environmental investigation agency

Convention on Plastic Pollution

Essential Elements: Reporting and Monitoring

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Introduction

Fact-finding is policymaking and good policymaking requires good fact-finding.

A global reporting and monitoring framework is *sine qua non* for the new international legally binding instrument to end plastic pollution. Both the quantities of plastics flowing through the economy and the presence of plastic pollution in the environment will determine the success or failure of the adopted policy interventions, informing priorities and decisions.

Over time, UNEA Resolution 5/14 and its predecessor resolutions have taken an increasingly expansive view of the problem to be solved (all plastic pollution, not just in the marine environment) and the interventions needed to solve it (across the full lifecycle of plastic, not just waste management).[1] Indeed, UNEA Resolution 5/14 makes specific reference to provisions to promote sustainable production and consumption (upstream measures), product design (midstream measures) and environmentally sound waste management (downstream measures) taking approaches based on resource efficiency and circular economy.[2] This further includes development of provisions that "specify national reporting, as appropriate" and "periodically assess the progress of implementation of the instrument" and "the effectiveness of the instrument in achieving its objectives."[3]

Reporting and monitoring

In line with United Nations Environment Assembly (UNEA) Resolution 5/14, the new instrument will seek to end plastic pollution in all environments.[4]

Progress towards this objective can be measured through a combination of economic and environmental indicators, instituted through national reporting (bottom-up) and environmental monitoring (top-down).

These are complementary and interdependent activities that together will help us understand the evolution of inputs of plastics into the economy and presence of plastic pollution in the environment, based on established baselines. This framing sets out at least four lines of inquiry (questions) that, in turn, should inform the design of the global reporting and monitoring framework (see Table 1).

All four of these inquiries are essential for the proper functioning and utility of a global monitoring and reporting framework. For example, to assess the exposure, harm and ecotoxicological effects of plastic exposure (inquiry 4) it is necessary to quantify its presence (inquiry 2) and chemical constituents (inquiry 1). In turn, quantifying leakage (inquiry 3) compliments and reinforces information on environmental presence (inquiry 2), as well as deriving other useful information and trends. Lastly, country-level data on the production and consumption of plastics (inquiry 1) fortifies all other data sources, representing the backbone of information needed to know if we are moving towards sustainable production and consumption of plastic.

Without all four pillars of knowledge, it will not be possible to properly track and inform the effectiveness of policy interventions through time and across geographies.

Table 1: *Lines of inquiry and indicators for the global monitoring and reporting framework*

Inquiry 1: Are we transitioning towards sustainable production and consumption of plastics?	
Purpose: To achieve sustainable production and consumption of plastics through the transition towards a non-toxic circular economy for plastics	**Example indicators:** • Virgin plastic production, consumption and use • Product design • Additive use • Waste management (e.g. collection and recycling)
Inquiry 2: How much plastic is in the environment and where is it?	
Purpose: To identify plastic pollution in the biosphere (e.g. land, sea, freshwater, atmosphere)	**Example indicators:** • Concentrations of microplastics in the environment • Presence of macroplastics in the environment • Plastic-associated chemical pollution • Bioindicator species
Inquiry 3: How much plastic is entering the environment and from where?	
Purpose: To identify and reduce sources of plastic entering the environment	**Example indicators:** • Waste management (e.g. characterisation, collection, disposal illegal dumping) • Plastic waste imports and exports • Primary microplastic use • Lost fishing gear • Agriplastic use
Inquiry 4: What are the human health and environmental impacts of plastic pollution?	
Purpose: To identify and reduce impacts of plastic pollution on humans, flora, fauna and ecosystems	**Example indicators:** • Exposure risks and thresholds • Bioindicator species • Pre-production (e.g. climate and air quality)

I. National reporting

A global reporting framework for plastic pollution will rely on national reporting of plastic inputs into the economy (inquiry 1) and leakage into the environment (inquiry 3).

At its core, national reporting serves three main purposes. First, it complements environmental monitoring by allowing scientists and policymakers to complete our understanding of the state of the environment and its evolution, providing information on sources (inputs into the economy and leakage) and trends that cannot be discerned from environmental monitoring alone. Second, it allows for conclusions to be drawn for each individual country on their national action, supporting implementation and compliance. Third, it enables conclusions to be drawn on the overall effectiveness of the new instrument, which will then inform priorities and next steps.

For these reasons, national reporting should be comprehensive and complete, providing statistical data at each stage of the lifecycle of plastics, including:

- **Virgin pellet and resin production and consumption.** As a material, plastic begins life as virgin pellets and resins produced primarily from petrochemicals derived from oil and gas but also coal and biomass. Virgin pellets and resins are melted, mixed and moulded into plastic products by polymer converters; although post-consumer pellets, flakes and powders produced by recyclers from plastic waste are also used. Virgin pellets and resins are traded internationally as goods with unique Harmonised System (HS) codes based on polymer type under the World Customs Organization (WCO).[5] Currently, accurate data on virgin pellet and resin production and consumption is currently unavailable; governments must instead rely on unsubstantiated information volunteered by petrochemical representatives, such as PlasticsEurope and the American Chemistry Council (ACC).[6] Fortunately, securing such data is a fairly straight-forward exercise for governments as there are relatively few polymer producers of virgin pellets and resins, an industry dominated by major petrochemical companies.[7] Following the approach taken in the Montreal Protocol, reporting on virgin pellets and resins should cover three key data points: (i) production; (ii) imports; and (iii) exports. This would then allow for production and consumption to be calculated at the country and global levels.

