Sustainable production and consumption criteria: Pathways for achieving a global primary plastic production reduction

Recent research demonstrates a direct link between plastics production and plastics pollution[1-4]. Hence, **Article 6** addressing ***Supply and Sustainable Production*** **of plastics, is a fundamental pillar of the Global Plastics Treaty** and a crucial leverage point for achieving other key Treaty pillars and therefore ensuring its effectiveness[5,6] (**Fig. 1**). Article 6 is set to establish a global target within an annex to the Convention to reduce the production and consumption of primary plastic polymers (PPP) to sustainable levels (§6.1.).

As per the Oslo Symposium on **Sustainable Production and Consumption (SPC)**, sustainable consumption is defined as "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations"[7]. **Article 6** has the potential to lay the foundations for achieving sustainable levels of production and consumption of plastics, with implications for efforts to reduce PPP production, and increase transparency and traceability of plastic products. This will further aid efforts to increase recovery and circularity, thereby reducing the harmful impacts of plastics on human health and the environment across the full life cycle, and in turn improving member states' abilities to meet the mandated goal of eliminating plastic pollution[5,8]. As shown in **Figure 1**, SPC criteria introduced in Article 6 can therefore directly contribute to other provisions of the current text.

Article 6: Sustainable production. To ensure sustainable production levels in the future, including legal obligations regulating PPP with the Treaty appears critical. Article 6 (option 2) in the current Chair's text references a global target, though data gaps render establishing this target challenging. Scientific evidence does support the need for a reduction, and this can be facilitated via numerous levers, including application of essentiality, safety and sustainability criteria. Further, there is no text proposal on how to operationalise the global target into national obligations. If this remains undefined at the international level, there is a risk of fragmentation, similar to the Paris Agreement: States are implementing climate policies within their nationally determined contributions (NDCs), but there is no guarantee that these efforts add up to achieve the goal of the agreement.

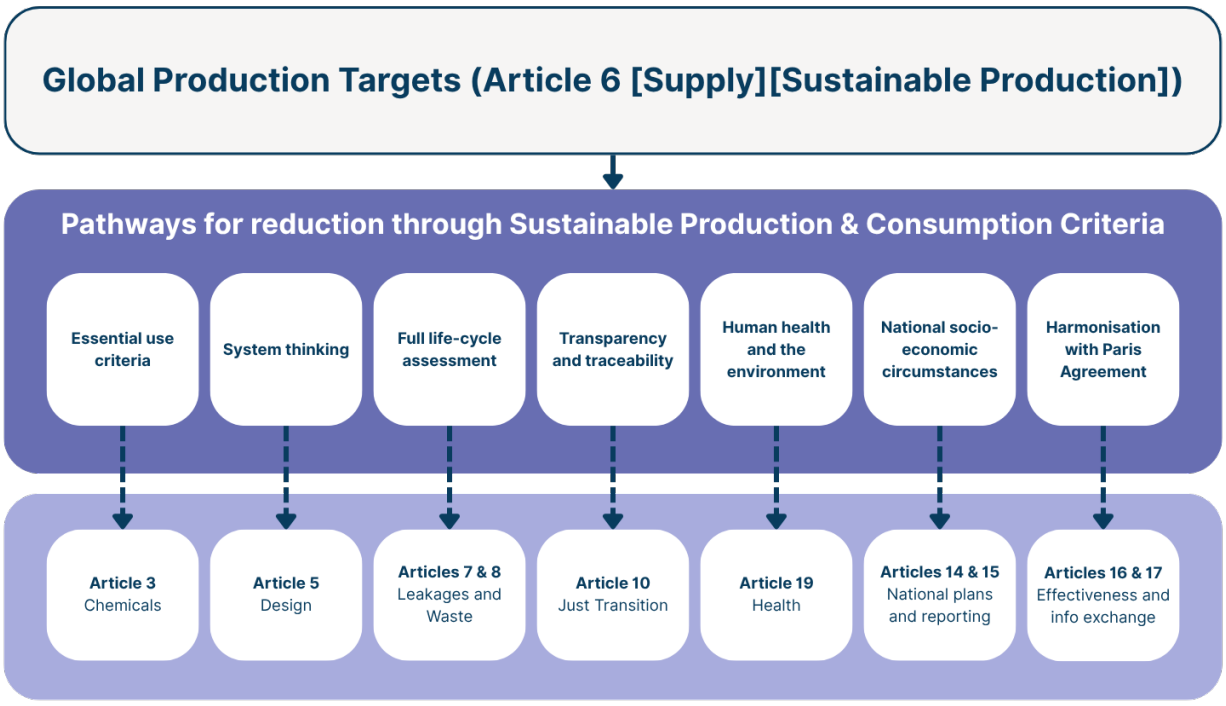

Figure 1: Article 6 as basis for pathways to integrating Sustainable Production and Consumption criteria into key pillars of the Global Plastics Treaty

Importance of Article 6 for other Articles in the Treaty

Article 3: Plastic Products and Chemicals of Concern. The SPC of plastics as defined above provides a mandate to phase out hazardous chemicals in plastics. Minimizing resource consumption through a reduction of PPP will provide incentive to phase out non-essential products, such as certain single-use and short-lived products. Ultimately, only essential uses of plastics would be deemed sustainable[3,9-12]. In this regard, SPC criteria may foster the implementation of such restrictions and phase outs [globally and in a harmonized manner], thus supporting Article 3 in regulating plastic products and Chemicals of Concern.

