measures to address single-use plastics have seen a significant growth in the past decades, the majority of which are bans, market-based instruments or a mix of the two. Today, 141 countries have banned or restricted one or more plastic products, and 33 countries have banned or restricted one or more plastic polymers (Nordic Council of Ministers, 2024). A combination of bans, market-based instruments and other policies complementing each other appear to be the most successful approach (UNEP, BRS, 2023).

To determine which single-use plastic items to prioritise for regulation in terms of their unnecessary uses and human health and

environmental impacts and risks, national, regional, and international efforts to address single-use plastics could apply the concept of essential use to single-use plastic regulation. Existing international and national regulatory frameworks, recommendations on how to apply the concept to PFAS, and proposals for the application of the concept for the plastics treaty provide relevant examples to guide how this could be done. This could help policymakers make regulatory efforts more targeted towards the most harmful single-use plastics, while ensuring that critical functions for human health, safety and the functioning of society are maintained through suitable substitutions or time-bounded exemptions for essential uses.



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