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**United Nations  
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United Nations Environment Programme**

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**Ad hoc open-ended expert group  
on marine litter and microplastics  
fourth meeting**

Item 4 (d) of the draft provisional agenda\*  
**Analysis of effectiveness  
(subparagraph 7d)**

**Draft revised methodology to analyse the effectiveness of existing  
and potential response options and activities on marine litter and  
microplastics at all levels to determine the contribution in solving the  
global problem**

**Note by the Secretariat**

1. The ad hoc open-ended expert group (AHEG) was established through the United Nations Environment Assembly resolution 3/7 paragraph 10. Its mandate was extended through resolution 4/6 paragraph 7, which also requested the group to, amongst other things, through subparagraph 7(d):

*“Analyse the effectiveness of existing and potential response options and activities on marine litter and microplastics at all levels to determine the contribution in solving the global problem.”*

2. The expert group requested the Secretariat, in the outcome document from the third ad hoc open-ended meeting on marine litter and microplastics\*, to:

- (a) Ensure the stocktaking survey will feed into the effectiveness analysis;
- (b) Take into account comments provided during the third meeting of the expert group on the methodology proposed in document UNEP/AHEG/2019/3/5;
- (c) Consider the existing body of work on effectiveness analysis methodologies;
- (d) Consult Member States intersessionally on a revised methodology;
- (e) Make the updated methodology available 6 weeks prior to the fourth meeting of the expert group;
- (f) Carry out a few pilot studies by applying the updated methodology and make them available prior to the fourth meeting of the expert group;
- (g) Invite the scientific advisory committee to provide advice on methodological approaches related to effectiveness.

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\* UNEP/AHEG/2020/4/1

\* Available at [https://papersmart.unon.org/resolution/uploads/aheg\\_3\\_outcome\\_document\\_0.pdf](https://papersmart.unon.org/resolution/uploads/aheg_3_outcome_document_0.pdf)

3. This draft document aims to provide an outline of the revised methodology as presented for consideration in the UNEP/AHEG/2019/3/5 report and is presented to AHEG-4 for discussion and consideration. The ultimate objective of the exercise is to provide a method and an assessment of response options that enables Member States to measure progress towards the elimination of all discharge of plastic litter into the ocean. The exercise builds on the stocktaking exercise mandated under resolution 4/6 subparagraph 7(a) and described in Working Document UNEP/AHEG/2020/4/2. This report may be revised based on feedback received from consultations prior to the AHEG-4 in order to ensure it adequately responds to the request set out in subparagraph 7(d).

## **Introduction**

4. This draft document responds to resolutions 3/7, 4/6 and the outcome document of AHEG-3, in which the importance of achieving the global goal of long-term elimination of discharge of litter and microplastics to the oceans was agreed. The assessment of the effectiveness of possible response options should enable measurement of whether progress was being made towards the global goals that had been set, primarily target 14.1 of the Sustainable Development Goals and ultimately the elimination of all discharge of plastic litter into the ocean.

5. The leakage of plastic waste into the environment presents a risk to the oceans in the form of marine plastic litter and microplastics. Management controls (preventive and mitigative) have been put in place to prevent such leakage into the environment and to mitigate the impacts thereof once leaked. An analysis of the effectiveness of management controls must identify and consider those risks which reduce the effect of preventive and mitigative measures. Stressors increase the likelihood of leakage, contributing to the pollution event and undermining the end goal of long-term elimination of discharge into the ocean.

## **Summary of submissions on methodological approaches related to effectiveness**

6. As per the guidance to the UNEP Secretariat on the preparations for the fourth meeting of the expert group,<sup>1</sup> the Scientific Advisory Committee convened by the Executive Director of UNEP to guide and provide input to the preparation of an Assessment on sources, pathways and hazards of litter including plastic litter and microplastics pollution was invited to provide advice on methodological approaches related to effectiveness. In addition, Member States and major groups and stakeholders were subsequently invited to submit further suggestions to improve the methodology for analysing effectiveness of response options and activities at all levels.

7. In total, 30 submissions were uploaded to the UNEP papersmart portal or emailed directly to the Secretariat. Of the portal submissions, 2 did not contain any data and 7 were duplicates, giving a total of 21 valid submissions. Of the 21 valid submissions, 6 provided information on their current or upcoming responses and activities, 3 provided a narrative highlighting the issue more broadly and 12 submissions provided suggestions relating directly to options for the methodology, including published approaches.

8. The proposed revised methodology was presented to Member States and major groups and stakeholders in an online webinar. Comments were noted during the webinar and 4 further comments were emailed to the Secretariat.

9. As requested during the third meeting of the expert group, the revised methodology takes into account the above submissions, as well as comments provided during the third meeting of the expert group and the existing body of work on effectiveness analysis methodologies. In addition, the stocktake survey undertaken in delivery of subparagraph 7(a) of UNEA resolution 4/6 will feed into the effectiveness analysis.

