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Waste management

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► **To cite this version:**

Marie-France Dignac, Gabin Colombini, Jean-François Ghiglione. Waste management. *Plastics: Poison most handy*, 2024. hal-04703892

HAL Id: hal-04703892

<https://hal.inrae.fr/hal-04703892v1>

Submitted on 20 Sep 2024

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Sheet 7: Waste management

by Marie-France Dignac, Gabin Colombini & Jean-François Ghiglione

In our trash bins



©Jules Vagner-Objectif Zero
Plastique

- The proportion of plastics in municipal waste in the United States surged from less than 1% in 1960 to over 12% by 2018¹⁹, imposing a substantial financial burden on local authorities for its management (see [Normative, ethical and economic challenges of our societies regarding plastic production](#)).
- Approximately **half of the plastics manufactured are designated for single use²⁰, with nearly two-thirds intended for short-term use²¹**.
- A staggering 80% of the 8.3 billion tons of plastics produced since 1950 have ultimately found their way into the environment²⁰.
- Urban waste also comprises 34% of organic matter¹⁹, which holds potential for valorization to enrich soil fertility with organic content.

The paradox of plastics found in organic waste

Plastics and microplastics contaminate the organic fraction of biologically treated waste (through composting, methanization, etc.), which is returned to the soil, thus becoming a source of soil pollution (see [Plastic in soils](#)). They end up in organic waste due to sorting inaccuracies or the absence of separation of biowaste at the source, or during the unpacking of biowaste preceding anaerobic digestion (for biogas production), where digestates are applied onto soils. **Reducing the plastic content in waste would facilitate the enhanced valorization of its organic fraction, which serves as a vital source of nutrients and carbon for soils.**



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Transitioning away from plastics

The waste hierarchy or 3R concept establishes priorities based on waste's environmental impact:

1. **Reduce**²² plastic and waste production by fostering more durable consumption, minimizing packaging, and phasing out non-essential plastics.
2. **Reuse** essential plastics instead of discarding them after initial use. This necessitates designing items for repairability and ensuring plastics are reusable and refillable, while also guaranteeing they do not become toxic over time.
3. **Recycle** after waste collection and sorting, as a final recourse. Today, recycling merely delays ultimate disposal as plastics undergo limited cycles of recycling, resulting in plastics of lower quality²³ ("downcycling"). Transitioning away from plastics entails reimagining and simplifying plastic compositions²⁴ to increase the recycling rate, which presently accounts for a mere 12% of plastics waste in Europe.



¹⁹ Environmental Protection Agency, 2018. Advancing Sustainable Materials Management: [Facts and Figures Report](#).

²⁰ Geyer et al., 2017. Production, use, and fate of all plastics ever made. *Science advances*, 3, [10.1126/sciadv.1700782](#)

²¹ Geyer et al., 2017. Production, use, and fate of all plastics ever made. *Science advances*, 3, [10.1126/sciadv.1700782](#)

²² Lau et al., 2020. Evaluating scenarios toward zero plastic pollution. *Science*, 369(6510), pp.1455-1461.

²³ Carmona et al., 2023. [A dataset of organic pollutants identified and quantified in recycled polyethylene pellets](#). *Data in Brief*, 51.

²⁴ Dey et al., 2022. Global plastic treaty should address chemicals. *Science*, 378, pp.841-842. [10.1126/science.adf5410](#)

Plastics : Poison most handy

March 2024 (English version)



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