



# Waste, Health and Environmental Justice

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## Exploring the impact of mismanaged waste on the health and well-being of our communities.

It's no secret that the global economy is one of immense waste. Consider the following facts:

- On average, U.S. residents produce over [1,700 pounds of waste](#) per person every year.
- Only about one-third of these materials are recycled or composted; the rest go to landfills, incineration facilities or into the environment, including our parks, streams and oceans.
- Approximately 9-14 million tons of post-consumer plastic [ends up in the world's aquatic ecosystems](#) every year.
- [Less than 10%](#) of plastic produced globally is recycled.
- [The U.S. wastes](#) 80 billion pounds of food each year, an estimated 30-40% of its available food supply.
- Globally, solid waste generation is expected to increase by [70% by 2050](#), up to 3.4 billion metric tons.

All of these factors significantly impact the health, well-being and livelihoods of communities around the world. Mismanaged waste causes environmental degradation, affects public health, contributes to climate change, and costs businesses and municipalities billions to manage. Many of these negative impacts are disproportionately felt by disadvantaged and underrepresented communities.

### What are the waste implications for people?

Over the past several decades, waste generation has increased significantly, with a clear and devastating impact on human health and the environment. Mismanaged waste creates a variety of adverse effects, including:

- Landfilling waste reduces local air, water and soil quality, with significant health consequences for those nearby.
- The incineration of waste produces CO<sub>2</sub>, heavy metals, methane and other air pollutants, which can contribute to asthma and other adverse health impacts.
- Mismanaged waste, including plastic pollution, damages fisheries and associated livelihoods and contributes to food insecurity.

### How do landfills release pollutants?

Dumps and landfills release pollutants into the soil, water and air. Pollutants from landfills enter the soil and groundwater through rainwater that enters the landfill cell. Rainwater can be contaminated when it comes into contact with chemicals such as volatile organic compounds, chloride, nitrogen, solvents, phenols, trichloroethylene and heavy metals seeping into groundwater.

While protections are often put into place to prevent this contaminated water, known as leachate, from escaping landfills, these protections are prone to failure. They can put the water supply of nearby communities at risk. Landfills also emit gases such as methane, carbon dioxide, nitrogen, ammonia, sulfides and hydrogen, produced as bacteria break down [organic waste](#). The amount and type of gases emitted depend on the landfill's age, composition, temperature and moisture content.



## What are the negative health consequences of landfills?

The toxins and gases created from landfills, many of which pose a cancer risk at high exposure levels, can be inhaled and/or ingested by individuals working at or living near the site. [Studies](#) have indicated that elevated levels of hydrogen sulfide – commonly emitted from landfills – can lead to increased eye, throat and lung irritation, lung cancer, nausea, headaches, nasal blockage, sleeping difficulties, weight loss, chest pain and asthma aggravation.

Additionally, studies in [Italy](#), [Brazil](#) and [South Africa](#) have found that people living within 5 kilometers of a landfill are at increased risk of developing various health problems, including tuberculosis, depression, hospitalization and even death from lung cancer and respiratory issues. Similar to landfills, waste incinerators are disproportionately located in underrepresented communities. While incinerators often produce energy from waste, the process releases pollutants into the surrounding environment, negatively impacting humans. These findings further highlight the need to focus first on waste reduction, to limit the need for landfills and incinerators in the first place.

## How is plastic affecting our oceans?

Many discarded materials never find their way into managed waste facilities such as landfills or recycling centers. Stemming the flow of waste into our waterways and oceans is critical to ensure the health and sustainability of marine life and the coastal communities that depend on them. Each year, [9-14 million tons of plastic waste are added to the world's aquatic ecosystems](#), adding to the vast amount of waste already in our oceans and waterways. Even worse, this plastic never goes away: it only breaks down into smaller microplastics over time, releasing chemicals such as phthalates and bisphenol A (BPA) into the water, which can disrupt endocrine signaling, reduce fertility, damage the nervous system and increase the risk of cancer in humans.

Additionally, these microplastics are then often ingested by marine mammals and fish, many of which are eventually eaten by humans. Microplastics are a growing concern for human health because recent studies have identified them in human tissues, such as the bloodstream, placenta and lung tissue. Minimizing plastic use at the source and correctly managing the disposal of essential plastics are vital to stemming the ill effects of plastic pollution in oceans and for human health.