## Method

10. The revised method<sup>†</sup> takes a two-pronged approach to analysing the effectiveness of response options and activities (management controls) to determine their contribution to the solving the global problem of marine plastic litter and microplastics. First, similar response options and activities are aggregated into an **archetype** management control, the components of which are informed by each individual response option or activity (see section 6.2). Secondly, the archetype management control is considered within a broader **management strategy**, based on the Bowtie analysis. This provides a more holistic analysis of the additional factors contributing to the effectiveness of the management control and the role of the management control within the broader management strategy.

### *Identifying characteristics of response options and creating archetypes*

11. The stocktake survey undertaken in delivery of subparagraph 7(d) of the UNEA-4 resolution will provide one source of response options and activities to identify the various components of the governance strategy.

12. Similar response options and activities will be aggregated into an archetype management control. The following steps will assist in identifying those that are appropriate for collating into a single archetype.

13. **Step 1:** Response options and activities will be assessed to determine the characteristics listed in Table 1. An initial categorisation will be conducted based by filtering the characteristics of response options and activities listed in Table 1. These characteristics will be included in an introductory narrative as well as the final matrix of each archetype.

*Table 1: Identifying characteristics to group response options and activities into archetypes.*

| Characteristic Type                    | Characteristic  | Source (# = 7a stocktake survey field) |
|--|---|--|
| Name                                   | Short, descriptive name   | 7                                      |
| Primary objective                      | Objective: Reduce waste generation, clean beaches, trap litter in waterways, change process, legislation, etc.<br>Target sector, activity or impact: manufacturers, consumers, waste management services, government, human health, biodiversity, etc.  | 7, 8, 9, 19, 20, 21, 22                |
| Type of response option or activity    | Preventive control; Mitigative control; Monitoring and evaluation; Escalating factor; Supporting factor.  | 7, 8, 9                                |
| Lifecycle phase                        | Source materials; Product manufacture; Use phase; End-of-life.  | 18                                     |
| Geographic Range                       | Mountains and upland area; Agricultural land/soils; Entire water catchment; Forests or Mangroves; Freshwater rivers and lakes; Urban environment; Waste disposal sites; Coastal zone; Maritime area within national jurisdiction; Areas beyond national jurisdiction; Open ocean and high seas; Air | 17                                     |
| Environmental Zone (of implementation) | Land; Freshwater; Marine; Air   | 17                                     |

<sup>†</sup> A previous method is outlined in the UNEP/AHEG/2019/3/5 report.

|                              |                      |                         |
|------------------------------|----------------------|-------------------------|
| Regulatory or Non regulatory | Mandatory; Voluntary | 7, 8, 9, 19, 20, 21, 22 |
|------------------------------|----------------------|-------------------------|

14. **Step 2:** Where response options display obvious similarities, these will be aggregated. For example, obvious similarities could include:

15. Control measures - legislation, standards, rules
  - (a) A ban on microbeads in cosmetics,
  - (b) A ban on disposable plastic bags,
  - (c) A tax to disposable plastic bags,
  - (d) Marine litter action plans developed under the Regional Seas Programme,
  - (e) National EPR schemes for packaging,
  - (f) Legislation to reduce the use of particular single-use plastics,
  - (g) Etc.
  
16. Control measures - technology and processes
  - (a) Waste separation technologies,
  - (b) Waste recycling technologies,
  - (c) Waste repurposing technologies (concrete, bricks, pavers, etc.),
  - (d) Global design standards,
  - (e) Waste to Energy or fuel (e.g. pyrolysis),
  - (f) “Fishing for litter” projects with subsidies,
  - (g) Alternate materials – biodegradable, compostable,
  - (h) Etc.
  
17. Supporting measures – working with people
  - (a) Raising awareness, education (incl. training, conferences, action, e.g. beach cleans)
    - (i) Consumers
    - (ii) Manufacturers
    - (iii) Government,
  - (b) Campaigns to change behaviour
  - (c) Etc.
  
18. Monitoring and evaluation:
  - (a) Monitoring programmes – litter on beaches, waterways, floating,
  - (b) Develop harmonised methodologies,
  - (c) Etc.

## *Analysis of effectiveness*

19. Submissions from Member States, the Science and Advisory Committee and major groups and stakeholders have been taken into account in the revised method for the analysis of the effectiveness of existing and potential response options and activities on marine litter and microplastics at all levels to determine the contribution in solving the global problem.
20. The analysis will, amongst other submission suggestions, be qualitative, take into account the DPSIR (drivers, pressure, state, impact and response) model, acknowledge the multi-disciplinary and cross-sectoral nature of combating plastic pollution across its full life cycle.
21. It was suggested the analysis should not evaluate whether implementation is effective based on current domestic implementation, as that is case-specific given a country's capabilities, but could identify barriers to and enabling conditions for fully effective implementation.
22. Where operational or management targets have not been set, some may be suggested to complete the governance strategy. These may be based on the Sustainable Development Goals as a default. Where monitoring is not in place or is limited to some of the individual management controls included in the archetype, the available information will be reflected, and any lack of information will be highlighted as a gap.
23. Barriers discussed in the AHEG-1 and AHEG-2 meetings will be included in the discussion of each strategy. Where response options may reduce the effect of an identified barrier, this will be included in the assessment of effectiveness in contributing to solving the global issue.

