

United Nations Environment Programme

**Multi-stakeholder consultation workshop on a systemic approach to marine plastics
15 and 16 February 2018**

Final workshop report



**Addressing
Marine Plastics**
A Systemic Approach



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Introduction

UN Environment, the Ellen MacArthur Foundation, the Ocean Conservancy and Grid Arendal are collaborating under a Global Environment Facility (GEF) funded project (2017-2019)¹ to harness existing knowledge and experience on marine plastics throughout their life cycles. This analysis will contribute to developing a strategic roadmap for building systemic models that stop plastics from flowing into the ocean and fully integrate them in circular economies at local, national and global scales. Targeted areas for developing proofs of concept include sites in the Asia-Pacific region where plastic leakage is amongst the highest globally.

It is necessary to address the global value chain of marine plastics, as the life cycle of plastics is cross-boundary and cross-cutting from policy, technology, management, economics, awareness raising and behaviour change. A holistic approach requires understanding the sources, pathways and fates of plastics – including microplastics – entering the marine environment, for which little work has been done. By tracing back those plastics value chains, UN Environment aims to identify opportunities to reduce and soundly manage marine plastics. The project will contribute to the long-term objective of driving the plastics value chain towards a circular system where plastics do not become waste, and do not pose a threat to the environment, in particular to oceans.

A workshop was convened by UN Environment as a first expert consultation in the context of this project and brought together plastics and marine experts from different horizons. Appendix 0 provides a list of the participants at the workshop. The intention of the workshop was for the experts to contribute to the initial findings from the stocktaking exercise, including:

- Marine plastics information relevant to the project: the most problematic products and polymers in different regions, actors, initiatives, key sources and sectors, legal & policy frameworks from key countries & regions (national and subnational examples), and inclusion of analysis of international governance frameworks.
- Marine Plastics Value Chain mapping and hotspots identification, and key intervention (or leverage) points along the value chain, based on life cycle thinking.

The outcomes of the workshop, in terms of current gaps in knowledge and action (policy, technology and awareness); recommendations on priority hotspots in the life cycle of plastics; and related actions (policy and technical) along the value chain of plastics that could be taken to address the most problematic products and polymers; will guide the future research of the project.

Session 1: Overview

Tim Kasten, Deputy Director of the United Nations Environment Programme (UNEP), Division of Technology, Industry and Economics (DTIE) welcomed participants and provided an introduction to the workshop.

Isabelle Vanderbeck (UN Environment) presented an [introduction to the GEF project: Addressing Marine Plastics – A Systemic Approach](#).

Kanako Hasegawa (UN Environment) presented the [key elements of two recent framework documents](#):

- Assessment of the effectiveness of relevant international, regional and sub-regional governance strategies and approaches;

¹ <https://www.thegef.org/project/addressing-marine-plastics-systemic-approach>

- Outcome from UNEA-3: marine litter resolution

Feng Wang (UN Environment) presented on [the plastics value chain and the need for a systemic approach](#).

Key drivers of the project

A systemic approach to addressing marine plastics is closely linked to circular economy, to sustainable consumption and production, and to the chemicals agenda. Once plastics are in the oceans, in the form of macro or microplastics, there is not much we can do. Intervention thus needs to be upstream, and it should involve all stakeholders.

Intervention needs to rethink the system, where plastics are kept at the highest possible value and do not pollute our oceans, but also do not pollute our rivers and land (as ultimately, a large part of the plastics in rivers and on land end up in the ocean). To achieve this vision of a new plastic economy requires systemic thinking taking into account the entire value chain, and to propose strategic intervention points, be it at the design, production, consumption, or waste management phases.

The intervention needs to include considerations on chemicals, and to keep chemicals of concern away from plastics, not only so as to ensure there is no damage to marine ecosystems (and potentially to the food chain), but also to allow for easier recycling.

The intervention (in its design and implementation) needs to be coordinated and synergistic, and to involve all actors of the value chain: government, companies, research institutions, waste sector, finance sector, consumers etc. This can only be achieved using a lifecycle thinking approach.

Session 2: Review of the stocktaking

Philippa Notten (consultant to the GEF project) presented the [findings of the stocktaking exercise on products and polymers](#).

Plenary discussion: products and polymers

The importance of consistent definitions was raised, with a recent IUCN report on microplastics² (quoted in the stocktaking exercise) using a different definition of secondary microplastics to that agreed on by a global panel of experts³. In the latter, the distinction between primary and secondary microplastics is based on whether the particles were originally manufactured to be that size (primary) or whether they have resulted from the breakdown of larger items (secondary). In the GESAMP definition, microplastics are considered to be secondary regardless of whether the breakdown from larger items occurs before or after entering the ocean. This is different to the definition used in a recent IUCN report (and reportedly also the Nordic countries), that takes a flow or life cycle perspective, and in which primary microplastics are defined as those particles *entering* the marine environment at a size of < 5 mm (regardless of whether they were manufactured at that size or are abraded from larger items outside of the marine environment), and secondary microplastics as plastic particles < 5 mm resulting from breakdown of larger items *already in* the marine environment (i.e. in the GESAMP definition tyre abrasion particles would be defined as secondary, and in the IUCN definition they would be defined as primary). The importance of a distinction between land-based “wear and tear” sources

² Boucher, J. and Friot, D. (2017) Primary microplastics in the oceans: a global evaluation of sources, IUCN: Gland, Switzerland.

