

Packaging at the core

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Credits

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Packaging at the core of the pollution

The overall production of packaging and generation of packaging waste has been steadily growing over the past 20 years.

The most recent data shows that Europe reached the record level of 174 kg of packaging waste per person in 2018¹. From 2009 to 2019, 'paper and cardboard' was the main type of packaging waste material in the EU (32.2 million tonnes in 2019), with plastic and glass being the second and third most packaging wasteful materials, respectively (15.4 and 15.2 million tonnes, respectively, in 2019). Most packaging is designed to be used only once.

In fact, the pollution caused by packaging waste has seen no boundaries, and it goes beyond a waste management issue. **How are packaging and climate change related? Or how does packing relate to chemicals, food waste, and waste trade? In reality, the relationship is closer than most people may think.**

This paper aims to compile evidence of the boundless aspects of packaging pollution, and demonstrate how solving the packaging issue can help tackling other major world problems.

Currently, most packaging in Europe are:



Single-use: this fact, by itself, is a big problem. Single-use means that the packaging was designed and produced to be used only once and thrown-away. And because of that, the environmental impact related to such products - including resource extraction; use of raw materials; land, energy, and water use; and CO₂

emissions - is enormous. As levels of packaging production and consumption continue to

¹ Eurostat (2022) "Packaging waste statistics", in Eurostat. Available at: ec.europa.eu/eurostat/statistics-explained/index.php?title=Packaging_waste_statistics

rise, especially for single-use applications, the current waste management systems cannot cope with the increasing amount of waste generated.

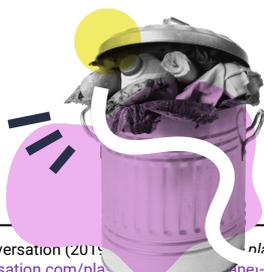


Warming our planet: It has also been estimated that CO₂ emissions from materials used for packaging are more than those caused by global aviation.² The most used materials in packaging are plastic, glass, paper, and cardboard. According to a study carried out by the Centre for International

Environmental Law (CIEL), in order to manufacture one kilogram of plastic, 3.5 kg of CO₂ are emitted into the atmosphere.³ What's more, not only its production process has a high carbon footprint, but also so does its end of life. This same study shows that for plastic packaging, which represents about 40% of plastic demand, global emissions from incineration of this particular type of plastic waste amounted to 16 million metric tons of CO₂e in 2015. Also, according to the aforementioned study, in 2019 the global production and incineration of plastic (including plastic packaging) emitted more than 850 million metric tons of greenhouse gases – equal to the emissions from 189 five-hundred megawatt coal power plants.



Putting our health at risk: In Europe alone, over 8,000 chemicals can potentially be used in food packaging, tableware, and other food contact materials - and many of these chemicals have been associated with harmful impacts on our health. In fact, the chemicals used in the production, processing, preparation, and packaging of food may contribute to cancer, harm reproduction, and cause hormone disruption.⁴



Wasting our food: over the past decades, packaging waste and food waste generation have simultaneously increased. 37% of all food sold in the EU is wrapped in plastic packaging.⁵

² The Conversation (2019). *Planet twice as much as aviation – here's how to make it climate-friendly*. Available at: theconversation.com/planet-twice-as-much-as-aviation-heres-how-to-make-it-climate-friendly-116376

³ Centre for International Environmental Law (CIEL) (2019). *Plastic & Climate - the hidden costs of a plastic planet (executive summary)*. Available at: www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-Executive-Summary-2019.pdf

⁴ Zero Waste Europe (2020). *Towards safe food contact materials in a toxic free circular economy*. Available at: zerowasteurope.eu/wp-content/uploads/2020/05/towards_safe_food_contact_materials.pdf

⁵ UNWRAPPED project (2019). *How throwaway plastic is failing to solve Europe's food waste problem (and what we need to do instead)*. Available at: zerowasteurope.eu/library/unwrapped

Packaging, which should protect the food and increase the shelf life, is often found to be a driver of food waste.

