

# ISWA Combats Plastic Pollution



Plastic pollution is increasingly understood as a genuine global crisis, due to its dispersion and persistence in the environment all over the planet and the destructive impact it could have on marine ecosystems and even potentially on human health. There is wide expert consensus that the majority of the plastic in our waterbodies, such as rivers and oceans, originates on land. Another key part of the plastics pollution challenge is the open burning of plastic waste, contributing to poor air quality in cities across the global south. In order to combat the problem of plastic pollution, it is imperative to understand these land-based sources and flows, and in particular the mechanisms behind how after-use plastic initially becomes unmanaged. It is not until you have access to information on the uncontrolled release into the environment that successful interventions can be applied.

The task of quantifying the amount of plastic that is openly burnt, spread on land and entering waterbodies is particularly challenging, due to the wide variance in sources, locations and mechanisms by which it escapes. Applying overly simplified approaches such as a single factor to determine the transfer of waste plastic from land to water, is consequently not feasible and would inevitably lead to misleading or highly uncertain results.

### **AN EVIDENCE BASED EFFORT**

In 2016 The International Solid Waste Association (ISWA) formed a Task Force to combat marine plastic pollution. In collaboration with the University of Leeds, they have developed the Plastic Pollution Calculator tool in order to help practitioners address this challenge. The tool can be used by any party involved in tackling marine litter and could be of particular interest and utility to municipal waste managers, NGOs, and national and international waste management organisations.

The 'Calculator' takes a well-informed approach of the realities on the ground, especially in rapidly developing economies where great challenges of waste and resources sector services and

infrastructure exist. It uses a wealth of background information and/or supplied by the tool user to map the complex flows of MSW plastic in the waste management system and the environment. By studying each aspect of these flows in detail, as well as applying both an item-based and temporal analysis, specific leakages can be estimated with enhanced certainty and at greater resolution. These can then be combined to get a better integrated understanding of the overall impact of plastic pollution in that area.

The aim of the Plastic Pollution Calculator is to model in a practically useful level of detail the item-specific plastic waste generation, and its subsequent movement throughout the waste management system and the environment. This includes any locations and conditions where plastic may escape into the environment and become unmanaged. Such a quantification could then be used to provide area-specific, localised and targeted engineering-based interventions.

Specifically, it allows each leakage route to be quantified and subsequently ranked in order of relative importance. In this way, targeted engineering interventions, including infrastructure needs and provision of services can be identified, together with estimates of their plastic pollution prevention potential.

### **THE 'CALCULATOR' IN SHORT**

It is currently believed that the leakage of macro-plastic items from land to marine environments is mainly a result of lack of waste infrastructure and services, unsound waste management practices such as open dumping, and local socio-economic conditions, such as prevalence of littering. Since these vary at country, city and district levels, it is vital to focus on the details of these local characteristics. Likewise, all plastic items are not the same, and depending on their use, shape, size, and material properties, would also leak and flow to the environment in different quantities.

## THE PLASTIC POLLUTION CALCULATOR COMBINES THREE TYPES OF DATA INPUTS:

1. Primary data user input questions on the waste management specifics of that area (e.g., waste characterisation studies, household surveys, landfill tracking, interviews, litter surveys, waste plans)
2. Literature data to provide country or income level "default" values where other information is not available
3. Expert-reviewed leakage factors that relate leakage probabilities by specially designed algorithms



The 'Calculator' uses material flow analysis to model the movement of plastic items from the point of generation as waste (e.g. as a component of household waste or litter) to their end destination (landfill or escape into the environment). By using this valuable input, the user can then consider various scenarios whereby underlying factors are changed (e.g. improvements in waste collection infrastructure or action to address littering) in order to explore and identify actions that could have the biggest preventive effect in tackling marine litter.

The 'Calculator' is designed to be applied even at the district level, by which we mean a single area which has relatively homogenous features for key factors such as socio-economics and waste and resources management systems. This allows a reasonably accurate picture of plastic flows through a city to be developed and allows targeted actions to be explored. Districts of a city can then be combined to provide an overall model of plastic flows within the city or region as a whole.

As explained, the task of quantifying the amount of plastic that enters terrestrial and marine environments from land is particularly challenging due to the wide variance in sources, locations and mechanisms by which it escapes. The 'Calculator' is the most comprehensive, integrated and

applicable toolkit helping users to analyse sources pathways and fates of after-used plastics items that were mismanaged for any reason. By covering all aspects of plastics pollution (open burning, on-land dispersion and entering waterbodies), each associated with different potential damage to environment and communities, the tool can account for the overall plastic pollution impact of an area.

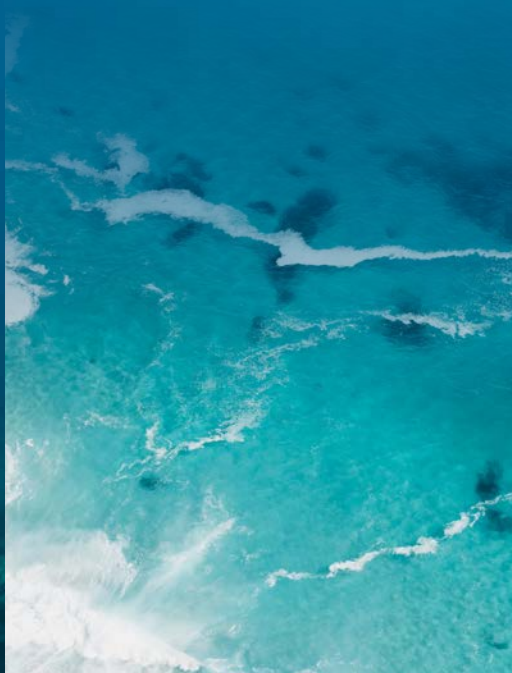
The data required, can be obtained in two ways. In the simplest approach, local information on waste management practices can be collected on a broad level, together with default values for more uncertain inputs provided by the internal tool database, interpolating from similar realities on the ground. Using this approach, the 'Calculator' is able to be used relatively quickly by waste management officials, NGOs and governments.

Usually, especially to inform interventions, additional reliability could be required: therefore, on the ground assessment can be implemented to improve the answers and obtain better representability and information resolution. Again, this approach is applicable for waste management officials, NGOs and governments, but it requires additional resources and investment in data collection.

# About ISWA

ISWA, the International Solid Waste Association, is a global, independent, and non-profit association. It is the only worldwide association promoting sustainable, comprehensive, and professional waste management.

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## ISWA Marine Litter Task Force

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