

MAKE FOR THE PLANET BORNEO

Kuching, Sarawak, Malaysia
June 24-28, 2018

BEAT PLASTIC POLLUTION

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The Problem

Plastic production has been increasing exponentially since the early 1950s and it reached 322 million metric tons in 2015. Market demand for plastic products is expected to continue increasing and projections indicate the production levels may reach around 600 million metric tons by 2025 and exceed 1 billion metric tons by 2050.

Society has used the ocean as a convenient place to dispose of unwanted materials and waste products for many centuries, either directly or indirectly via rivers. The volume of material has increased exponentially with a growing population and an increasingly industrialized society. The demand for manufactured goods and packaging, to contain or protect food and goods, increased dramatically throughout the twentieth century. The many favourable properties of plastics, including durability and low cost, make plastics the obvious choice in many situations.

Unfortunately, society has been slow to anticipate the need for dealing adequately with end-of-life plastics, to prevent plastics entering the marine environment. As a result there has been a substantial volume of debris added to the ocean over the past 60 years, covering a very wide range of sizes (metres to nanometres in diameter). This is a global phenomenon. As a result there are multiple routes of entry of plastics into the ocean, and ocean currents have transported plastics to the most remote regions. By 2050, it is projected that there will be more plastic waste than finfish in our oceans.

In conjunction to this year's World Environmental Day (WED), the theme revolves around its efforts to deal with plastic waste – **Beat Plastic Pollution**. "*If you can't reuse it, refuse it*" is the actionable takeaway that comes along with the theme to combat one of the greatest environmental challenges of our time and invites all of us to rethink our approach to designing, producing and using plastic products locally, nationally and globally to stem the rising tide of single-use plastics.

While plastic has many valuable uses, we have become over reliant on single-use or disposable plastics, with severe environmental consequences. These unsustainable patterns generate a vast amount of waste, much of it contributing to marine litter, which has choked our oceans and waterways. This is not just a problem for unfortunate sea turtles or the coastal communities that must deal with packaging waste washing up on their shores. It is a problem for all of us, everywhere.

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In a recent development on global waste, the world's largest importer of waste – China, put a waste import ban on the 24 categories of solid waste including certain types of plastics, paper and textiles starting in 2018, which has left half of the world such as the United States, the United Kingdom, the European Union and Japan scrambling to find new dumping grounds. The ban would not only clean up China as a major polluter, but also serve a turning point to inspire a paradigm shift in the way waste is managed. The European Union unveiled plans for all plastic packaging in Europe to be recyclable by 2030 and phase out single-use plastics like paper cups and straws to tackle pollution.

Core Constraints

People's attitudes and behaviour contribute significantly to many routes of entry of plastics into the ocean. Any solutions to reducing these sources must take account of this social dimension, as attempts to impose regulation without public understanding and approval are unlikely to be effective.

Several highly effective land-based approaches for preventing plastic leakage have been identified:

- Closing leakage points within waste management systems
- Increasing collection of waste and expanding service
- Implementing waste to fuel and waste to energy options for difficult to recycle plastics
- Sorting out high value plastics for recycling, and converting low value plastics to refuse derived fuel (RDF)

The Challenges

(a) Re-capture the value embedded in plastic waste: for example, create scalable products from recycled plastics that could be easily manufactured, have limited environmental impacts, and are zero waste in order to incentivize a market for plastic recycling globally.

b) Scalable solutions to stop plastic pollution and other debris from entering the ocean.

c) Create scalable innovations to manage and clean-up the waste already in the ocean and reverse its negative effects, especially in sensitive ecosystems.

d) Design and prototype NEW non-plastic replacements for common, single-use plastic items that could be adopted for use throughout SE Asia.

Background Information

The use of plastics has proliferated in recent decades, due to complex mix of societal and economic benefits. Unfortunately, the rate of increase in use has not been matched by the adoption of suitable systems to control unwanted plastic items.

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There is great potential in promoting the 3 Rs (Reduction, Re-use and Recycling) as a key contribution to reducing plastic waste generation and reducing the input of plastic to the oceans. This will be aided by the development of innovative and effective solutions as an intrinsic part of the circular economy. In this way 'unwanted' plastic can be seen as a useful resource, with commercial value, rather than a waste problem requiring the allocation of scarce public and private sector resources. Such action reduces our reliance on non-renewable reserves of oil and gas to produce plastics and reduces the need for waste management, for example via landfill. This is a rapidly developing field that is being embraced by business and institutions, and it needs to be encouraged at a global level.

However, adequate controls have to be in place to ensure that plastic waste streams are separated appropriately, to reduce the potential for unnecessary and unwanted cross-contamination, especially of consumer products made with recycled plastic. Commercially available 'biodegradable' plastics do not offer a viable alternative, and in most cases will not lead to a reduction in microplastic formation.

With this change in philosophy, other approaches from the business and commercial sectors may be useful, such as the use of value-chain models. This can help to guide the optimum use of resources, identify intervention points and provide opportunities for economic incentives throughout society, with an end-point being the reduction of inputs of marine debris.

Risk of not addressing this challenge:

It will be more difficult to bring about a significant reduction in plastics entering the ocean, and this may come to be seen as an inevitable consequence of economic growth. When faced with hard choices about allocating public and private sector resources, it may be difficult to justify expenditure on 'ocean pollution', which is avoidable, compared with more immediate societal needs (e.g. health service, education and other economic investment).

Further reading & examples of solutions

Be inspired by recent winners of the Circular Design Challenge:

<https://newplasticseconomy.org/projects/innovation-prize>

And, plates made of leaves by Makers: https://www.youtube.com/watch?v=_sI0c0JuW5A

Scientists accidentally create mutant enzyme that eats plastic bottles:

<https://www.theguardian.com/environment/2018/apr/16/scientists-accidentally-create-mutant-enzyme-that-eats-plastic-bottles>

Prevent plastics from reaching the ocean: see innovations & initiatives at the Ocean Recovery Alliance

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<http://www.oceanrecov.org/>

The large-scale Ocean Cleanup Initiative: <http://www.theoceancleanup.com/>
and Baltimore city's Mr. Trash Wheel: <http://www.southernfriedscience.com/?p=17362>

Reports & Papers

Jambeck et al. 2015. Plastic waste inputs from land into the ocean

Science:

<https://www.dropbox.com/s/uxbtj0c5k2fha8c/Supplement%20to%20Challenge%20Jambeck%20et%20al%20Science%202015%20ocean%20plastics%20.pdf?dl=0>

Ocean Conservancy and Mckinsey Center for Business and the Environment. Stemming the Tide: Land Based Strategies for a Plastic Free Ocean: <http://www.oceanconservancy.org/our-work/marine-debris/mckinsey-report-files/summary-stemming-the-tide.pdf>

Ocean Conservancy Trash Free Alliance

<https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/trash-free-seas-alliance/>

Ellen MacArthur Foundation, "New Plastics Economy: Rethinking the Future of Plastics" 2016.

<https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics>

Ocean Conservancy: <http://www.oceanconservancy.org/our-work/marine-debris/the-next-wave.pdf>

World Bank report:

https://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1334852610766/What_a_Waste2012_Final.pdf