Recent research⁶ has shown that wrapping fresh products in plastic packaging does not make them last longer, but rather adds to pollution and food waste. The same research piece studied five items: apples, bananas, broccoli, cucumber, and potatoes - stored in the original packaging and loose, and at different temperatures. It calculated that, if these five products were sold loose, and the best-before dates removed, it could save more than 10,300 tonnes of plastic and about 100,000 tonnes of food from being wasted each year – the equivalent of 14 million shopping baskets of food. Packaging often forces people to buy more than they need; in fact, big retailers are driving food and plastic packaging waste in Europe through practices such as food grading standards, as well as packaging food in multipacks and small format packs, which leads to overbuying. Oversized packaging and packaging items that are difficult to empty also lead to the waste of perfectly edible food.⁷ Another study showed that chopping green beans to fit plastic packaging resulted in 30-40% of the beans being wasted.⁸



Non-recyclable and not recycled: nowadays, the overwhelming majority of packaging placed in the market is single-use and, in most cases, doesn't get recycled. Most statistics available on the recyclability of packaging are inaccurate, as the current waste management scenarios do not reflect the real conditions of the market. In fact, just because a product is recyclable does not mean it will be collected, recycled and turned into new materials and products. The format and flexibility of, as well as multilayer, food packaging products imply the existence of waste management infrastructures equipped to deal with these products, which is unlikely to be the case in practice⁹.

⁶ Zoe Wood (24 February 2022). "Plastic packaging increases fresh food waste, study finds", in The Guardian. Available at:

www.theguardian.com/environment/2022/feb/24/plastic-packaging-increases-fresh-food-waste-study-finds

⁷ Wikström et al., (2014). "The influence of packaging attributes on consumer behaviour in food-packaging life cycle assessment studies – A neglected topic", in *Journal of Cleaner Pollution*, 73 (2013), pp. 100-108. Available at: www.worldpackaging.org/Uploads/SaveTheFood/RMITInfluence.pdf

⁸ UNWRAPPED project (2019). *How throwaway plastic is failing to solve Europe's food waste problem (and what we need to do instead)*. Available at: zerowasteurope.eu/library/unwrapped

⁹ The same report provides an example of the recycling of aseptic cartons, which contains multilayers of plastic and aluminium. Within the study analysed (Meneses, Pasqualino and Castells (2012)), they've assumed 100% recycling of aseptic cartons, although the separation of the different layers was not a widespread practice. Similarly, the Quantis (2015) study on coffee assumed capsule packaging recycling to be at average North American residential rates, although there was no indication that the selected packaging is actually recyclable. According to the report, coffee capsules are acknowledged to be particularly challenging for recyclers due to their small format, multi-material composition, and the fact that the coffee grounds within are not recyclable, a necessity for a separate waste stream (France 24, 2017)

For instance, according to a report on life cycle assessments (LCA) in food packaging,¹⁰ a material's recyclability depends on its ability to reacquire the properties it had in its virgin/original state after being recycled. Therefore, the greater the mix of materials within the packaging, the lower the overall quality the recycled material becomes. Currently, most single-use packaging placed in the EU market is made out of complex materials; involving different materials or polymers, layers, and there are many different types that should not be recycled together. The presence of many chemicals in packaging also hampers recycling. Moreover, food leftovers in single-use plastic packaging can also undermine its recyclability.

Furthermore, current recycling statistics do not take into account the inappropriate disposal. These statistics tend to assume that 100% collection of waste streams go to landfill, incineration, or recycling. This is at odds with reality, where a substantial fraction of packaging ends up in the terrestrial and marine environment, or is exported to third countries. In fact, (see below) a third of plastic packaging destined for recycling is shipped outside of EU territory.¹¹



End up as waste sent to countries outside Europe: where it is usually burnt, landfilled, or leaked in the environment. The European Union relies heavily on international trade for its overgeneration of plastic and packaging waste. In 2019, the EU exported a monthly average of 150,000

tonnes of plastic waste beyond its borders.¹² In 2017, plastic packaging accounted for 75% of the plastic waste exported (by weight). Due to the fact that most single-use packaging are not recyclable, they are exported "for recycling" to third countries - in its majority to countries in the Global South with more limited waste management infrastructures. In fact, a third of the plastic packaging destined for recycling is shipped outside of EU territory¹³, where control over whether the recycling process actually happens (or happens under the right conditions) cannot be monitored.