³ GESAMP (2015). Sources, fate and effects of microplastics in the marine environment: a global assessment (Kershaw, P. J., ed.). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Rep. Stud. GESAMP No. 90, 96 p.

and secondary microplastics formed in the sea was acknowledged for the mapping type studies but that different non-conflicting terms should be agreed upon.

The limits of detection in the size of environmental plastics were raised (about 100 micron) as the most likely reason why tyre particles are not being detected in marine environmental samples (both in sediment and in the water column). The disparity between top down (material flow analysis) and bottom up (marine sampling) studies therefore will remain until sampling/analysis technology develops.

It was raised that that fibres detected in marine samples may not only be attributed to textiles, and could also be largely due to ropes, that are very prevalent in marine applications, and are made from largely the same polymers (PP, PET, nylon etc.). Dolly ropes were found to be the primary source of microplastics from the sea.

A question was raised on how much plastic litter comes back out of the sea (studies quoted in the stocktaking analysis look only at quantities going into the sea and their fate in the different marine compartments). It was indicated that the amount removed is very small with respect to the volumes going in, with for example the Ocean Conservancy annual coastal clean-up removing roughly the equivalent of one days' worth of plastic relative to the eight million tonnes a year entering the sea estimate. It was added that quantifying shoreline plastic is very difficult, thus the reliance on plastic waste data (scale of use and waste management) to provide a better estimate of the quantities.

It was cautioned that, whilst recognising that waste data provides the best route to estimating the quantities of marine litter, this should not lead us to lose sight of the fact that we should focus upstream and on production and consumption level to understand the material flows (needed for addressing the problem).

A question on textile fibres and the degree to which they can be removed from wastewater treatment plants was raised. It appears this is a research area with a number of potential solutions being raised. However care must be taken that the solution is not merely delaying the release of the fibres (e.g. consumers rinsing a washing machine filter, wastewater treatment sludge being used as fertiliser with potential for fibres to enter water runoff). Research indicates that how the garments are woven can significantly affect their tendency to shed fibres. Also, a pre-wash of textiles before putting them onto the market can remove as much as 30% of the fibre loss.

Session 3: Marine plastics Value chain mapping

Alexis Laurent (Technical University of Denmark, contracted institution under the GEF project) presented the findings of the [marine plastics value chain mapping, plastic losses and hotspots identification](#).

Plenary discussion: Value chain mapping

A participant cautioned against calling PVC hazardous, and mentioned that the constituents are hazardous and not the PVC polymer (which is used safely in many applications).

The importance of considering not only the environmental impacts but also the social and economic impacts was raised. Even if an assessment of these is outside of the scope of the study, they should at least be mentioned, as they will be key information to identify the key actions and their effect on the three aspects of sustainability.

The terminology used needs to be defined, for example, explaining what is understood by mismanaged waste. This led on to a discussion of the availability of waste data, and to the fact that all the studies

predicting plastic waste flows are using the same underlying studies for their waste data. A need for better data on waste was identified.

A discussion was held on the state of knowledge of marine impacts of plastic litter. There is still missing information on external costs and ecological costs, and the methods from environmental economics are not very good. Thus whilst it is acknowledged that much research is still needed, it was felt important not to get too focused on quantifying impacts, but to already take action as there is sufficient evidence that impacts are occurring and that action is needed.

Participants were divided into three break out groups, with the first group discussing the methodology of the hotspots identification and plastic losses exercise, with mainly the academic participants; the second group covering value chain representation from an industry perspective, industry and environmental participants; and the third group covering value chain representation for a government perspective, with mainly the participants representing government.

Group discussion: Methodology

The group identified the need to assess the impacts of plastics. A recent FAO (2016) report on seafood safety should be consulted on the socio-economic impacts of marine plastic. The impacts of microplastics are largely unknown, with research needed on impact pathways and impact assessment (including human health impacts). There also needs to be an understanding of risks versus impacts.

The fate of plastics is especially a gap (what happens in the marine environment). The current models quantify plastic flows into the ocean, with the recognition that the uncertainties increase considerably if the models were to include the impact of plastics. The group recognized the need for research matching the top-down (material flow) and bottom-up (marine sampling) estimates, which will require fate modelling of plastic losses. The need to consider regionality and the variation was also recognized.

The data limitations of the current top-down (plastic flow) estimates were discussed. Data on Chinese plastic waste flows was identified as a key gap because large differences have been found between different data sources. Ghana⁴ was also mentioned as an example where country-specific data have been found to be different (higher) than World Bank estimates (a 2012 global review of solid waste management by the World Bank⁵, as the only comprehensive source of global waste data, is used by just about all studies estimating plastic flows to the ocean). The need for different datasets was identified. The lack of agreed definitions was also raised as an area requiring attention, for example, there is no agreed definition of what is “mismanaged waste”. It was however raised that “mismanaged” does not necessarily equal “going into the oceans”. An estimate of emission or leakage of mismanaged waste to the ocean is required.

The need to prioritize data needs was raised, with waste data from China a priority. However, obtaining good waste data was recognized as challenging, with waste management often being the responsibility of local authorities (with local authorities in developing countries frequently lacking capacity for sufficient record keeping), and due to the informal sector often carrying out waste-related functions in developing countries. Obtaining good plastic material flow data, on the other hand, was recognized as requiring participation from industry and citizens.

