1. The Need for New Strategies to Protect Human Health in the Age of Plastics

Judith Enck

Thousands of years ago, Rabbi Tarfon (70–135 C.E.) prophetically said, "Do not be daunted by the enormity of the world's grief. Do justly now, walk humbly now. You are not obligated to complete the work, but neither are you free to abandon it." These inspired words apply to the current plastics crisis.

Humanity has exceeded a tipping point in the production of plastics, and global plastic production continues to rise at an alarming rate.[1] Micro- and nanoparticles from plastic waste have now been found in every corner of the planet from the Mariana Trench to Mount Everest.[2] Plastic has infiltrated our food, our water, our air, our soil, and our bodies.[3] It contributes to climate change at every stage of its life cycle.[4] Indeed, there is nowhere on Earth to escape the presence of toxic plastic pollution. The time is now for faith communities, the public, and policymakers to come together to address the urgency of plastic pollution.

[1] See Alden Wicker, "The Plastics Crisis Is Now a Global Human Health Crisis, Experts Say," *Mongabay*, November 19, 2024, news.mongabay.com/2024/11/the-plastics-crisis-is-now-a-global-human-health-crisis-experts-say/.

[2] See Sanae Chiba, Hideaki Saito, Ruth Fletcher, Takayuki Yogi, Makino Kayo, Shin Miyagi, et al., "Human Footprint in the Abyss: 30 Year Records of Deep-sea Plastic Debris," *Marine Policy* 96 (2018): 204–212; Imogen E. Napper, Bede F.R. Davies, Heather Clifford, Sandra Elvin, Heather J. Koldewey, Paul A. Mayewski, et al., "Reaching New Heights in Plastic Pollution: Preliminary Findings of Microplastics on Mount Everest," *One Earth* 3, no. 5 (2020): 621–630.

[3] See Center for International Environmental Law, *Plastic & Health: The Hidden Costs of a Plastic Planet*, ed. A. Kistler (2019), www.ciel.org/plasticandhealth.

[4] See Center for International Environmental Law, *Plastic & Health*.

In November 2023, the United Nations Climate Change Conference, COP28, hosted its first-ever Faith Pavilion, signifying a recognition of the role of faith communities as partners in fighting global climate change. Faith communities represent access to "millions of acres, billions of people, and trillions of dollars," said the organizers. Indeed, faith-based organizations own eight percent of all habitable land surface, fifty percent of schools worldwide, and make up over thirty-five percent of the global fossil fuel divestment movement, which has mobilized more than $40 trillion in commitments.[5] Powerful declarations, such as Pope Francis' 2015 encyclical letter *Laudato Si'*[6] and the 2024 Muslim Al-Mizan statement,[7] represent pinnacle achievements in faith contributions to the climate movement, inspiring awe and reverence for nature, speaking the truth of the existential threat of climate change, and imploring humanity to change course.

Perhaps most importantly, faith communities use their moral authority to name the damage of ecological destruction, draw upon the spiritual resources of their respective traditions to work through ecological grief, activate people to look inward and adopt sustainable practices, and mobilize their communities to advocate for policy that can affect institutional change.

The movement to address plastic pollution is often siloed outside the climate movement. But plastics are made from chemicals and fossil fuels, and if plastic were a country, it would be the fifth largest source of greenhouse gas emissions behind only China, the United States, India, and Russia.[8] While faith engagement with the plastic issue has not yet reached

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[5] See Global Fossil Fuel Divestment Commitments Database, divestmentdatabase.org/.

[6] See Francis, *Laudato Si': On Care for Our Common Home* (2015), www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html.

[7] See Othman Llewellyn, Fazlun Khalid, Aishah Ali Abdallah, Ibrahim Özdemir, Evren Tok, Fachruddin M. Mangunjaya, et al., *Al-Mizan: Covenant for the Earth* (The Islamic Foundation for Ecology and Environmental Sciences, 2024).

[8] See Matt Simon, *A Poison like No Other: How Microplastics Corrupted Our Planet and Our Bodies* (Island Press, 2022), 252.

the level of that of the climate crisis, the necessity for a moral framework on plastics is just as urgent.