# Waste and Environmental Justice

## Who feels the negative impacts of waste the most?

In the United States, the negative health impacts of landfills, lead smelters, incinerators and waste facilities are disproportionately felt by communities of color and low wealth. This is largely due to the long history of racial discrimination in the United States through zoning and housing segregation dating back to the great depression, commonly referred to as “redlining.” [Redlining](#) is a discriminatory practice [established in the 1930s by the U.S. federal government](#), “by which banks and insurance companies, among other industries, refuse or limit loans, mortgages and insurance coverage within specific geographic areas, especially inner-city neighborhoods” with high populations of people

### Additional reading:

[The Color of Law: A Forgotten History of How Our Government Segregated America](#) by Richard Rothstein

[Toxic Wastes and Race at Twenty](#) by Robert D. Bullard, Ph.D., Paul Mohai, Ph.D., Robin Saha, Ph.D., Beverly Wright, Ph.D

of color, either directly or through the selective raising of prices. Redlining has led to the intentional placement of waste facilities, highways, and other disruptive infrastructure in predominantly Black and low-income communities without political power or acknowledged rights to oppose placement.

## What are the impacts of landfill placements?

While race and class are determinants of proximity to landfills and incinerators in the U.S., non-White communities are more likely to be impacted than White communities of the [same social class](#). They are more likely to live near toxic sites and landfills, and data has shown that these communities are also more likely to have elevated levels of [lead in their blood](#).

Black Americans are also overrepresented in cities with the most abandoned toxic waste sites. The proximity of communities of color to incinerators is 89% higher than the [national average](#). Because of this, Black Americans suffer from greater exposure to pollutants and greater exposure to [particulate matter](#). Black communities are 54% more likely to be exposed to fine particulates, a known carcinogen associated with lung disease, heart disease and premature death, compared to [the overall population](#).

## How are those who work in the waste industry affected?

Trash collectors, recycling sorters and other individuals dealing with the direct management of waste face hazardous conditions while at work. Work-related illnesses and disorders associated with working with waste include respiratory problems, infectious diseases, gastrointestinal issues, muscle pain, fever, headache, fatigue, irritation of eyes and skin, chronic bronchitis and pulmonary issues.

Municipal solid waste and composting workers handle waste with inorganic dust, bioaerosols, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), heavy metals, dioxins and furans. Asbestos-related lung disease, abnormal lung function, gastrointestinal disease, contact dermatitis and leptospirosis are documented clinical and biological effects of exposure to these toxins.

Additionally, there is the threat of being exposed to chemicals (acid, cadmium, mercury, lead and metalworking fluids) for those who work with and handle [the recycling of batteries, lights and metal scraps](#). Recycling and waste facilities often have inadequate ventilation, promoting the growth of fungi and other biological hazards and increasing the chance of work-related diseases. Fungi grow from old decaying organic matter and transmit airborne particles as bioaerosols. This decaying organic matter can attract disease-carrying animals, including rats, cockroaches and pigeons, exposing workers further to harm. Among recycling and waste workers in British Columbia, 78% reported suffering from respiratory illnesses [due to their employment](#). Waste collection is one of the deadliest occupations, with an incidence rate of [35 fatalities per 100,000 full-time workers](#), ten times the national average.

### Learn more about leading environmental justice and waste organizations:

[Alliance for Mission Based Recycling](#)

[Break Free from Plastic](#)

[Climate Justice Alliance](#)

[International Solid Waste Association](#)

[Partnership for Southern Equity](#)

[Plastic Pollution Coalition](#)

[Waste Aid](#)

## What happens to the waste we send overseas?

The U.S. [exports a considerable amount of plastic waste](#) to developing countries, such as Vietnam, Malaysia, Thailand and Indonesia. Much of the potentially recyclable material that is sent overseas ends up in landfills or the ocean or is openly burned, all of which significantly impact citizens' health. A report found that an estimated

400,000 to 1 million people in the developing world die every year due to the impacts of mismanaged waste, [including harm from plastic pollution](#).

In 2019, the 1989 Basel Convention was amended to make global trade in plastic waste cleaner, more transparent and better regulated, to protect developing countries from taking these large shipments from the Global North. Because the United States did not ratify the agreement, which went into effect on January 1, 2021, the U.S. is effectively banned from the global plastic waste trade. However, it [remains common](#) for U.S. exporters to continue shipping plastic waste to these countries.

## What is the impact of plastic waste on low-income communities and countries?

Approximately [3 billion people worldwide](#), particularly in some of the least developed countries, depend on seafood as their primary source of protein. However, the marine food chain is now filled with toxins from plastic, such as lead, cadmium and mercury, because of [plastic waste](#). Of the world's population (nearly 800,000,000 people), 10% also depend on fisheries for their livelihoods, which are at significant risk due to the vast amount of waste that continues to flow into the world's oceans yearly. Fisheries generate over [\\$152 billion](#) in exports each year, with 54% of exports originating in developing countries, highlighting the importance of a healthy, plastic-free ocean for ensuring economic stability in communities around the globe.