### ***When is a response option effective?***

24. The aim of the study is to “analyse the effectiveness of existing and potential response options and activities on marine litter and microplastics at all levels to determine the contribution in solving the global problem.” Here the goal is “long-term elimination of discharge of litter and microplastics to the oceans” as stated by the United Nations Environment Assembly in its resolution 3/7. A definition of effectiveness for the purposes of this study would therefore ideally need to be based on two criteria, namely:
  - (a) quantifying the volume of plastic waste (macro, micro and nano) entering the oceans from all point and diffuse sources, and
  - (b) quantifying the impact of a single response option has on this volume.
25. The volume of discharge per Member State at the time of the study has been estimated using broad models that do not support a robust and definitive baseline against which to measure effectiveness at the national, sub-national and local levels. In addition, quantitative baseline and/or monitoring data at the level of individual response options is also limited.
26. The effectiveness of response options will, for the purposes of this study, be based on the objective of that particular archetype. Each archetype identified in this study (see section 6.2) will be assessed to determine the objective of the activity, whether explicitly stated or inferred. These may be quantitative targets (operational and/or management targets) that contribute to the overall goal of long-term elimination of discharge of litter and microplastics to the oceans. The effectiveness of the archetype will then be determined against these target/s. Such data will not be evaluated against an estimated amount entering the oceans globally or nationally.
27. The stocktake study undertaken in delivery of sub-paragraph 7a of UNEA Resolution 4/6 groups existing activities and actions into four primary categories. These are:

- (a) Legislation, standards, rules
- (b) Working with people
- (c) Technology and processes
- (d) Monitoring and analysis

28. These four groupings will be replicated in this study. However, only the first three groups will be assessed against the following types of indicators:

- (a) Process indicators,
- (b) Input indicators, and
- (c) Performance indicators (outputs and outcomes).

29. For the purposes of this study, activities within the fourth category of monitoring and analysis are categorised as a tool to measure effectiveness, not a characteristic against which to measure effectiveness.

### *Types of indicators included in the assessment*

30. Each response option will be assessed to determine whether operational and/or management targets have been set. For each archetype, all targets will be reflected where they are defined to illustrate the range in use. In absence of defined targets, SDG targets will be considered as a possible default or indicators will be suggested.

31. As defined by the OECD:

(a) Input indicators are used to measure the amount of resources that are allocated to a policy. Thus, they are measures of effort.

(b) Output indicators monitor how efficiently policies are executed. The information they provide can help to improve the implementation of policies. Output indicators measure quantities that are produced by a policy in order to achieve its objectives, but not progress towards the objectives itself. Outputs are means to achieve a policy objective, but no ends in themselves. They are produced because policy makers expect them to contribute to desirable outcomes

(c) Outcome/result indicators are used to monitor the effectiveness of policies in achieving their objectives. They help to understand whether policies are well-designed in view of their objectives. Outcomes are the underlying motivation behind policies, but in most cases, they can only be affected through the production of outputs.‡

### *Process Indicators*

32. Process indicators are qualitative indicators that describe important components of a response option or activity that contribute to the achievement of the outcomes, goals and objectives. These can be regarded as indirect indicators of merit and do not necessarily guarantee, but are expected to lead to, success. For the purposes of this study, the process indicators are categorised as follows:

- (a) Governance
- (b) Management
- (c) Co-operation components
- (d) Co-benefits

‡ OECD, 2016. *Using Outcome Indicators to Improve Policies: Methods, Design Strategies and Implementation*. OECD Regional Development Working Papers 2016/02. <https://dx.doi.org/10.1787/5jm5cgr8j532-en>

### *Input indicators*

33. Input indicators are quantitative or qualitative indicators that provide measures of the resources required to conduct project activities. For the purposes of this study, the input indicators are categorised as follows:

- (a) Scope,
- (b) Maturity, and
- (c) Scale.

### *Performance indicators*

34. Performance or results indicators are quantitative indicators that provide measures of the impacts, outcomes and outputs of response options. Monitoring data relating to performance indicators is used to evaluate the effectiveness of a response option in meeting the management targets and, where necessary, drive a review process of management controls. For the purposes of this study, the performance indicators are categorised as follows:

- (a) Output indicators
- (b) Outcome Indicators

### *Monitoring and analysis*

35. Where monitoring data is available for those indicators relevant to the response option, this will be reflected. Where more than one response option forms an archetype, available data will be provided for each.

### *Assessment indicators*

36. Similar response options and activities will be grouped into a single management control, forming an archetype. Individual response options will be listed individually within each of the components of the management control, illustrating the range of control measures being undertaken while informing the assessment and discussion for the archetype management control.

37. A response option will be assessed within its own scope and objective and on whether the components listed in Table 2 are included in activities. Where data is available that allows for quantification of outputs and outcomes, these will be reflected in the performance indicators.