- **Recycled plastic production and consumption.** Like virgin pellets and resins, accurate data on the quantities of recycled plastics (pellets, flakes and powders) by polymer type is needed. Such information would be used to determine the state of secondary markets for recycled plastic and progress toward a circular economy. Reporting on recycling should cover the same three key data points: (i) production; (ii) imports; and (iii) exports. This would then allow for production and consumption to be calculated at the country and global levels.

- **Plastic use.** National reporting should also provide information on plastic use by market segment, for example packaging, building and construction, automotive, electrical and electronic, household and leisure sports, agriculture, appliances, mechanical engineering and medical.

- **Plastic waste management.** Plastic waste management will be a critical component of the global agreement. Parties will therefore need to report data on their individual efforts in this regard, particularly as it relates to collection, recycling and disposal (e.g. landfill and incineration). Coupled with data on production, consumption and use, this allows for progress on circularity and leakage to be determined. The level of specificity of the data reporting on plastic waste management should be tethered to the level of specificity of data reporting on production, consumption and use, for example by polymer type and market segment.

- **Plastic waste trade.** Significant quantities of plastic waste are traded and accurate data on plastic waste shipments and treatment is lacking. Such data should be reported, in coordination with reporting obligations under the Basel Convention to avoid redundancies.

- **Sea-based sources of plastic pollution.** While approximately 80 per cent of marine plastic pollution originates from land-based sources, the remaining 20 per cent comes originates from sea-based sources, primarily from fishing vessels followed by shipping, offshore industries and tourism.[8] Such data should be reported, in coordination with reporting obligations under the International Maritime Organization to avoid redundancies.

- **Primary microplastics.** Primary microplastic pollution is plastic that enters the environment in small pieces and includes microplastics emitted during the lifecycle of a product through wear and tear (e.g. automobile tires, road markings, textiles, artificial turf, paint), through accidental spills (e.g. pellets) or because intentionally added (e.g. microbeads in cosmetics and cleaning products, controlled release fertilisers). It is likely that factors will need to be developed and used to facilitate reporting on many of the primary microplastics.

- **Additives.** Additives refer to the chemicals added to the polymers along the supply chain to change their physical, thermal, electrical or aesthetic characteristics. The types of additives are varied, and the term is used broadly here to include those that assist production and manufacturing processes (e.g. catalysts, solvents,

auxiliaries, lubricants, mould release agents, cross-linkers) and those that improve performance (e.g. antioxidants, colorants, plasticisers, stabilisers, compatibilisers, flame retardants). These additives are often toxic and can undermine secondary markets for post-consumer plastics and a safe circular economy. Additives are primarily added to plastic by three main actors along the supply chain: (i) polymer producers who make virgin pellets and resins; (ii) masterbatch makers or compounders, i.e. specialist mixers of pellets and resins with additives; and (iii) polymer converters who melt, mix and mould pellets and resins into products.

Therefore, an early body of work under the new instrument will be to develop a global reporting framework for plastic pollution, including methodologies for calculation and standardised definitions and formats, setting out clear obligations and timeframes. Reporting should be undertaken on an annual basis to enhance its utility for scientists, economists, and policymakers.

Moreover, developing well-functioning national reporting systems will require early investment and support to institutionalise reporting into the industrial and bureaucratic landscape and make it regular and systematic while ensuring its utility as a performance and planning tool. Capacity-building and training on reporting and data-gathering should therefore be provided by implementing and bilateral agencies, for example.

Over time, decisions by the governing body will undoubtedly raise the need for additional reporting on certain topics. In all instances, the secretariat should be empowered to question data and provide assistance, as needed, working in tandem with implementing and bilateral agencies.

II. Global environmental monitoring

Global environmental monitoring addresses inquiries 2 and 4 (see Table 1). At its core, it serves three main purposes. First, it complements national reporting by allowing scientists and policymakers to complete our understanding of the state of the environment and its evolution, providing information on the evolution of the presence of plastic pollution in the environment and its impacts, which cannot be discerned from national reporting alone. Second, it enables for conclusions to be drawn on the need for additional interventions. Third, it enables conclusions to be drawn on the overall effectiveness of the new instrument over longer time scales, which will then inform priorities and next steps.