Faith communities employ an alternative epistemology and modality in their orientation to these crises that can illuminate the moral imperative to take action. As former UN Development Program Administrator James Gustave Speth once noted: "I used to think that top environmental problems were biodiversity loss, ecosystem collapse, and climate change. I thought that thirty years of good science could address these problems. I was wrong. The top environmental problems are selfishness, greed, and apathy, and to deal with these we need a cultural and spiritual transformation."[9]

In 2019, the United Nations Environment Programme's Faith Working Group on Pollution adopted its resolution "Stop Plastic Pollution and Restore Our World," calling for—among other provisions—plastic-reduction policies, bans on the use of certain single-use plastics, strategies leveraging faith-based platforms to raise awareness of plastic pollution, and government accountability for the unequal effects that plastic has on marginalized and vulnerable societies.[10] Since the 2022 adoption of the UN Environment Assembly resolution to address plastic pollution, a growing number of faith-based organizations from a wide range of religious and spiritual traditions have participated in the Intergovernmental Negotiating Committee on Plastic Pollution (INC) meetings. Some of these initiatives are specifically targeting pollution at the community level while others focus on the rights of key communities impacted.

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[9] Quoted in: Geoff Davies, "COP28: Humans of All Faiths (and No Faith) Have a Limited Window of Opportunity to Act on the Climate Crisis," *Daily Maverick* (November 30, 2023), www.dailymaverick.co.za/opinionista/2023-11-30-cop28-humans-of-all-faiths-and-no-faith-have-a-limited-window-of-opportunity-to-act-on-the-climate-crisis/.

[10] See United Nations Environment Programme (UNEP), "Stop Plastic Pollution and Restore Our World," March 2022 (updated: July 2024), drive.google.com/file/d/1QhZFTXveeqG1n-rP2yWDk4n0x0T6dtX9/view.

All the world's religions share a commitment to truth, both the spiritual and moral truths upheld by our traditions as well as by an honest appraisal of the reality of the world in which we live. The Swiss Reformed Christian theologian Karl Barth (1886–1968) once said, "Take your Bible and take your newspaper, and read both. But interpret newspapers from your Bible."[11] While *interpretation* of the reality of the world's plastic pollution crisis will depend on each faith tradition's customs, practices, and beliefs, the facts on the ground remain the same. However, when these interpretive perspectives are held together, each tradition speaking from its own deeply held faith, we can build a powerful moral and spiritual framework and mandate for the movement to end plastic pollution.

The first step along this journey is acknowledging the truth: plastic is a threat to the environment, the climate, human health, and environmental justice.

Plastic Pollution in the Environment

Thirty-three billion pounds of plastic end up in our oceans each year—mostly from land—and much of that is unnecessary, single-use plastic that we could easily do without.[12] In fact, the top ten most common waste items found in worldwide coastal cleanups in 2024 were single-use plastic products, including beverage bottles, food wrappers, bags, food containers, cups, plates, straws, and stirrers.[13] This plastic persists in the environment at least for decades, choking marine life, and entering our food, soil, air, and water. Marine, freshwater, and terrestrial animals consume and become

[11] "Barth in Retirement," *Time*, May 13, 1963, time.com/archive/6831843/barth-in-retirement/.

[12] See Andrew Forrest, Luca Giacovazzi, Sarah Dunlop, Julia Reisser, David Tickler, Alan Jamieson, and Jessica J. Meeuwig, "Eliminating Plastic Pollution: How a Voluntary Contribution from Industry Will Drive the Circular Plastics Economy," *Frontiers in Marine Science* 6 (September 24, 2019), doi.org/10.3389/fmars.2019.00627.

[13] See Ocean Conservancy, "Cleanup Reports: International Coastal Cleanup," September 4, 2024, oceanconservancy.org/trash-free-seas/international-coastal-cleanup/annual-data-release/.

entangled in plastic trash, threatening their ability to eat, function, and survive.[14] Seabirds mistake red or orange plastic for shrimp. Sea turtles mistake plastic bags for delicious jellyfish. The planet's creatures have a diet filled with microplastics, which comes with a whole host of chemicals, many of which are toxic.[15]

Plastics and Human Health

With plastic production expected to triple by 2060, this problem will only get worse.[16] And animals are not the only ones with a plastic-filled diet. The presence of microplastics contaminates the planet we depend on for survival and ultimately lodge themselves in the human body—from our hearts,[17] lungs,[18]

[14] See Chris Wilcox, Melody Puckridge, Qamar A Schuyler, Kathy Townsend, and Britta Denise Hardesty, "A Quantitative Analysis Linking Sea Turtle Mortality and Plastic Debris Ingestion," *Scientific Reports* 8, no. 1 (August 16, 2018), doi.org/10.1038/s41598-018-30038-z.