⁴ The mention of Ghana brought up a side discussion on eWaste and whether leakage from this waste stream is considered in plastic losses to the ocean. It was asserted that it is most likely not included as eWaste is traded as a commodity and not as a waste.

⁵ Hoomweg, D. and Bhada-Tata, P. (2012) What a Waste: A Global Review of Solid Waste Management, Urban Development & Local Government Unit, World Bank: Washington DC.

Finally, value chain impacts (impacts from plastic production) should not be overlooked, as well as impacts from waste management (such as occupational health impacts from informal waste collectors).

Group discussion: Value chain

The two groups discussing the value chain stages and actors came up with similar suggestions for addition and clarification. Putting forward the circularity aspect, and innovative actors was required. Greater resolution in stakeholders, particularly around industry/use was also required, so that the drivers/incentives would be captured. A number of crosscutting stakeholders, such as innovators/researchers and finance institutions were also added. Greater resolution around use phase and end of life phases were required. The suggestions are incorporated into the revised value chain map shown in

Figure 1.

The role of geography on value chains should not be overlooked, although this is difficult to represent on the value chain map; the global picture has to be supplemented by regional pictures. The importance of considering the export trade of waste was also raised.

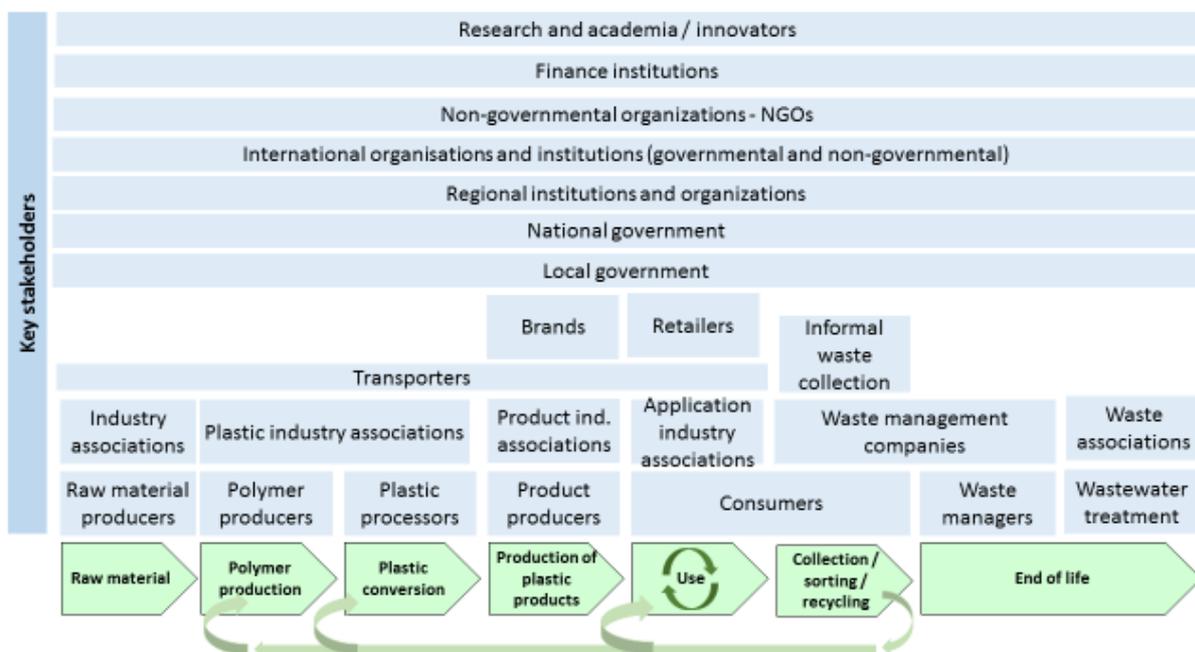


FIGURE 1: VALUE CHAIN STAGES AND KEY ACTORS

Session 4: A vision of a sustainable system for plastics

In this session participants put forward their vision of a sustainable system for plastics in 2030. The vision was to be in the form of a headline or tweet. Participants wrote their visions on post it notes, and the notes were grouped by theme on the boards at the front. Participants then voted on their favourites by marking their top three.

The “winning” vision was “*a world without waste*”. This and the other visions that received a high number of points are shown in Table 1.

TABLE 1

Ranking	Vision	Points received
1	Waste becomes obsolete, 100% materials circularity reached in communities around the globe	14
2	Global ban on production of single use plastics brings hope for a cleaner ocean	10
3	Where is all the plastic?	4
3	No packaging ends up in landfill or as litter creating adverse environmental impacts elsewhere	4

Session 5: Policies and legal framework

Joao Sousa (IUCN) presented the findings of an IUCN study on [National marine plastic litter policies in EU Member States](#).

Paulo Lemos (European Commission) presented the [European strategy for plastics in a circular economy](#).

Discussion

A question was raised on the reaction of industry to the EU strategy for plastics: Paulo Lemos responded that you cannot let the focus be on end of life, as the industry are aware that their reputation is bad there. The European Commission worked with Plastics Europe, and in general industry sees a good balance with environmental protection and industry, but also recognising that a strategy cannot please everybody. Setting targets is important, as it gets the industry sector working towards this. Just by putting out a proposal on dossier of restriction on microplastics, industry is already shifting towards using alternative products. EU Circular Economy strategy is setting the standard, a benchmark for the industry.