### Example: Bali, Indonesia

Bali's economy relies heavily on tourism, which is now in jeopardy due to the influx of plastic waste on its otherwise pristine beaches. Its two most popular beaches accumulate up to 54 metric tons of plastic daily. The ocean is so polluted that marine life is decreasing, and the marine life there is harder for [tourists to see](#) and enjoy, threatening the local economy.

# A Way Forward

## What is a circular economy?

While waste production continues to rise, it does not have to continue along its current trajectory. Solutions are available at all levels for countries, cities, businesses and individuals to support the transition to a circular economy. A circular economy is defined as “a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is [extended](#).” Because all materials have value, the goal is for as little to be wasted as possible, even if materials need to be repurposed for a different product. This supports the shift away from the “take-make-dispose” linear economy that is in practice today, which is unsustainable, damaging and – as outlined in this resource – represents a clear public health hazard.

In a circular economy, the focus shifts away from the extraction of raw material resources and toward the environmental and societal benefits of redesigning processes to eliminate waste from being produced in the first place and repurposing existing products and materials for a safer and more sustainable economic system. While a circular economy is the goal, it will take time and



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an intentional transition. In the meantime, there are steps and shifts that businesses can make to get closer to a society with minimum waste generation, reducing the inequities that mismanaged resources and excess waste create a cross the globe.

## What is zero waste?

Many cities, businesses and individuals are working toward zero waste to reduce the amount of waste being sent to landfills, incinerators and the environment. The Zero Waste International Alliance defines zero waste as “designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources and not burn or bury them. Implementing zero waste will eliminate all discharges to land, water or air threatening planetary, human, animal or plant health.” The [zero waste hierarchy](#) is an effective and clear tool for communicating the path to zero waste by focusing on preventing waste through upstream initiatives such as reduction and reuse over waste management through downstream practices such as recycling and composting.



## How does zero waste benefit society?

While eliminating all waste is an aspirational achievement, moving closer to this goal and emphasizing the importance of upstream strategies has numerous benefits to society. Less waste means fewer landfills and trash collection vehicles burning fossil fuels. Reducing, reusing, and recycling [creates ten times more jobs than disposal](#). Zero waste strategies also reduce greenhouse gas emissions, conserve resources, promote social equity, and build community.

Sharing resources and taking responsibility for our consumption are fundamentals of the zero waste philosophy and promote a kinder and more equitable society for all. Those who consume the most and waste the most do not have to face the bulk of the negative and toxic consequences. Zero waste allows for this unequal burden to be significantly lessened. The resource conservation benefit of zero waste is also crucial for low-income countries, communities and individuals by keeping finite resources in the economy for longer rather than only valuable commodities available to a select few. Zero waste strategies and goals can help alleviate many of the burdens that historically excluded communities face due to mismanaged waste today and in the future.

# TRUE Certification for Zero Waste

[TRUE](#) (Total Resource Use and Efficiency) is a zero waste certification program that encourages adopting sustainable resource management and waste reduction practices that contribute to positive environmental, health and economic outcomes.

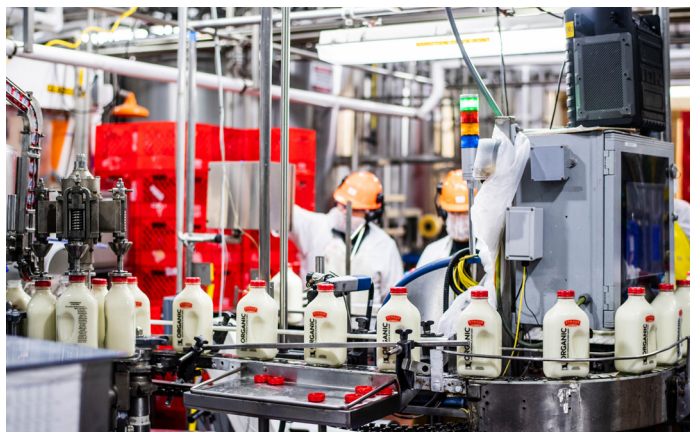
Facilities achieve TRUE certification by meeting an average of 90% or greater overall waste diversion from landfill, incineration (waste-to-energy) and the environment over a period of 12 months, as well as achieving a minimum number of optional credits aimed at improving overall resource management and efficiency.

The [TRUE Rating System](#) is a road map to zero waste based on the [zero waste hierarchy](#) and is designed to aid in the transition to a circular economy. TRUE does this by supporting businesses and communities in rethinking and redesigning processes to ensure that all resources are valued for their highest and best use.



While individual action is an important part of the solution, corporate involvement is critical to achieving change at scale. [Studies have shown](#) that the 5,500 largest publicly traded companies in the U.S. send more than 340 million metric tons of waste to landfills and incinerators annually at a high cost to society and their bottom lines.