*Table 2: Process indicators to assess the three categories of response options and activities*

| Category                                | Indicator | Source<br>(# = 7a stocktake<br>survey field) | Value |
|---|-----------|--|-------|
| <b>PROCESS INDICATORS (qualitative)</b> |           |  |       |

|                                       |   |   |  |
|---------------------------------------|---|---|--|
| Governance components                 | Management target/s are defined (What is to be achieved?)                 | 9c, 19, 20, 21, 22.<br>Review of literature, other sources          | Y/N  |
|                                       | Operational target/s are defined (How is it to be achieved and measured?) | 9c, 19, 20, 21, 22<br>Review of literature, other sources           | Y/N  |
| Management components                 | Local capacity building and development                                   | 31, 38.<br>Review of literature, other sources                      | Y/N  |
|                                       | Ongoing funding is secured  | 23, 27.<br>Review of literature, other sources                      | Y/N  |
|                                       | Monitoring is in place  | 9d, 34g, 34g.i.<br>Review of literature, other sources              | Y-type/N   |
|                                       | Reporting is in place   | 9d, 13.<br>Review of literature, other sources                      | Y-type/N   |
|                                       | Review process is defined   | 9d, 14, 33, 34.<br>Review of literature, other sources              | Y/N  |
| Co-operation components               | Domestic stakeholders included  | 31, 38.<br>Review of literature, other sources                      | Y-type/N   |
|                                       | International capacity building   | 7, 8, 9, 15, 19, 20, 21, 22.<br>Review of literature, other sources | Y-type/N   |
| Co-benefits                           | Social, Economic, Environmental   | 34d, 34e, 34f, 34h.<br>Review of literature, other sources          | Y-type/N   |
| <b>INPUT INDICATORS (qualitative)</b> |   |   |  |
| Scope                                 | International; Regional; Transnational; National; Sub-national; Local     | 15  | Level of effort if contribution is scaled:<br>Local = high<br>Subnational = med-high<br>National = medium<br>Transnational = low<br>Regional = low<br>International = none                                   |
| Maturity                              | How established a given response option or activity is                    | Review of literature, other sources.                                | Confidence level in likelihood of success:<br>e.g. low = not yet established, medium = ready to be applied or has been piloted (established), high = well-established, numerous examples of use in countries |



|  |  |  |  |
|--|--|--|--|
| Scale  | Level of effort of each activity.  | Review of literature, other sources.             | E.g. small, medium, or high <sup>§</sup>   |
| <b>PERFORMANCE INDICATORS (quantitative)</b> |  |  |  |
| Output                                       | Upstream (pre-leakage) - measure against primary objective)                  | 31b, 31c.<br>Review of literature, other sources | E.g. amount of waste 1) generated, 2) reused, 3) collected, 4) recycled, 5) disposed of sustainably, and 6) amount of marine litter removed, 7) number of targeted stakeholders engaged (incl. sectors, national or international) |
| Outcome/result                               | Downstream (post-leakage) - <b>towards eliminating discharge into oceans</b> | 31b, 31c.<br>Review of literature, other sources | Quantity of waste prevented from entering the marine environment   |

38. Factors not directly within the control of the response option can influence the expected outcomes positively or negatively. These may be regarded as enabling and supporting factors or barriers and escalating factors. In addition, achieving the operational and management targets may assist in making progress towards one or more Sustainable Development Goals. These additional factors should be considered when assessing the contribution of a response option to the global issue of marine litter and microplastics and are listed in Table 3.

Table 3: Additional factors to consider when analysing response options and activities

| Type                                 | Additional factors   | Source (# = 7a stocktake survey field)                     |
|--------------------------------------|--|--|
| <i>Escalating factors</i>            | The barriers identified in the AHEG-1 and AHEG-2 meetings will be reflected as escalating factors within the broader management strategy (section 5.2). The discussion of archetype management controls will highlight where response options may reduce the effect of a barrier, but this effect will not be included in the assessment of effectiveness in contributing to solving the global problem. | 13b, 35, 36, 44.<br>Review of literature, other sources    |
| <i>Supporting factors</i>            | Response options and activities submitted by major groups and stakeholders will be reflected as supporting factors. These are not necessarily within the control of government authorities but play an important role towards achieving the global goal and objective of long-term elimination of discharge to the oceans  | 12, 23, 27, 31, 32.<br>Review of literature, other sources |
| <i>Tracking towards global goals</i> | The operational and management targets, the objective and any co-benefits will, where applicable, be mapped to the Sustainable Development Goals beyond 14.1. The discussion will therefore also consider whether the response option or   | Review of literature, other sources                        |

<sup>§</sup> Additional indicators suggested were 1) the scale of use of innovative technologies and materials, and 2) level of financial investment required to achieve impact at scale.

|  |   |  |
|--|---|--|
|  | activity contributes to tracking global progress of long-term elimination of discharge to the marine environment. |  |
|--|---|--|

39. As per the report of the third meeting of the ad hoc open-ended expert group on marine litter and microplastics (UNEP/AHEG/2019/3/6):

“The assessment of the effectiveness of possible response options should enable measurement of whether progress was being made towards the global goals that had been set, primarily target 14.1 of the Sustainable Development Goals and ultimately the elimination of all discharge of plastic litter into the ocean. Several representatives said that in order to achieve such measurement, more data and research were needed to provide a strong scientific and knowledge base.”