In response to a question on whether it would not be helpful to put a ban on microplastics in cosmetics, like several countries are doing, including the UK, Paulo Lemos responded that if you propose a ban you have to go through a technical procedure (impact assessment etc.). One of their studies told them the best way to go was restriction. Restrictions are currently on cosmetics with the intention to apply them across the board on microplastics, and they can already see that the sector is changing. Restrictions are thus useful to giving a signal to a sector on the directions policy related instruments are taking, and that it is in the best interest of industry to follow.

Session 6: Actors and initiatives

Philippa Notten (consultant to the GEF project) presented a [preliminary categorisation and listing of actors and initiatives addressing marine plastic](#). Feedback from the participants on the categorisation into “knowledge” and “action” oriented initiatives, as well as the breakdown of initiatives according to their priority focus in the plastics value chain (plastic in the ocean / plastic entering the ocean / production and use) was requested.

Participants were then broken up into three groups and took part in a World Café on actors and initiatives. The three boards covered:

- Knowledge-oriented initiatives addressing plastic
- Action-oriented initiatives addressing plastic in and entering the ocean
- Upstream initiatives (addressing plastic consumption and use)

More than 140 actors and initiatives were identified in the brainstorming at the three paperboards. It is interesting to note that the majority of actors and initiatives identified were action-oriented rather than knowledge-oriented, with the latter accounting for 40% of the actors and initiatives identified. Global international agencies (e.g. UN Environment, World Bank, OECD etc.) and the larger not-for-profits (WWF, IUCN, Ocean Conservancy etc.) along with research groups at a number of universities made up most of the knowledge-oriented initiatives identified. Of the numerous action-oriented initiatives identified, just over one-third are aimed upstream at addressing plastic consumption and production, with the majority aimed at addressing plastic in and/or entering the ocean (i.e. ocean clean-ups and plastic litter awareness). Whilst there is a large degree of cross-over between the action- and knowledge-oriented actors, with many of the larger agencies and organisations identified in both, within the action-oriented actors there is a large number of smaller foundations and not-for-profits. This is indicative of the groundswell of grassroots organisations getting involved in the fight against marine plastic litter.

Session 7: Identification of gaps

Thinking back to the vision for a sustainable plastic system identified in session 5, participants were asked to identify the main gaps preventing the realisation of this vision. Participants were invited to write down three to four gaps in knowledge or action covering policy, technology and awareness on post it notes. The facilitators grouped the gaps by themes and value chain stage, with the resultant summaries compiled for gaps in knowledge shown in Figure 2, gaps in action shown in Figure 3, and gaps in enabling conditions (financing, incentives, awareness, policies and actions plans) shown in Figure 4. The numbers in parentheses in the figures indicate where specific gaps were raised by more than one participant.

Plastic material flow data and waste data was most raised in terms of gaps in knowledge, with the experts indicating that a better understanding of the routes of plastic flows into the ocean is needed, as well as the need for a knowledge of plastic flows by geography, application, polymer type, size etc. Related knowledge gaps on waste data included common definitions and methods to estimate plastic losses to the environment. The next most recognised gap in knowledge was in understanding the social, economic, and environmental impact of marine litter, with the importance of impacts on human health (toxicity), biodiversity and characterising impacts from an LCA perspective raised.

The most raised gap in action was that of consumer information, awareness and public participation. A related gap was that of addressing cultural barriers to behaviour change preventing the adoption of

alternatives to single-use plastics. After consumers, waste management was the area with the next most gaps in action. The experts particularly identified waste infrastructure and integrated waste management systems as gaps.

Gaps in enabling conditions were identified across the value chain, but the most raised were gaps at the start of the value chain, in the lack of incentives to create demand for recycled plastic and the related lack of incentives for industry to reduce the use of primary plastic in production, and gaps at the end of the value chain, particularly in financing for waste management and innovation. A similar theme emerging in the overarching gaps identified was the lack of global exchange platform(s), for exchange of best practice, harmonised global action on marine litter prevention, as well as policy support for regulation and target setting.

Note on figures 2, 3 and 4 below: figures presented between brackets represent the number of times the statement was provided as a gap. As a consequence, the highest the figure, the more it was mentioned by the participants.