Article 5: Plastic Product Design. By improving the use of plastics towards reducing resource consumption, implementation of SPC criteria can incentivise the production of higher quality and higher value products. Since the SPC criteria are based on a full life cycle approach, Article 6 will have implications for improving plastic product design for circularity while minimising socio-environmental impacts, for instance by considering chemical and feedstock choices[13,14]. The availability of renewable resources, particularly those in high-demand, such as biomass, can become comparable to the availability of non-renewable resources if the rate of consumption exceeds the rate of regeneration[12,15,16]. Following this logic, it is important that the design of plastic products takes into account a sustainable rate of consumption of resources.

Furthermore, the SPC criteria of Transparency and Traceability, including disclosure of the types and quantities of plastic materials and chemicals produced and used , are essential for evaluating the safety and sustainability of plastics across the whole supply chain in a traceable way[13,17-20]. Data transparency is necessary for a transition towards a more safe and sustainable circular economy and to assess progress toward reduction targets[12]. For this reason, as outlined in the Chair's Text (§6.3), statistical data on production, consumption, imports and exports of PPP, along with measures for progress toward achieving the global target, will be crucial for ensuring SPC for plastics and successfully limiting hazardous materials and chemicals13 produced for, and incorporated into, plastic products.

Article 7: Release and leakages & Article 8: Plastic waste management. Many countries are already struggling to manage plastic waste, and these challenges will worsen as production and consumption continue to grow. High rates of waste generation also increase the risk of plastic waste exports and end-of-life treatments, such as incineration or landfilling, that undermine circularity goals. Integrating waste hierarchy principles, such as prioritising reduction, reuse, and repurposing over recycling and disposal, will reduce plastic production and its subsequent releases, leakages, and emissions. Connected with Article 5: Plastic Product Design, sustainable design of plastic products can follow different principles, such as design for recyclability, durability[12,13] and minimizing releases and leakages into food, beverages, the environment, and atmosphere during use, as well as during the handling and management at end of useful life[23,28]. It is important to note that design variations for the same product group (e.g., packaging) burden waste management systems since they require increased sorting efforts[12,13,29,30]. Limiting the production and variety of plastics (Articles 5 and 6) to essential uses supports adopting effective waste management systems incentivised through circularity[31]. Additionally, limiting plastic chemicals, polymer production and plastic product manufacturing to only essential products will reduce the total amount of hazardous chemicals, microplastics and plastic debris released into the environment each year.

Article 10: Just transition. By eliminating the production of non-essential plastic chemicals and products, resources can be redirected toward the production of essential plastic products, while also ensuring their safety and sustainability (**Article 5 on plastic product design: Core elements**). To ensure a just transition, definitions of "essential" and "non-essential" plastics may vary based on socio-economic conditions, and different constraints likely therefore need to be applied to different countries, as acknowledged in Article 4: Exemptions; Article 12: Capacity building, technical assistance and technology transfer, including international cooperation; and Article 14: National plans.

Article 19: Health. Fundamentally, implementing SPC criteria would imply that production and consumption of plastics does not pose a risk to health. As such, Article 6 provides a mandate for the Treaty to phase out chemicals and polymers of concern. By increasing transparency throughout the life cycle, Article 6 will further provide the foundation for closing any knowledge gaps about plastic chemicals in use, which is currently a major concern and barrier for sufficiently protecting human health.[36-37] Article 6 influences Articles 3 and 7, which, in turn, can affect the success of Article 19. Vulnerable and local communities, such as informal waste pickers, can be disproportionately exposed to the harmful effects of plastics[5]. The effective implementation of Articles 19 and 10 is, therefore, closely connected to the outcomes of Article 6.

Article 14: National plans & Article 15: Reporting. In order to ensure effective implementation of the measures laid out in the above-mentioned articles, Article 14 on national plans and Article 15 on reporting are crucial. National plans enable parties to share measures implemented at the national level and their impacts. This reporting mechanism is important to ensure global coordination and harmonization. Relating back to Article 6, parties to the instrument can include within their national plans which measures they have taken to limit the production of primary plastics, and report on which measures have been implemented to collect data on production, imports, and exports of PPP. All of these enhance the SPC criteria of transparency and traceability.

Article 16: Effectiveness evaluation & Article 17: Information exchange. In the Chair's Text, Article 6 calls for each party to report statistical data on production, consumption, imports and exports of PPP and the measures taken to achieve goals of the treaty (Articles 15 & 17). Along with this, a mechanism could be included to establish binding national targets which, taken together, will achieve the global target (Article 14). Also, as outlined in Article 6 and supporting Article 16, a subsidiary body with strong Conflict of Interest policies is essential for scientific and technical assessments, to evaluate the success of treaty implementation, and to offer recommendations for improvements.

Additionally, the SPC of plastics is closely linked to other Multilateral Environmental Agreements (MEAs). This includes the Paris Agreement, given plastics' contribution of 5.3% of global greenhouse gas (GHG) emissions[32-34], particularly from fossil fuel extraction and plastics manufacturing[32-35]. Thus, one of the most effective ways to reduce plastic-related GHG emissions is to limit plastics production[35].

In conclusion, establishing an Article 6 on Sustainable Production based on SPC criteria is essential to effectively limit plastic pollution at its source, align global efforts with broader environmental and climate commitments, and ensure a just transition toward a circular plastics economy, as well as to protect human and environmental health.

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