## *Discussion*

40. A discussion will follow the assessment of the archetype. Although not a measure of effectiveness, the role of the response option or activity within the broader management strategy will be discussed (preventive control, mitigative/recovery control or contributing to the monitoring, reporting and evaluation of the management control). A diagrammatic overview of the broader governance strategy, linking archetypes will provide a holistic view of the linkages between various archetypes and the factors outside of the control of the response option that may influence the outcomes both positively and negatively (escalating and supporting factors).

41. Where applicable, the context and contribution of the response option within the achievement of the broader Sustainable Development Goals will be provided.

## **Response options as part of a broader governance strategy**

42. The development of governance strategies illustrates the interplay between various response options, providing a view of the cause-effect pathways and the drivers that can influence the effectiveness of responses in achieving management targets across the lifecycle of plastics and towards the overall global objective of eliminating discharge to the marine environment.

43. By including escalating and supporting factors, a more holistic view of the cause-effect pathways for plastic waste entering the oceans is developed. This will provide policymakers with an opportunity to evaluate all contributing factors within their national context and the comprehensiveness of their own responses to the issue.

44. Each governance strategy will aim to provide a qualitative assessment of the effectiveness of response options and activities currently in use by different governments, institutions, industry, civil society and academia. This will be illustrated through the following:

45. The process of developing a complete governance strategy, within current knowledge, by incorporating different response options related to the issue will highlight components of response options or activities that are not consistently included in the modelled governance strategy.

46. Where quantitative data is available for a particular response option, this will be included in the analysis of that response option, forming a component of the qualitative assessment of the contribution of that response option to the governance strategy.

47. The governance strategy can build knowledge on the gaps in the governance strategy intended to address the issue of marine plastic litter and microplastics. For example, monitoring or reporting may not cover a particular aspect required to evaluate and review the effectiveness of management controls.

### *The Bowtie analysis*

48. The IEC/ISO 31010 Bowtie analysis is a method that identifies 1) the **source** of the risk, 2) the associated **prevention** controls that reduce the likelihood of the pollution event taking place, and the 3) **mitigation/recovery** controls that reduce the effect once the pollution event has taken place.\*\* Together, the prevention and mitigation controls reduce the consequences to the overall objective. Outside of the governance strategy, external factors can both negatively affect (escalate) and positively affect (support)<sup>††</sup> the outcome of management controls. Figure 1 provides a high-level diagrammatic overview of the Bowtie analysis.

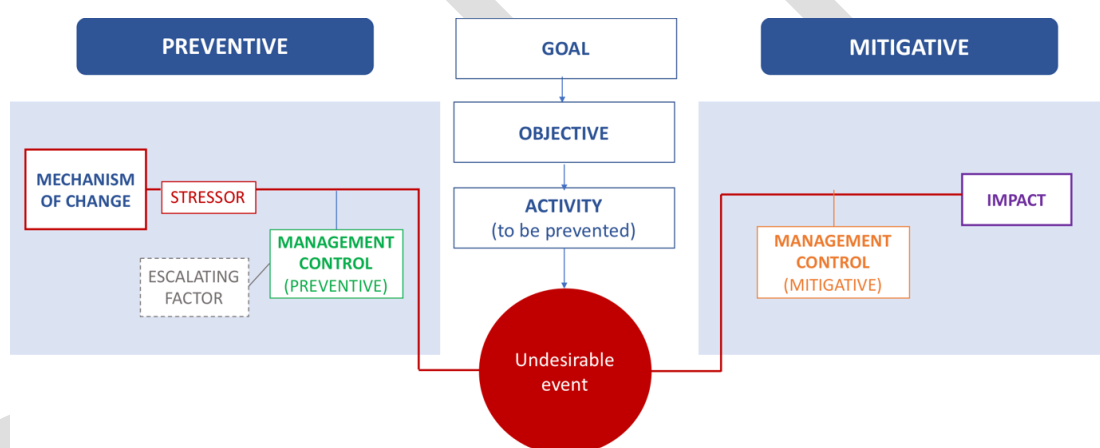


Figure 1: Diagrammatic representation of the Bowtie analysis

49. To assess the effectiveness of a governance strategy, the targets and outcomes must be evaluated against the management targets and objective to determine progress towards achieving the long-term goal (elimination of all plastic discharges into the ocean). This requires monitoring of operational controls to match actual outcomes to expected outcomes of the operational controls. Controls that have not achieved their expected outcomes should be reviewed and adapted accordingly.<sup>‡‡</sup>

### *Application of the Bowtie analysis to the governance of marine plastic litter and microplastics*

\*\* See Cormier, R., Elliot, M., Kannen, A., 2018. *IEC/ISO Bowtie analysis of marine legislation: A case study of the Marine Strategy Framework Directive*. ICES Cooperative Research Report No. 342, 56.

<https://doi.org/10.17895/ices.pub.4504>; Astles, K.L., Cormier, R., 2018. *Implementing Sustainably Managed Fisheries Using Ecological Risk Assessment and Bowtie Analysis*. 10. 10.3390/su10103659, Cormier, R., Elliot, M., Kannen, A., 2018. *IEC/ISO Bowtie analysis of marine legislation: A case study of the Marine Strategy Framework Directive*. ICES Cooperative Research Report No. 342, 56. <https://doi.org/10.17895/ices.pub.4504>.