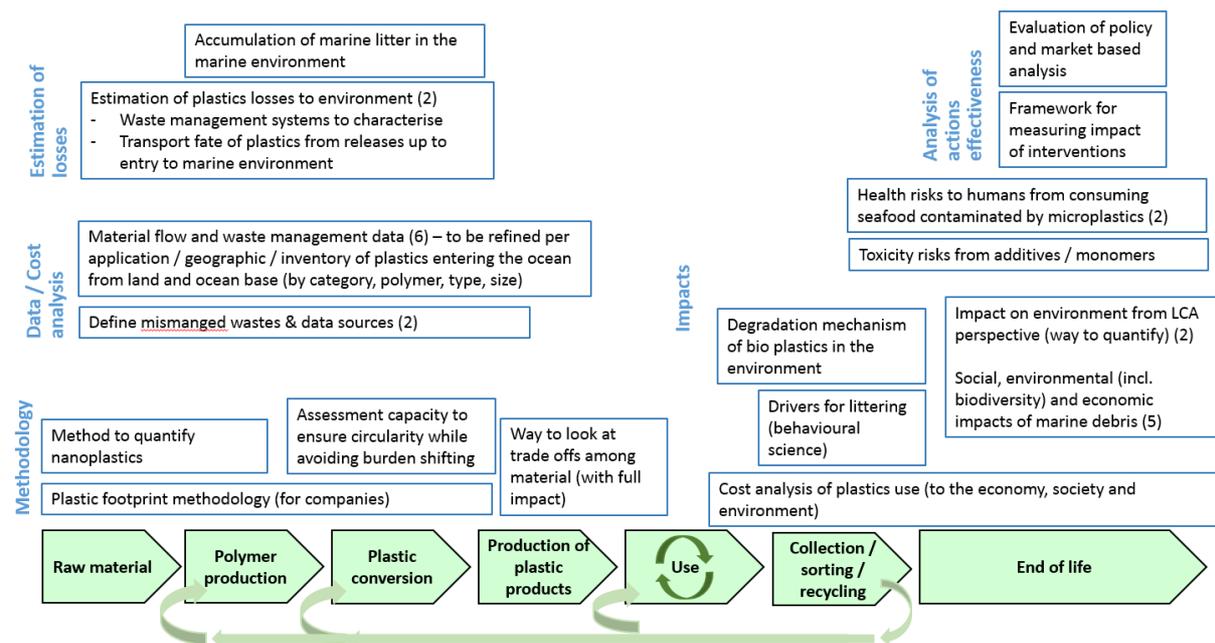


FIGURE 2: GAPS IN KNOWLEDGE

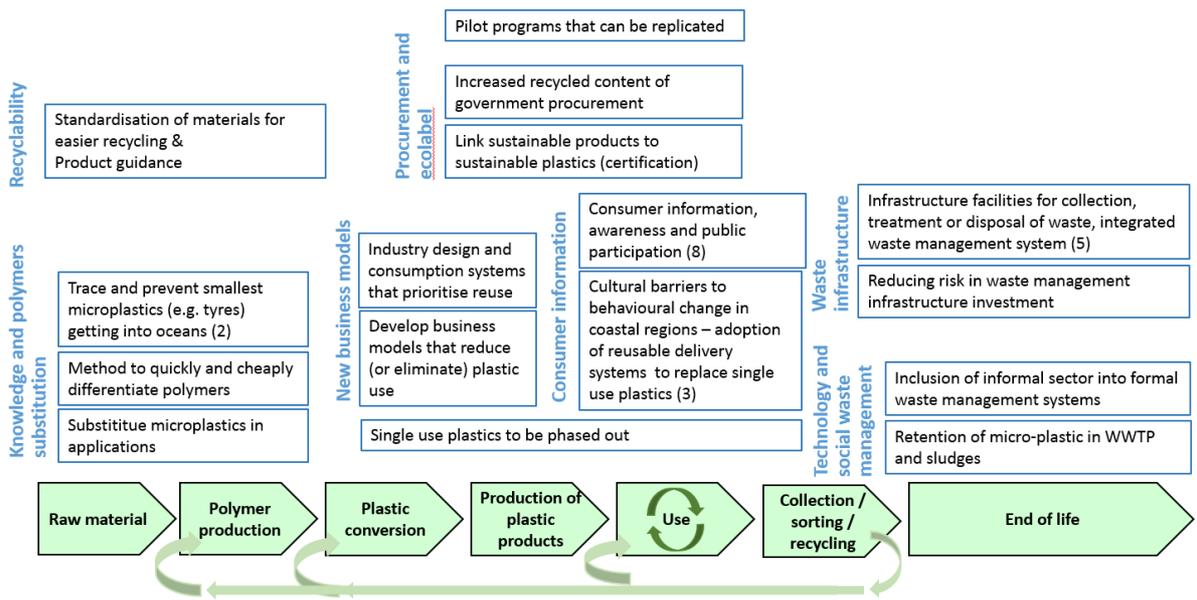


FIGURE 3: GAPS IN ACTION

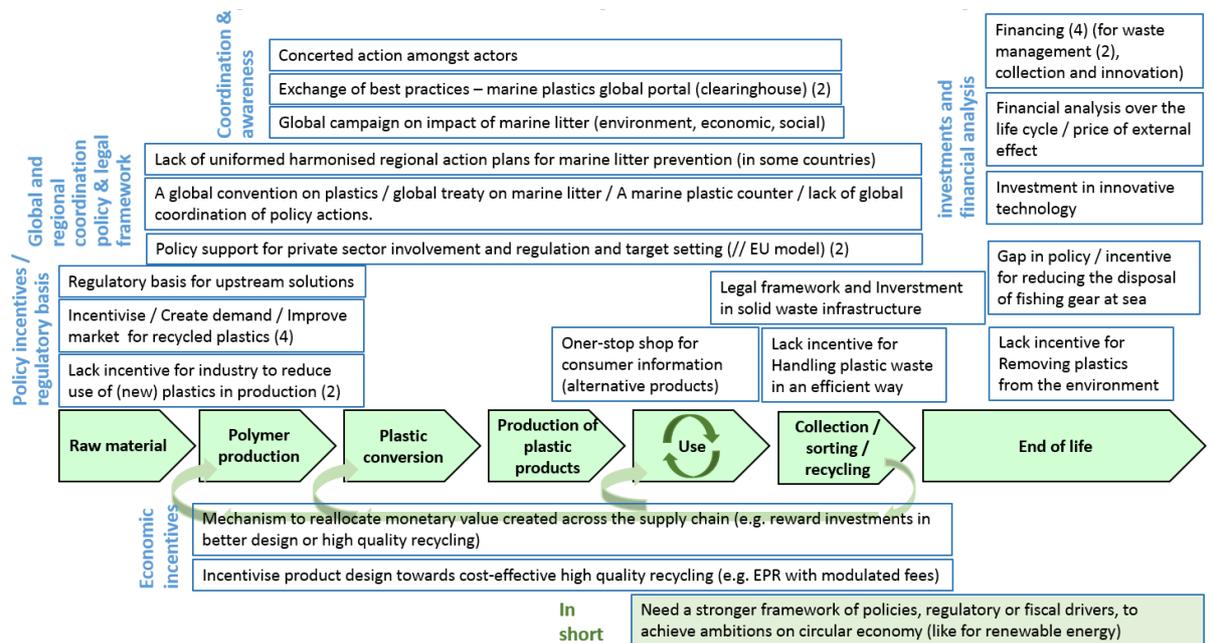


FIGURE 4: GAPS IN ENABLING CONDITIONS: INCENTIVES, FINANCING, AWARENESS, POLICIES AND ACTIONS PLANS

Session 8: Identification of key intervention points

This session started with a recap of the workshop thus far (see Figure 5), and a summary of the plastics value chain and key stakeholders (see

Figure 1) and of the gaps in technology, policy and awareness identified the previous day (see Figure 2, Figure 3, Figure 4).

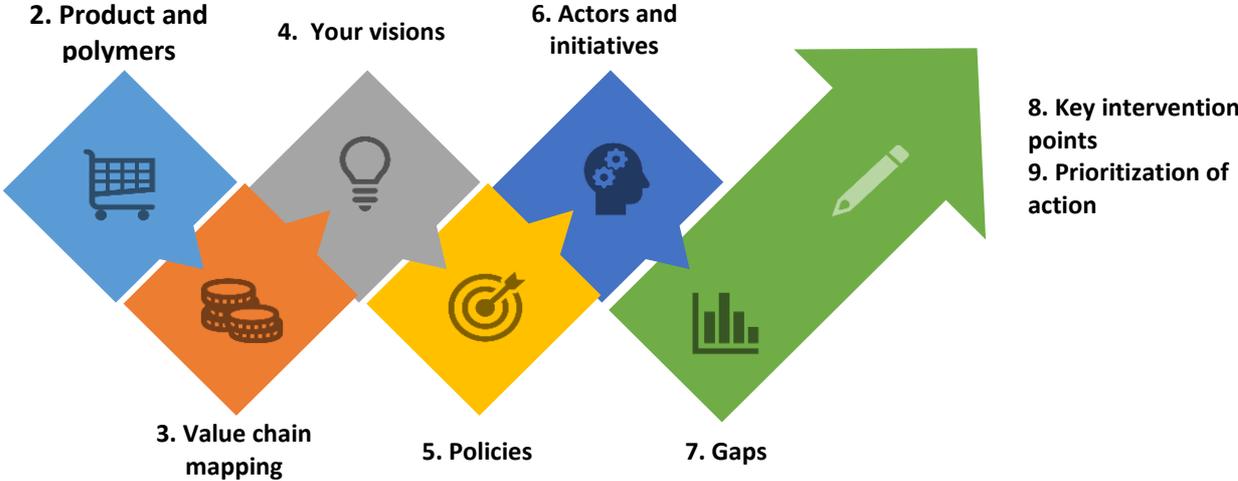


FIGURE 5: FLOW OF THE WORKSHOP

Participants then broke up into groups, and considering the gaps identified in Session 7, were tasked with identifying key intervention points across the plastics value chain.

Summary of recommendations

From the breakout group recommendations, it was clear that Interventions should focus on upstream solutions and not only on “end of pipe”. Furthermore, in designing interventions it is important to acknowledge the state of governance (both within industry and local government), as well as to be aware of local conditions. Differentiating actions between developing and developed countries was recognised as being necessary.

The following interventions around **knowledge** were identified as being needed:

- Development of a framework to measure and evaluate actions taken on marine plastic, covering hazards, benefits, cost etc.;
- Creation of a repository of waste data, as well as guidance to those needing to gather data on waste (i.e. providing an accepted terminology and methodology) and building capacity around waste management and waste data collection at the local government level;
- Building the case for sound waste management through providing knowledge on the economic, social and environmental benefits of waste, and creating incentives about marine plastic by making clear the links between the environmental and socio-economic impacts of marine plastic and the causes. Consumers need to be made aware of the value of plastics and their responsibility as consumers;
- Harmonising recycling labels and improving traceability, which are required to move towards circularity;
- Developing knowledge on microplastics, particularly on identifying the stage(s) at which fibres “leak” into the environment;
- Furthering knowledge on marine plastics, including understanding the stock of marine plastic, identifying the types of plastic in marine litter and identifying environmentally relevant data points to understand the impact of marine litter on biodiversity and the marine environment;
- Research on new materials and systems to increase circularity, including developing incentives and funding for research on such new materials.

Funding research (e.g. donor organisations, governmental grants, foundations and private donors), raising awareness and concern (i.e. effectively communicating scientific results) and collaboration between industry and stakeholders were identified as required to address the identified knowledge needs.

The following interventions around **economic instruments** were identified as being needed:

- Developing economic incentives, including better communication of costs (between companies and also to consumers).
- Building new business models following the waste hierarchy (i.e. reduction and reuse before recycling and disposal).
- Reconciling economic, environmental and social arguments to convince investors and local governments to support new business models and waste management.