In addition to reducing the amount of waste sent to landfills and incinerators, businesses must think critically about how to redesign processes and purchasing decisions so that less waste is produced in the first place. Companies can demonstrate leadership by shifting to circular thinking and prioritizing processes, operations and actions to reduce waste and resource extraction upstream.



*Strauss Family Creamery | TRUE Gold | Petaluma, CA*

Surprisingly, this decision often saves money for the business redesigning its waste streams. A transition to a zero waste framework has one of the quickest returns on investment (ROI) of any sustainability decision a business or facility can make. This is because TRUE focuses on internal policies and procedures more than installing new infrastructure or technology.

TRUE applies to facilities, campuses, events and construction projects. By implementing TRUE, companies can cut greenhouse gases, manage risk, reinvest resources, create jobs, drive value creation and save money. With more than 162 million square feet of space registered or certified with TRUE, covering 46 U.S. states and 32 countries, TRUE projects have been able to divert more than 2.7 million metric tons of waste from landfill since 2017 — a number that has increased daily.

## Implementing zero waste strategies through TRUE

TRUE focuses on upstream strategies to encourage the reduction of materials generated during extraction, transportation, product packaging and other processes that occur before consumption. Upstream management, such as purchasing reusable service ware instead of single-use plastic, is critical to reducing waste and moving toward a circular economy. While downstream management, including recycling and composting, is an essential approach for materials already in circulation, businesses can significantly increase their impact by incorporating upstream management to eliminate waste and reduce the need for downstream practices.

It is estimated that 71 times that amount of waste is created upstream for every unit of waste thrown away, meaning that the waste at the end of a product's life is only a fraction of the waste generated throughout its lifecycle. TRUE helps businesses find ways to restructure their purchasing, production and distribution systems to prevent waste from being created in the first place. In situations where the creation of waste is unavoidable, the TRUE rating system provides new avenues for recycling, composting and reuse instead of landfilling or incineration.

## Examples of TRUE credits that help reduce environmental hazards and advance healthier workplaces and communities include:

### **Hazardous Waste Prevention Credit 5: Collect universal waste from employees and/or customers**

[Household hazardous waste](#) is often disposed of improperly due to a lack of knowledge of proper disposal or limited availability of locations that collect universal or hazardous waste. When universal waste is improperly

disposed of and not reused or recycled, dangerous metals can leach into the land and groundwater, increasing toxicity and endangering the public. Providing a location to collect this waste from employees and/or customers can help limit improper disposal and associated health impacts.

**Reuse Credit 6: Donate all food safe for human consumption**

Donating all safe food for human consumption reduces the amount of food waste sent to landfills while also helping to address [the larger public health issue of hunger](#) in our communities.

**Compost Credit 1: Collect compostables separately from other materials**

**Training Credit 4: Clearly label all collection receptacles**

Working at an MRF (materials recovery facility) is one of the most [dangerous occupations](#) in the U.S. Employees encounter hazards when picking out contaminated or hazardous materials from recycling streams. Collecting compostables separately and labeling all collection receptacles reduces the contamination in recycling streams and mitigates risk to MRF workers.

**Reduce Credit 6: Practice grasscycling for all mowed surfaces**

**Reduce Credit 7: Reduce yard trimming waste through native landscaping or xeriscaping**

Using native plants and allowing grass clippings to break down in their natural cycle saves water, reduces organic waste and eliminates the need for [chemical fertilizers, which can be damaging to human health](#).

**Pilot Credit 2: Promote the Health and Safety of Personnel Managing Solid Waste**

The TRUE Rating System includes a [Safety First Pilot Credit](#) that focuses on eliminating adverse health impacts of solid waste management on personnel. It encourages the adoption of more stringent health and safety measures, such as the use and proper disposal of personal protective equipment, as well as risk management and mitigation training for employees working with solid waste.

## Connecting waste with TRUE and LEED certifications

[LEED](#), the world's most widely used green building rating system, works in tandem with TRUE as part of the [LEED Zero](#) certification suite. A complement to the [LEED](#) rating system, LEED Zero recognizes projects that have reached net zero or net positive status in carbon, energy, water or waste categories. To achieve LEED Zero Waste, a project must achieve both LEED certification and TRUE Platinum certification. This combination ensures that a facility is holistically approaching waste with the building itself included in that calculation.

## Moving forward with TRUE

Zero waste efforts and the transition to a circular economy are one of the fastest, most effective ways for businesses to protect the environment, promote human health, save money, and create jobs. The TRUE Rating System offers 15 different categories, each focused on maximizing the life cycle of every product to promote a fully circular economy. Projects around the world are implementing these credits with impressive results – and savings.

Solving the challenge of global waste together will take hard work, but the benefits to human health, environmental justice and the global economy are worth the effort.

**Cover images:**

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