[15] See Meysam Saeedi, "How Microplastics Interact with Food Chain: A Short Overview of Fate and Impacts," *Journal of Food Science and Technology* 61, no. 3 (2024): 403–413.

[16] See Organisation for Economic Co-operation and Development (OECD), "Global Plastic Waste Set to Almost Triple by 2060, Says OECD," Press release, June 3, 2022, www.oecd.org/en/about/news/press-releases/2022/06/global-plastic-waste-set-to-almost-triple-by-2060.html.

[17] See Julie Corliss, "Microplastics in Arteries Linked to Heart Disease Risk," *Harvard Health* (June 1, 2024), www.health.harvard.edu/heart-health/microplastics-in-arteries-linked-to-heart-disease-risk.

[18] See Lauren C. Jenner, Jeanette M. Rotchell, Robert T. Bennett, Michael Cowen, Vasileios Tentzeris, and Laura R. Sadofsky, "Detection of Microplastics in Human Lung Tissue using μFTIR Spectroscopy," *Science of the Total Environment* 831 (July 20, 2022): 154907, doi.org/10.1016/j.scitotenv.2022.154907.

brains,[19] and liver[20] to the placenta,[21] breast milk,[22] and even newborn babies.[23] This illustrates in the most tangible way possible what Chief Seattle so prophetically warned, that "What we do to our earth, we do to ourselves."[24]

Micro- and nanoplastic particles, which leach and shed from plastic products, contain many of the sixteen thousand chemical additives found in plastics.[25] At least 4,200 of those additives are considered to be "highly hazardous" to human health and the environment. Thousands more have not even been tested for their safety.[26] As we absorb plastics through our skin, swallow them, and breathe them, chemicals come along for the ride.[27] Chemicals found in plastics have been associated with cancer, nervous

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[19] See Luís Fernando Amato-Lourenço, Katia Cristina Dantas, Gabriel Ribeiro Júnior, Vitor Ribeiro Paes, Rômulo Augusto Ando, Raul De Oliveira Freitas, et al., "Microplastics in the Olfactory Bulb of the Human Brain," *JAMA Network Open* 7, no. 9 (September 16, 2024): e2440018, doi.org/10.1001/jamane tworkopen.2024.40018.

[20] See Thomas Horvatits, Matthias Tamminga, Bebei Liu, Marcial Sebode, Antonella Carambia, Lutz Fischer, et al., "Microplastics Detected in Cirrhotic Liver Tissue," *Lancet* 82 (August 2022): 104147, www.thelancet.com/journals/ebiom/article/PIIS2352-3964(22)00328-0/fulltext.

[21] See Shaojie Liu, Jialin Guo, Xinyuan Liu, Ruoru Yang, Hangwei Wang, Yongyun Sun, et al., "Detection of Various Microplastics in Placentas, Meconium, Infant Feces, Breastmilk and Infant Formula: A Pilot Prospective Study," *Science of the Total Environment* 854 (September 13, 2022): 158699, doi.org/10.101 6/j.scitotenv.2022.158699.

[22] See Antonio Ragusa, Valentina Notarstefano, Alessandro Svelato, Alessia Belloni, Giorgia Gioacchini, Christine Blondeel, et al., "Raman Microspectroscopy Detection and Characterisation of Microplastics in Human Breastmilk," *Polymers* 14, no. 13 (June 30, 2022): 2700, doi.org/10.3390/polym14132700.

[23] See Antonio Ragusa, Alessandro Svelato, Criselda Santacroce, Piera Catalano, Valentina Notarstefano, Oliana Carnevali, et al., "Plasticenta: First Evidence of Microplastics in Human Placenta," *Environment International* 146 (January 2021): 106274, doi.org/10.1016/j.envint.2020.106274.

[24] Clay Haswell, "'What We Do to Earth, We Do to Ourselves,'" *HuffPost*, April 22, 2016, huffpost.com/entry/what-we-do-to-earth-we-do_b_9751760.

[25] See Plastic Pollution Coalition, "PlastChem: State of the Science on Plastic Chemicals," March 20, 2024, www.plasticpollutioncoalition.org/resource-library/plastchem-state-of-the-science-on-plastic-chemicals.