For these reasons, environmental reporting should be comprehensive and complete, allowing us to identify a range of environmental and human health impacts, including:

- **Plastic pollution in the biosphere.** Led by the work of the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), environmental monitoring is at present heavily skewed towards the marine environment. At least 27 databases and datasets exist for marine plastic pollution in the seas and oceans, compared to few or none at all for freshwater, terrestrial and atmospheric environments.[9] Despite the marine-centric research agenda, plastic pollution in the freshwater environment, for example, is just as detrimental, with microplastic pollution up to 23 times more severe.[10] Similarly, atmospheric plastic is now ubiquitous the world over, even in extremely remote locations, yet it has only recently received attention from the scientific community. While there is a need for an expansion and development of monitoring efforts in certain marine environments that have historically received less attention (e.g. the water column and seafloor), there is also an urgent need for monitoring the presence of plastic pollution in other environments, including lakes, rivers and agricultural land.

- **Bioindicator species.** Many species that ingest plastics can provide information on the presence of plastic pollution. Biomonitoring is most useful when a combination of bioindicator species with different characteristics are used.[11] To date, few species have been used as bioindicators of plastic pollution and almost all are marine (e.g. the Atlantic fulmar, albatross and common mussel). Yet the identification and use of suitable bioindicators is necessary to observe the presence of plastic pollution over well-defined spatio-temporal gradients and identify and address its impacts. Suitable species should be selected based on at least three criteria: (i) ecology and biology, (ii) habitat and home range and (iii) statistical analysis.[12] Furthermore, detection methods of ingested plastics need to be standardised in coordination with other instruments such as International Whaling Commission (IWC), Center for Biological Diversity (CBD), Convention on Migratory Species (CMS) and to avoid redundancies and to build on existing bodies of work.

- **Exposure risks and thresholds.** The significance of this is outlined by GESAMP Working Group (WG40), which was established in 2012 to provide a more comprehensive, independent and global assessment of the sources, fate and effects of plastic in the marine environment.[13] WG40 will provide an assessment of: (i) the impact of plastics and microplastics on food security, i.e. the environmental impacts of plastics and microplastics on species at a population level, including physical and chemical effects; (ii) the impact of plastics and microplastics on food safety, i.e. the chemical contaminants and pathogens in seafood associated with ingested microplastics; and (iii) the transfer of biota, i.e. the social, economic and environmental effects of plastics and microplastics on the distribution of biota, including indigenous and non-indigenous species and pathogens.[14] The extent of impacts is still poorly understood in many areas, including those in non-marine ecosystems and habitats and the links between microplastics and human health. As such, it is proposed that the work of WG40 be built upon but be expanded in the

context of the new instrument to include assessment in freshwater, terrestrial and atmospheric systems using a newly established dedicated scientific body.

Environmental monitoring can take several forms and thus an early activity for the Parties will be to develop standard approaches outlining what will be monitored and common methodologies for measurement. As an example, in the Guidelines for Monitoring Marine Litter on Beaches in the OSPAR Maritime Area, the OPSAR Commission sets out common methodologies for the selection of reference beaches, sampling units, timing of surveys, collection and identification of plastic, data recording and management, among others.[15] In developing a global monitoring framework for marine plastic pollution, coordination and collaboration with scientific experts, such as the GESAMP and relevant entities such as the regional seas programmes and conventions, should be undertaken. Global monitoring of terrestrial systems, such as agricultural lands, should be undertaken in coordination and collaboration with the Food and Agricultural Organization of the United Nations (FAO).

Science-policy interface

Science-policy interfaces exist so that policymakers are provided with relevant and reliable scientific information to ensure evidence-based decision-making.

In the context of plastics, it should meet four key requirements: credibility (transparency, openness to critique and scientific independence), legitimacy (broad participation and ownership), salience (tailored outputs) and agility (built-in review and scientific flexibility).[16]

To achieve these requirements, certain elements of design are critical. Legitimacy, for example, requires a high degree of transparency and selected experts from all relevant disciplines, including holders of Indigenous and traditional knowledge, allowing for broad participation of these stakeholders.[17] In terms of agility and salience, the mechanism should allow scientists and stakeholders to respond quickly to newly emerging issues and tailor outputs to specific needs.[18]

The best option to achieve this is through the establishment of a dedicated scientific body under the new instrument, one tasked with supporting the achievement of its objectives and the needs of the governing body, ensuring relevance and responsiveness.[19]

Such an approach is a necessary complement to independent science-policy panels, such as the one established in UNEA Resolution 5/8 for chemicals and waste, invariably including plastics.[20] Existing independent panels in other issues include the International Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which co-exist with dedicated scientific bodies. This approach has significant advantages. On one hand, since a subsidiary body will be instituted through the governing body, its work will remain highly applicable and relevant to the agreement. Having such a high degree of responsiveness to the agreement's objectives will allow it to adapt quickly to new information in a rapid and responsive manner. On the other hand, the independent panel can decide its own programme of work, producing topical, thematic or timely analyses of cross-cutting relevance or that may fall outside the remit of the subsidiary body.[21]

Conclusion

The importance of global reporting and monitoring framework for plastic pollution is overwhelmingly evident, with the new international legally binding instrument to end plastic pollution providing the opportunity to establish one.

Parties should find reporting and monitoring useful for achieving their own objectives too, assisting them with the implementation of their national action plans and tracking progress toward a non-toxic circular economy for plastics and the elimination of leakage.

Reporting and monitoring must be perceived of as — and be designed to be more than—just a procedural duty.

For more information

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