<sup>††</sup> “Supporting factors” are not included in the Bowtie analysis. This component has been added for the purposes of this study.

<sup>‡‡</sup> Astles, K.L., Cormier, R., 2018. *Implementing Sustainably Managed Fisheries Using Ecological Risk Assessment and Bowtie Analysis*. 10. 10.3390/su10103659.

50. By effectively controlling the causes, the event (plastic products and waste entering the environment) can be prevented. Once the event has taken place, the consequences must be controlled through mitigation and recovery. §§

51. The Bowtie analysis recognises that management controls do not operate in isolation. A number of response options may contribute to an outcome while external (escalating) factors, such as natural disasters, may influence the risks in achieving the objective. Applying the Bowtie analysis will therefore allow for a holistic view of the effectiveness of a governance strategy while providing analysis of each response option in achieving its own intended goal/objective.

52. The Bowtie analysis will assist in identifying 1) the mechanism of control, 2) the stressor/s, 3) prevention controls, 4) mitigative controls, and 5) the impacts and outcomes should the management controls not be effective. In addition, monitoring efforts (where available) and measurement of effectiveness (where available) for each response option will feed into the governance strategy. This will inform the evaluation of achieved results against operational and/or management targets (see figure 3 for illustration).

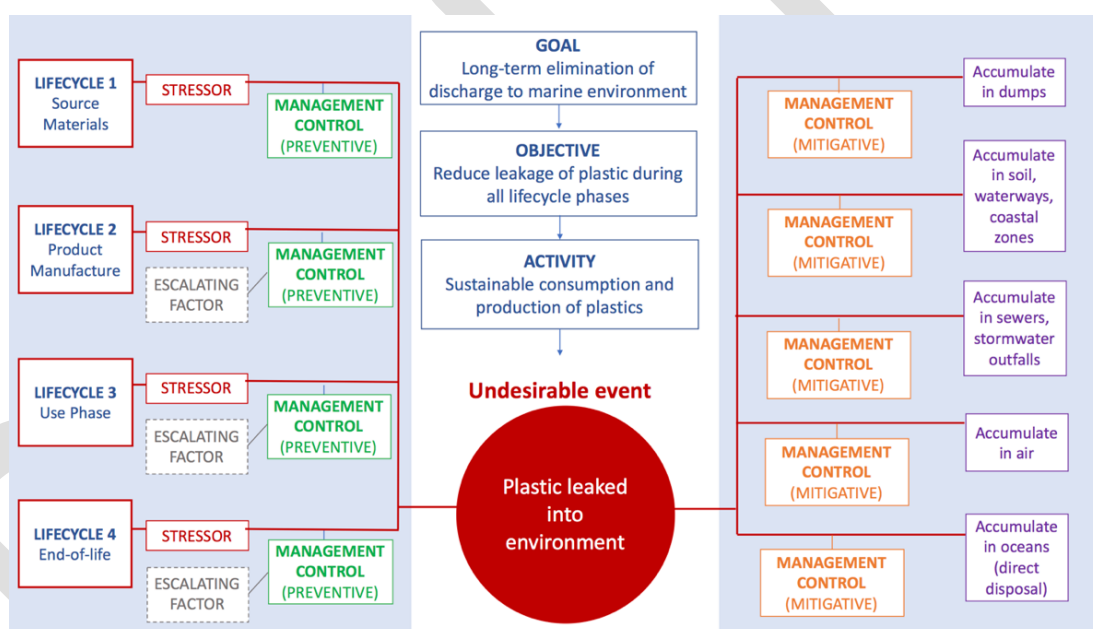


Figure 2: Illustrating the application of the Bowtie analysis to the governance of plastic pollution

53. Figure 2 provides an overview of the Bowtie analysis as applied to the issue of marine litter. On the left-hand side, the mechanisms of change are reflected in the four lifecycle phases. Each phase may have one or more stressors that increase the likelihood of plastic leaking into the environment. Multiple management controls may be applied to prevent such leakage from happening. Each lifecycle phase may result in one or more impacts on the right-hand side, which could lead to accumulation of plastic litter and microplastics in the oceans. In addition, accumulation in the oceans can result from direct disposal of plastic waste and fishing gear.

§§ Cormier, R., Elliot, M., Kannen, A., 2018. *IEC/ISO Bowtie analysis of marine legislation: A case study of the Marine Strategy Framework Directive*. ICES Cooperative Research Report No. 342, 56. <https://doi.org/10.17895/ices.pub.4504>

## Mapping the stocktake survey to the Bowtie analysis

54. The stocktake survey undertaken in delivery of subparagraph 7(d) of the UNE-4 resolution will provide one source of response options and activities to identify the various components of the governance strategy. Figure 3 illustrates which fields within the survey will be mapped to the governance strategy. Those fields that will not be used are also listed.