[26] Plastic Pollution Coalition, "PlastChem: State of the Science on Plastic Chemicals."

[27] See Center for International Environmental Law, *Plastic & Health: The Hidden Costs of a Plastic Planet*.

system damage, hormone disruption, and reduced fertility.[28] In 2024, researchers found tiny plastic particles in human arteries—specifically the carotid arteries, which supply blood to the brain.[29] In this study, patients with plastic-tainted arteries were 4.5 times more likely to suffer from a cardiovascular event like heart attack or stroke.

Plastic's Climate Impacts

What many people do not realize is that the plastic pollution crisis and the climate crisis are intrinsically linked, making it impossible to fight one problem without considering the other. Plastic contributes four times more climate-forcing greenhouse gas emissions to the atmosphere each year than the global aviation industry, according to a United States federal government study released in April 2024.[30] A Beyond Plastics report found that plastic is the new coal. In the US, plastic is set to outpace coal's greenhouse gas emissions by 2030.[31]

Plastic drives climate change because plastic is made from fossil fuels and because plastic production is highly energy-intensive. Plastic contributes to climate change from the beginning of its life cycle to the end, from the greenhouse gases that escape during the extraction and refining of fossil fuels, to the energy-intensive process used to make plastic, to the emissions in its transport, and on to the greenhouse gas burden of

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[28] See United Nations Environment Programme (UNEP), *Chemicals in Plastics: A Technical Report*, May 3, 2023, www.unep.org/resources/report/chemicals-plastics-technical-report.

[29] See Raffaele Marfella, Francesco Prattichizzo, Celestino Sardu, Gianluca Fulgenzi, Laura Graciotti, Tatiana Spadoni, et al., "Microplastics and Nanoplastics in Atheromas and Cardiovascular Events," *New England Journal of Medicine* 390, no. 10 (March 6, 2024): 900–910.

[30] See Nihan Karali, Nina Khanna, and Nihar Shah, "Climate Impact of Primary Plastic Production," *Energy Analysis & Environmental Impact Division*, April 2024, energyanalysis.lbl.gov/publications/climate-impact-primary-plastic.

[31] See Beyond Plastics, "The New Coal: Plastics and Climate Change," October 2021, www.beyondplastics.org/publications/the-new-coal.

waste management from landfilling, incineration, and recycling.[32] If we want to tackle climate change, we are going to have to tackle plastic pollution. They are one and the same.

Plastic's Impacts on Environmental Justice

Our current moment in the plastic pollution crisis demands that humanity remember its connection to Earth and other humans. The view that each person is an island, the master of their own domain and destiny must be called out for what it is—a fallacy that fails to acknowledge our dependence on this planet and our bonds with humanity.

Plastic pollution disproportionately affects low-income and vulnerable communities domestically and around the globe.[33] Communities in developing nations are plagued by rivers and beaches filled with plastic waste. Children in countries affected by waste exports should not have to spend their days sorting through plastics to earn pennies for their families. In these places around the globe, the incineration of plastics, both in households as a cheap source of fuel or at the industrial level, emits volatile organic compounds and toxins, causing serious health concerns.

Heavily polluting plastic production that affects the health of communities surrounding production facilities is surging. It is time to recognize and act on the knowledge that there is no just destination for a toxic product that originates from fossil fuels and is produced in facilities

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[32] See Center for International Environmental Law, *Plastic & Climate: The Hidden Costs of a Plastic Planet*.

[33] See Shriver Center on Poverty Law, Emily Coffey, Kate Walz, Debbie Chizewer, Emily A. Benfer, Mark N. Templeton, and Robert Weinstock, "Poisonous Homes: The Fight for Environmental Justice in Federally Assisted Housing," Shriver Center on Poverty Law, June 2020, www.povertylaw.org/wp-content/uploads/2020/06/environmental_justice_report_final-rev2.pdf; United States Environmental Protection Agency, "Summary of Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," 59 FR 7629, February 16, 1994, 19january2017snapshot.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice_.html.

that cause disease and ecological damage in the communities in which they are situated.

