

PLASTIC & MICRO-PLASTIC IN THE ENVIRONMENT

Ever wondered what the Earth will look like in 2030? Plastic and micro-plastic in the environment has led to a high prominence of plastic pollution in the environment. Plastic pollution can afflict land, waterways and oceans. It is estimated that 1.1 to 8.8 million metric tons (MT) of plastic waste enters the ocean from coastal communities each year (Jambeck 2015). Chris Corbin, Programme Officer for Assessment and Management of Environmental Pollution (AMEP)/Communication Education, Training and Awareness (CETA) with the UN Environment/Caribbean Environment Programme reiterated in his presentation that:



Plastic and micro plastics are a significant source of pollution for the Caribbean. Small plastic fragments typically less than five millimetres that are derived from the breakdown of macroplastics, including plastic bottles, and which are a significant source of marine pollution globally. Hence, there are calls for more research to be conducted in the area to aid in preserving the Caribbean waters.



Since the early 21st century there has been a global movement towards phasing out lightweight plastic bags (Schnurr et al. 2018). Single use plastic shopping bags, commonly made from low density polyethylene (LPDE) plastic, have traditionally been given for free by stores to transport goods; considered a convenient, cheap and hygienic way of transporting items (Xanthros & Walker 2017).

ENVIRONMENTAL IMPACT OF PLASTIC BAG USE

- **Danger to animal life:** Especially when they find their way into the sea. Animals mistaking these for food and when swallowed whole, animals may not be able to digest real food and die a slow death from starvation and infection
- **Loss of Resources:** Plastic bags are typically used for a short period of time but take hundreds of years to break down in landfill. While plastic bags can be recycled, only a tiny proportion of plastic bags are collected and reprocessed
- **Litter Problem:** Local and State Governments around Australia spend more than \$200 million per year picking up litter
- **Pacific Trash Vortex:** The amount of floating **plastics** in the world's oceans is increasing dramatically. The vortex is characterised by exceptionally high concentrations of suspended plastics, such as plastic bags, bottles, containers and other debris, that have been trapped by currents. Its impact on marine ecosystems is catastrophic due to its toxic nature and threat to marine life
- **Greenhouse gases:** Based on using lightweight plastic bags per week over a 2-year period, the greenhouse gas impact has more than three times the greenhouse gas impact of a reusable “green bag” (Northern Territory EPA)

Micro plastics occur from various sources, so improving solid waste management and banning of single-use plastic will reduce that input to the environment. Most recently the GOJ has taken a stance in banning the use of plastic packaging, including single use plastic bags (Gleaner 2019).

The GOJ has imposed a ban on importation, manufacture, distribution, and use of specific categories of plastic packaging materials. These include single-use plastic carrier/shopping bags, expanded polystyrene foam, commonly referred to as styrofoam, and plastic drinking straws (Smith 2018). The ban took effect January 1, 2019.



DECOMPOSITION OF PLASTICS

Plastic contribute to approximately 10% of discarded waste. Many kinds of plastics exist depending on their precursors and the method for their polymerization. Depending on their chemical composition, plastics and resins have varying properties related to contaminant absorption. Polymer degradation takes much longer as a result of saline environments and the cooling of the sea (Barnes et al. 2009).

Recent studies have shown that plastics in the ocean decompose faster than once thought, due to exposure to sun, rain, and other environmental conditions, resulting in the release of toxic chemicals such as bisphenol A (American Chemical Society 2009). However, due to the increase volume of plastic in the ocean, decomposition has slowed down (Bernstein 2009).

Marine conservancy has predicted the decomposition rates of several plastic products. It is estimated that:

- Foam plastic cups: 50 year
- Plastic beverage holder: 400 years
- Disposable nappy: 450 years
- Fishing line: 600 years (Le Guern 2018).
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CARIBBEAN RISK

Immediate danger to the Caribbean and its species as revealed by a July 2015 UN Environment plastics and micro-plastics fact sheet notes that:

Micro-plastics have the potential to move up through the food web and the potential to move on the dinner plate, with some studies showing that juvenile salmon can ingest two to seven micro-plastic particles per day, while young salmon can ingest up to 91 particles per day (Gleaner 2019):

Challenges:

- The consumption of plastics and micro-plastics by marine animals can lead to false satiation, starvation and death; and
- Plastics and micro-plastics are composed of harmful substances, such as antimicrobials, hydro-carbons and flame retardants, which can cause significant changes in marine and biodiversity health.

UN Environment has proposed several recommendations to address the challenges (Gleaner 2019):

- A scale-up of best practices and technologies around storm and wastewater management to capture micro-plastics before they enter the marine environment;
- Stricter legislation to curtail the use of plastics and transition to prohibiting the use and importation of single-use plastic, which Jamaica is now doing.
- Incentives to manufacturers to reformulate products and find innovative ways to design packaging that can be fully recovered by recycling processes or those which are more easily degradable and less toxic.

Research has also shown that 22 per cent of Caribbean households dispose of their waste improperly and that 30 per cent of the litter consists of plastics, making it one of the main pollutants offshore

and onshore (Heslop 2020).



ENTREPRENEURSHIP FROM PLASTIC WASTE:

Green Entrepreneur Transforming Plastic Waste into Pavements:

Founder of ReBuild, Zara Harris, has formulated a novel way of utilising discarded plastics in the construction of environmentally friendly albedo (heat resistant) pavements.

The project will:

- Minimise the amount of plastics in the environment
- Facilitate a smoother run-off of storm water than traditional pavements
- Provide jobs for Jamaicans and contribute to the economic growth of the country
- Increase awareness of the problem and encourage persons to live by sustainable means

Ms Harris was chosen by the Caribbean Climate Innovation Center to participate in the ClimateLaunchpad Global Grand Finals 2019 in Amsterdam, the Netherlands, from November 14-15 (Heslop 2020).



ReBuild Founder, Ms. Zara Harris

NSWMA Undertakes Plastic Bottle Recycling Project:

National Solid Waste Management Authority (NSWMA) undertook a \$7.5 million recycling pilot project in three communities in August 2016. These communities include: Rollington Town in Kingston; and Caribbean Estates and Caymanas Country Club in St. Catherine.

It was anticipated that the equivalent of 347 tonnes of solid waste or 3.8 million plastic bottles would be collected during the implementation.

The Japanese Government, through the Japan International Cooperation Agency (JICA), has provided \$6.5 million for the undertaking with the Government of Jamaica, through the NSWMA, contributing the remainder of the funds (McIntosh 2016).



From right to left: Mr Denzil Thorp, Permanent Secretary in the Ministry of Local Government and Community Development; centre, Japan's former Ambassador to Jamaica Mr Masanori Nakano, and NSWMA former Chairman, Mr Dennis Chung. Source: Jamaica Information Service.

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