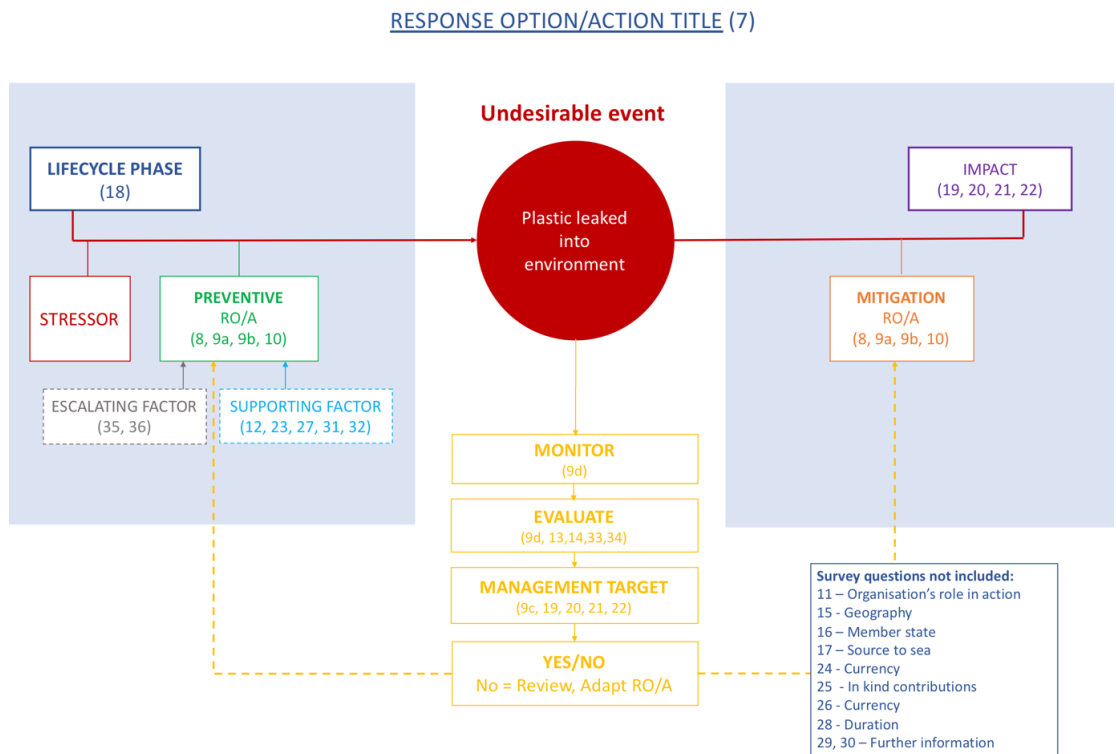


Figure 3: Mapping of stocktake survey fields to a governance strategy

Table 4: Legend for Figure 3

| SOURCE OF CHANGE - LIFECYCLE PHASE |  |
|------------------------------------|--|
| 18                                 | Raw materials                              |
|                                    | Design, production/manufacture             |
|                                    | Use/Consumption                            |
|                                    | Collection / sorting of plastics after use |
|                                    | Management of collected plastics           |
|                                    | Clean-up of plastic from the environment   |
| MANAGEMENT TARGET                  |  |
| 9c                                 | Technology and processes (incl research)   |
| 19                                 | Target of action                           |
| 20                                 | Impacts or harms action relates to         |
| 21                                 | Types of items or contaminants targeted    |
| 22                                 | Sectors targeted                           |
| EVALUATION                         |  |

| RESPONSE OPTION/ACTIVITY |                                    |
|--------------------------|------------------------------------|
| 7                        | ACTION TITLE                       |
| 8                        | TYPE OF ACTION                     |
| 9a                       | Legislation, standards, rules      |
| 9b                       | Working with people                |
| 10                       | Type of Action                     |
| MONITORING               |                                    |
| 9d                       | Monitoring and analysis activities |
| ESCALATING FACTORS       |                                    |
| 35                       | Drivers                            |
| 36                       | Barriers                           |
| SUPPORTING FACTORS       |                                    |

|    |                                    |
|----|------------------------------------|
| 9d | Monitoring and analysis activities |
| 13 | Reporting and evaluations          |
| 14 | Actual outcomes, impacts evaluated |
| 33 | Timeframe for evidence of impact   |
| 34 | Are outcomes evaluated             |

|    |                            |
|----|----------------------------|
| 12 | Actors (cooperation)       |
| 23 | Action is funded           |
| 27 | Type of funding (see list) |
| 31 | Stakeholder engagement     |
| 32 | Systems circularity        |

55. Additional sources for identifying response options and actions include the study on technical and financial resources or mechanisms (subparagraph 7(b)), the study on partnerships and increased cooperation (subparagraph 7(c)) and a literature review.

### *An example of a governance strategy: microplastic pollution*

56. Figure 4 provides an example of a governance strategy to prevent pollution by microplastics. Here, the component of microfibres from clothing is illustrated. The full governance strategy for eliminating discharge of microplastics would include microbeads, other microplastics and additional lifecycle phases (including the use phase). The diagram is provided for illustrative purposes only will be further mapped out during the study.

