Biodegradable materials can be an impactful alternative to the superabundance of single-use plastics in food, beverage, and shipping industries that pollute our lands and waterways.

Composite image clockwise from top left: 1, 2, 3 & 4

Biodegradables as a complementary solution to the Plastics Problem

By Diana Alberti and Preethi Kumaran

In an incessantly growing consumer economy, convenience is prioritized over sustainability. The commercial use of plastic in products began in the 1950’s and the practice has grown exponentially since, leading to more than an annual 350 million tons of primary plastic global production and more than 275 million tons of annual global plastic waste. More than half of all plastic materials ever produced were manufactured in the last 15 years alone. In 2015, only an estimated 9% of the United States’ total plastic waste was even recycled, half of which was managed through exports to China. Up until 2018, China had handled half of the world’s recycling materials through the industry’s largest recycling program, but after they established their ban on plastic imports, countries have had to scramble to figure out where to send their recyclable waste.

The United States has since been exporting recycling waste to countries like Malaysia, Indonesia, and Vietnam who have already been mismanaging 55%, 81% and 86% of their own waste, respectively, and are now drowning in imported waste as well. This waste is sorted by
low income wage workers already working in unsafe conditions, but with the unprecedented influxes of imported waste, these communities are now faced with never ending tides of trash littering their living environments — polluting their water, giving off toxic fumes, and severely affecting their health and livelihoods. This singular plastic industry has such far reaching and varied effects on the planets and inhabitants, touching on at least 8 of the 17 Sustainable Development Goals: Good Health and Well-Being; Clean Water and Sanitation; Industry, Innovation, and Infrastructure; Sustainable Cities and Communities; Responsible Consumption and Production; Climate Action; Life Below Water; and Life on Land.

So, how do we first reduce and, ultimately, eliminate the threat plastic poses to sustainability? There is no simple answer--the solution must include changes at the manufacturing, shipping, governmental, and consumer levels. Convenience, affordability, and availability are essential to creating comprehensive behavior change. There is great room for impact within development and implementation of biodegradable materials, though they are not a stand-alone solution due to the fraction of plastics they currently replace 5. They need to fit in with overall circular economy goals 6 & 7. In order to create successful behavior change in these spaces, awareness education, cost reduction, and overall incentivization need to be coordinated together to empower both manufacturers and consumers to prioritize alternatives. These efforts should be used to complement and fill the gaps where the circle economy and overall reduction of plastics still fall short.

Biodegradables include naturally biodegradable materials like bamboo being substituted for common plastic materials, and it also includes bioplastics, which can be created using materials that are plant-based or including animal-derived materials 8, 9, & 10. If manufacturers switch to certain alternative materials like glass, which are notably heavier, energy output via shipping increases by 40% 12. Here, biodegradables that are similar in weight can have a significant impact.

However, biodegradables have a two-to-four times higher manufacturing cost than plastics 13, which is likely to be passed onto consumers. Thus, governments must provide incentives (and disincentives) to manufacturers and find ways to reduce costs. Global clean tax cuts "can directly drive up investment and also drive down that crucial cost barrier" 15 and can be paired with carbon tax penalties to prioritize plastic alternatives.

Finally, partnering with continued awareness campaigns drives home the importance of purchasing non-plastic products to the consumer. Globally, concerns over plastics are rising at the consumer level 14, and engaging in further education can drive further consumer behavior change.

The food and beverage industry represents the largest target market for replacing plastics and other unsustainable packaging with biodegradable alternatives. Major beverage conglomerates recently committed to replacing single-use plastic beverage containers with biodegradables, with Bacardi’s commitment alone expected to eliminate 80 million plastic bottles per year 16.
Shipping is another major area for impact from biodegradable materials. Shifting away from plastics in this industry could have a $9 billion impact from both established companies and start-ups. Fiber-based packing materials integrate biodegradable alternatives to plastic wrappers and cushioning materials while also reducing the amount of air within packages and, therefore, overall container weight, further driving down environmental impact.

Biodegradables can be a vital part of the overall changes needed to drastically reduce and eliminate plastics, accompanying changes across all sectors. To encourage reform, we can support tax incentives, education, and investment in the industry.

For more reading:
13 Plastic Packaging Alternatives
Unilever Plastic Packaging Changes