Brand owners and retailers were identified as having an important role to play as a channel in raising consumer awareness, as well as in developing incentives to trigger consumer action.

The following interventions around **regulations and institutionalisation** were identified as needed:

- Creating a regulatory basis for upstream solutions, particularly around standardising food packaging (with respect to allowing recycled plastic content), whilst ensuring traceability and safety of recycled products;

- Creating a platform for industries and local government to exchange ideas around eco-design and recyclability;
- Developing a waste legislative framework and a clear vision of the issue were identified as enabling conditions. To meet these conditions, a need for an “IPCC for marine plastic” was identified, that is, an international treaty with a clear vision and goal;
- Creating a global “Green Plastic Fund”, analogous to the Green Climate Fund. This could be funded by a tax from a Global Protocol, as well as from donors;
- Developing regulations and incentives for extended producer responsibility (EPR).

Session 9: Prioritisation of action

In this plenary session, participants went through each value chain stage proposing priority interventions. Informal consensus was achieved through asking for “seconds” to a proposed intervention. Table 1 shows the interventions that captured most attention for each stage, and the follow up discussion further elaborates on the main ideas.

TABLE 2: PRIORITY ACTIONS ACROSS THE VALUE CHAIN

Value chain stage	Priority intervention	Primary stakeholder responsible
Cross cutting	Set up common platform for all value chain stakeholders to define coordinated approaches, including at regional level.	International and Regional institutions and organisations
	Agree on definitions to allow for harmonised data on waste	Research and academia / innovators
	Reduce, reuse, recycle hierarchy and life cycle based assessments to guide solutions	all
Raw material production	More research on how to transform secondary materials into high quality “raw” material	Research and academia / innovators
	Specific focus on food safety standards	National governments
	Increase recyclable content	Industry
Polymer production & plastic conversion	Develop alternative materials (with holistic life cycle thinking/LCA to evaluate them)	Industry, academia
	Design for recyclability (reducing/avoiding things that make plastic difficult to recycle, e.g. additives, multi-materials plastics)	Plastic processors
Production of plastic products	Design for reuse, together with the market	Brands and industry producers
	Promote the production of consumer products with lower associated plastic losses	Brands and industry
Use	Promote sustainable consumption (reduce, reuse, recycle).	Consumers, brands, retailers, governments.
	Raise awareness, and provide reliable sustainability information to consumer, as well as incentives for behaviour change	Retailers, brands and governments
Collection / sorting / recycling		
	Brands contribute to the set-up of initiatives and infrastructure, develop public/private partnerships	Brands, governments (incl. local), Waste managers
End of life	Develop integrated approach to coordination of waste systems, e.g. to complement EPRs	Local and national government, supported by industry
	Develop sector relevant solutions, e.g. tyres, microbeads (ban, restriction), textiles	Research and academia / innovators
	Improve solid waste management / treatment and wastewater management / treatment	Public/private partnerships between (local) governments and industry (plastic producers, brands, waste management industry)

Discussion

Raw materials and plastics production:

A need for **design for re-use** was identified, with reuse to be prioritised, wherever possible, in accordance with the waste hierarchy. There should be increased focus on “reduce, re-use, recycle and recover”; currently, recycling tends to take all the focus, and there is relatively little emphasis on reduce. Action to change the focus to “reduce and reuse” and then only to “recycle” as the third option requires the involvement of brands and industry/producers. A need for brands to **develop business models related to re-use of products** was identified.

A need for **design for recyclability**, supported by **research in increasing the recyclability of plastic waste**, was identified, in particular on the use and effect of additives often seen as a barrier to recyclability. Food safety standards that prohibit secondary plastics in food packaging, need to be of a particular focus, with due care given to the potential of contaminated recycled plastics. Currently, the

onus is on recyclers to handle the secondary material produced, but it should equally be on the producers. Better integration between the beginning and end-of-life actors is a requirement for success. A need for research into **new alternative materials**, e.g. bio-based polymers, as well as the **use of alternative materials** (e.g. steel or glass), was identified. Alternatives should be **assessed for potential burden shifting** (i.e. for unintended environmental and socio-economic impacts). Life cycle assessment (LCA) was suggested as the tool to evaluate alternatives. A need for **incentives to increase use of secondary materials** over primary plastics was identified. Governmental pressure such as through minimum recycled content standards and requirements for design for recyclability (including those for food packaging, recognising that this intersects with food safety standards) were suggested mechanisms.

The promotion of **consumer products with lower associated plastic losses** was put forward (in particular the apparel sector and tyre producers when it comes to microplastics). The producers of such products should put greater resources into researching alternatives and/or mitigating measures. A need was identified to ban (or otherwise restrict) the plastic microbeads in consumer products.

Use of plastic products:

Increased **actions** are needed to drive **sustainable consumption and production** (with actions under SDG goal #12 having relevance here). In particular, at the use phase, sustainable consumption is essential, and includes the importance of providing “better” alternatives to consumers. In order to do so, specific attention should be paid to the role of consumers, retailers and brand owners. It was identified that consumers currently have few options, barring some success stories in limited locations, e.g. coffee mugs deposit scheme. Service-oriented alternatives should be explored, e.g. consumers get the coffee they require and not the container. **Sustainable Public Procurement** can create market for more sustainable solutions and offer a concrete pathway for governments to lead by example.