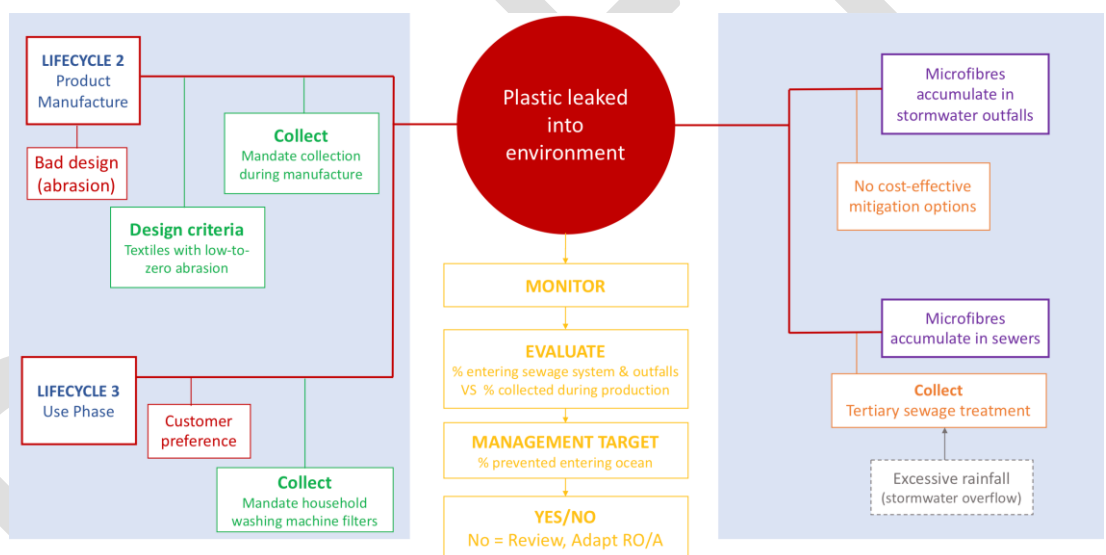


Figure 4: The example of microplastics

### *An example of a governance strategy: EPR Scheme for packaging*

57. Figure 5 provides an example of a governance strategy that uses an Extended Producer Responsibility scheme to contribute to financing collection and recycling processes. As for figure 4, this diagram is provided for illustrative purposes only and will be further mapped out during the study.

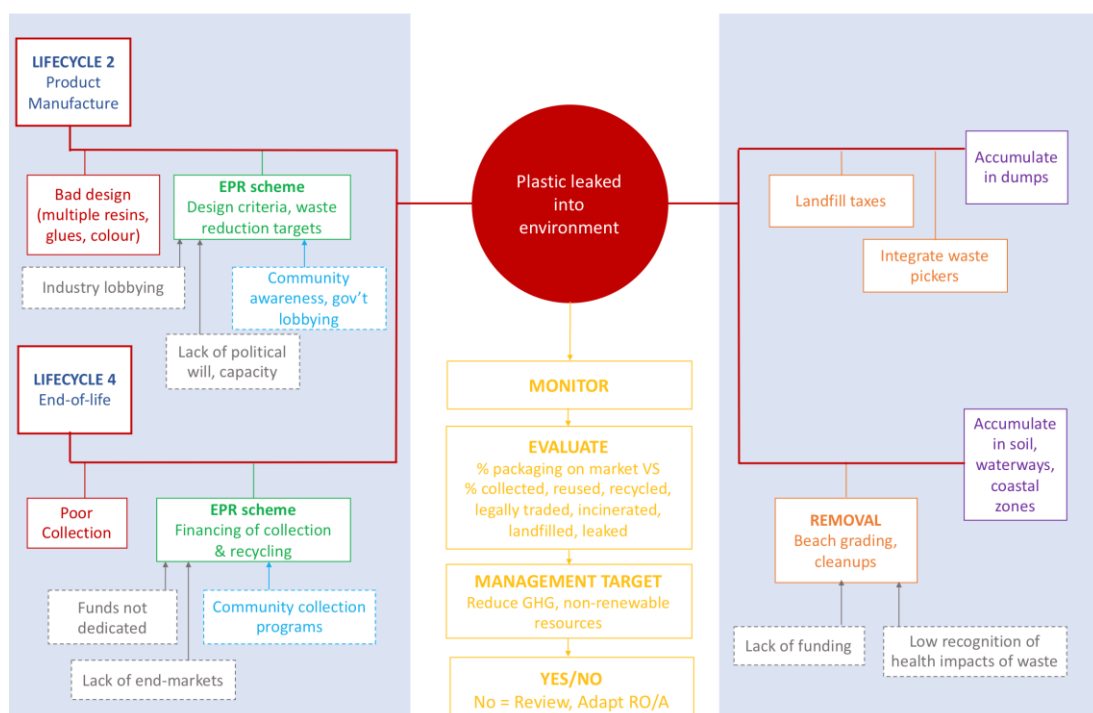


Figure 5: The example of an EPR scheme for packaging

## Questions

58. The AHEG may wish to comment on the revised methodology proposed to guide the secretariat in carrying out the mandate of subparagraph 7(d). In particular:

- Do the selected indicators deliver on UNEP/EA.4/Res.6, subparagraph 7(d)?
- Is it feasible and of value to add a weighting to the process indicators?
- Does illustrating the linkages between archetype response options using the Bowtie analysis provide information that is useful when considering the probability of a response option being effective in a specific context?