False Solutions

To solve the plastic pollution crisis, we must confront the problem at its source. We must address current endless and mindless increases in plastic production. Companies need to reduce the amount of plastic they produce and use. Focusing on downstream, end-use "solutions" will not bring about much needed change, despite what the plastics and petrochemical industries would have us believe. Plastics recycling has been an abysmal failure riddled with deception from its inception to today.[34]

Today in the United States, less than six percent of plastic is recycled.[35] The rest is landfilled, incinerated, or ends up in the environment. Plastics recycling was not designed to fix the problem; it was designed to make us feel better about our heavy use of plastic. As noted earlier, there are sixteen thousand different chemicals in plastic;[36] there are also many different colors and many different plastic polymers. The various plastic combinations of these chemicals, colors, and polymers can all be put in your recycling bin, but they cannot be recycled together. The countless combinations of chemicals, polymers, and colors in every county and city make the sorting and recycling process financially untenable and technically unviable. The plastics industry has known this for years but decided to mislead the public. ExxonMobil is now facing a major lawsuit from the California Attorney General Rob Bonta for misleading the

[34] See Beyond Plastics, "The Real Truth About the U.S. Plastics Recycling Rate," Beyond Plastics, May 2022. www.beyondplastics.org/publications/us-plastics-recycling-rate; Frontline PBS, "Plastic Wars," April 15, 2021, www.pbs.org/wgbh/frontline/documentary/plastic-wars/transcript/.

[35] See Beyond Plastics, "The Real Truth About the U.S. Plastics Recycling Rate."

[36] See Plastic Pollution Coalition, "PlastChem: State of the Science on Plastic Chemicals."

public about plastics recycling and their latest ploy, so-called chemical recycling.[37]

Chemical recycling, or what the plastics industry likes to call "advanced recycling," is just as much of a ruse.[38] It refers to largely unproven processes that use heat and/or chemicals to turn plastic waste into fossil fuels and other feedstocks to produce new plastic products. Chemical recycling is not new—it has been around, and failing, for decades. It also comes with a host of hazardous waste, air emissions, and safety issues that disproportionately affect the low-income communities and communities of color in which chemical recycling facilities are often located. Just like traditional recycling, this new form of waste management provides a distraction while companies exponentially increase the amount of plastic they flood into the world.

Real Solutions

Think of plastic recycling like this: If you walked into your bathroom to find the faucet on and water overflowing the tub, covering the floor, what is the first thing you would do? You would not start mopping, right? You would first turn off the tap. Recycling is like mopping while the tap is still on—it makes no sense. We need to turn off the tap—in other words, companies must stop producing so much plastic. Companies will not do this on their own. We need new laws, and strong enforcement of these laws, to turn off the plastics tap.

New policy is required to make this happen, because companies have proven time and time again that they are not going to do this on their own.[39] Policymakers must adopt policies on all levels of government to

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[37] See Lisa Song, "ExxonMobil Accused of 'Deceptively' Promoting Chemical Recycling as a Solution for the Plastics Crisis," *ProPublica*, September 27, 2024, www.propublica.org/article/exxonmobil-plastics-recycling-pyrolysis-lawsuit-california.

[38] Beyond Plastics, "Chemical Recycling: A Dangerous Deception (Report)," Beyond Plastics, October 2023. www.beyondplastics.org/publications/chemical-recycling.

[39] See Beyond Plastics, "Legislation," Beyond Plastics, www.beyondplastics.org/legislation.

reduce the amount of plastic being produced and used, and incentivize the use of reuse and refill systems that provide a safer and more sustainable solution for our planet and humanity. Forty-four percent of all plastics produced are single-use.[40] While the production of plastics for any purpose is damaging to the environment and human health, targeting single-use plastics—products that are often unnecessary—makes sense.

By acknowledging the truth of humanity's problematic reliance on plastic, people of faith and conscience are moved to align their actions with their understanding. As you learn more through this book, we encourage you to share your statements of solidarity with the movement to end plastic pollution. From preaching, liturgy, ritual, prayer, music, dance, all forms of artistic expression, signage, demonstrations, newsletter articles, social media, ads in your local paper or television, etc., there are infinite ways to share the news from your unique voice and perspective.

This is a global problem that requires everyone's assistance—policymakers, businesses, and individuals of all faiths. By accepting the truth, we can move forward with real, meaningful action. There is no time to waste.

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[40] See Roland Geyer, Jenna R. Jambeck, and Kara Lavender Law, "Production, Use, and Fate of All Plastics Ever Made," *Science Advances* 3, no. 7 (July 7, 2017), doi.org/10.1126/sciadv.1700782.

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