A need was identified for providing reliable sustainability information to consumers and for **increased consumer awareness to drive consumer behavior change**, as well as a need to **prioritize waste prevention**.

Collection/sorting/recycling/waste management/end of life:

A need for more data on all stages of the waste/end-of-life stage was identified, as well as actions to **improve solid waste management**, such as to **create incentives for improving collection and recycling**. While differentiating between developed and developing countries, a need for **better integration between national and local government** was identified, with good governance at the national level and local level coordination of waste management.

The need was identified for promotion of public-private partnerships to address waste management infrastructure gaps, requiring more **government actions (legislation)**, as well as more voluntary **industry action/engagement** to contribute to the cost of infrastructure. The need was identified for **industries to become involved in solid waste management**, with a need for **producers to take responsibility**. The need to identify potential financiers of collection schemes was raised, with advice that the role of producers should be strengthened. Policies, such as Extended Producer Responsibility (EPR) programmes, are a potential solution.

A need for increased focus on end-of-life schemes in general was identified, with an increased **focus on sorting valuable waste fractions** towards their use as secondary resources. The need for integrated waste management where all fractions are taken into account was identified as especially important in developing countries, where this is frequently lacking. In addition, it was raised that actions are also

needed for policies, e.g. of EPR schemes, to adequately treat the waste fractions with no apparent value.

It was raised that actions related to end-of-life/waste management need to be **specific to the geographical and cultural context**, and that direct “copy pasting” of solutions from one region/city/municipality to another will not be adequate.

In line with improving solid waste management, there is a similar need for **improved wastewater management**, through infrastructure, technology and economic feasibility.

Overarching actions across the plastic value chain:

In general, the hierarchy: reduce, reuse, recycle, should guide solutions to marine plastics.

Assessments, such as LCA, are needed to **assess the consequences of actions/interventions**, not only in terms of new raw materials, but also re-use models, and waste management alternatives and to prevent regrettable substitutions.

There is a need to use **definitions allowing for harmonised data and research**.

A **common geographical platform** for all value chain stakeholders, was identified as a prerequisite to having effective implementation of circular economy within a geographical region. This is needed both at regional (international) and national level. Such a platform should facilitate sharing of knowledge, and should recognise that different actions between developed and developing countries are required, and measures for achieving these will differ substantially depending on the context. It was also raised that actions to be taken should differentiate between macro- and micro-plastics (e.g. bans, restrictions may work for one but not the other).

Sector-based interventions was suggested as an approach, and the need for actions on marine plastics to link to actions under the SDGs was considered essential.

Closure and next steps

Elisa Tonda (UN Environment) thanked participants and closed the workshop. The content of the workshop, as summarised in this report, is being used to inform a stocktaking exercise and a hotspots analysis report. These constitute pieces of the larger project puzzle, that of informing the design of a strategic guidance to the marine plastics crisis by focusing on its systemic drivers.

The next steps of the project include a series of webinars to bring the discussion to a wider audience, as well as possibly another workshop later in the year.

Annex: List of workshop participants

Last Name	First name	Organisation
Bai	Phan	Veolia
Bills Freemyn	Keondra	Ocean Conservancy, GEF project partner
Boucher	Julien	EA – Shaping Environmental Action
Bunce Karrer	Leah	GEF
Busschbach	Hermien	The Netherlands, Ministry of Environment
Castelan	Guy	PlasticsEurope (on 15 Feb)
Collot	Anne-Gaelle	PlasticsEurope (on 16 Feb)
Cole	Matthew	Plymouth Marine Laboratory, UK
De Smet	Michiel	European Commission, Eco-Innovation, DG Research & Innovation
Fabres	Joan	Grid Arendal, GEF project partner
Harris	Stewart	American Chemistry Council
Jambeck	Jenna	University of Georgia
Kamikawa	Yui	SEA project representative, Coca-Cola
Kershaw	Peter	GESAMP
Kurvits	Tiina	Grid Arendal, GEF project partner
Lao	Crispian	Philippines National Solid Waste Management Commission
Laurent	Alexis	Technical University of Denmark, contracted institution for the project
Lemos	Paulo	European Commission DG Environment
Lenaghan	Michael	Zero Waste Scotland
McManus	Liana	GRID Arendal - consultant
Mink	Erika	Tetrapak international
Notten	Philippa	The Green house, consultant for the project
Prindiville	Matt	UPSTREAM
Ruffo	Susan	Ocean Conservancy, GEF project partner
Ryberg	Morten	Technical University of Denmark, contracted institution for the project
Gueye	Sokhna	SEA project representative, Nestlé, Novel Packaging
Sananes	Sarah	France, Ministère de la Transition Ecologique et Solidaire
Sousa	Joao	International Union for Conservation of Nature
Tahir	Akbar	Hasanuddin University, Indonesia
Woodring	Douglas	Ocean Recovery Alliance (Plasticity initiative)
Hema	Tatjana	UN Environment/Mediterranean Action Plan-Barcelona Convention Secretariat
Averous	Sandra	UN Environment
Friedrich	Carla	UN Environment
Hasegawa	Kanako	UN Environment
Kasten	Tim	UN Environment
Mila-i-Canals	Llorenç	UN Environment
Rey	Helena	UN Environment
Tonda	Elisa	UN Environment
Vanderbeck	Isabelle	UN Environment
Wang	Feng	UN Environment