¹⁰ Rethink Plastic Alliance, Zero Waste Europe, Friends of the Earth Europe (2018). *Justifying Plastic Pollution: The shortcomings of Life Cycle Assessments in Food Packaging Policy*. Available at:

zerowasteurope.eu/wp-content/uploads/2019/11/zero_waste_europe_report_justifying-plastic-pollution_the-shortcomings-of-lcas-in-food-packaging-policy_FoEE.pdf

¹¹ European Court of Auditors (October 2020). *Review No 04/2020: EU action to tackle the issue of plastic waste*. Available at:

www.eca.europa.eu/Lists/ECADocuments/RW20_04/RW_Plastic_waste_EN.pdf

¹² European Environment Agency (2019). *The Plastic Waste Trade in the Circular Economy*. Available at: www.eea.europa.eu/publications/the-plastic-waste-trade-in

¹³ European Court of Auditors (October 2020). *Review No 04/2020: EU action to tackle the issue of plastic waste*. Available at:

www.eca.europa.eu/Lists/ECADocuments/RW20_04/RW_Plastic_waste_EN.pdf

Packaging at the core of the solution

As a principle, a packaging that cannot be safely used, reused and recycled at the end of its life should not be produced or placed in the market in the first place.

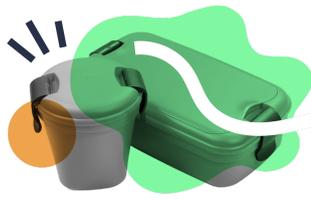
The solution to stop this packaging pollution chain is logical: the less packaging we produce, use, and discard, and the less materials we extract, the better for our environment and society.

This is why it is really important to think upstream: rethink and redesign packaging so that these products are toxic-free, circular, and contribute to regenerating ecosystems instead of polluting them. Moving away from this disposable packaging trend is a must; and should be addressed by maintaining its value, materials, and resources for as long as possible and returning them into the product cycle at the end of their use (while minimising the generation of waste).

Improving and expanding existing infrastructure for recycling is a necessary step, but that alone will not stop the trend of continual growth of single-use packaging and packaging waste. Waste prevention and reuse are at the top of the waste hierarchy for a reason: while prevention stops waste from ever happening, reuse helps reduce waste generation and the need for resource extraction and energy use compared to the manufacturing of new products and recycling¹⁴. Reuse also has the potential to reshape our relationship with products and packaging, shifting our habits towards more conscious production and consumption.

Getting out of our current linear model requires a systemic rethinking of the way products are currently delivered to consumers. When it comes to packaging, waste prevention and reuse should become a top priority for the EU.

¹⁴ Further information on Packaging Waste Prevention and Packaging Reuse is available here: <https://zerowasteurope.eu/wp-content/uploads/2022/06/Packaging-Reuse-vs-Packaging-Prevention.docx-1.pdf>



Reducing and redesigning packaging is key to solving most of the problems above. By eliminating packaging that we don't need, we can save resources, reduce emissions, and minimise waste. A good example is the French Circular Economy Law adopted in 2020,¹⁵ which seeks to reduce single-use plastic packaging and to develop alternatives such as bulk or reusable packaging. As of 1 January 2022, plastic packaging is banned for most fruits and vegetables in France.

Rethinking the purpose of packaging itself is also essential to open the door to packaging-free and in bulk options. This helps to not only prevent packaging waste, but also to prevent food waste as consumers can buy exactly what they actually want to consume - not more, not less! In addition a study on Short Food Supply Chains¹⁶ shows that *'relocalisation of food chains and delivery chains, based on short food supply chains, such as farmers' markets, community supported agriculture schemes, and basket delivery systems have great potential to connect consumers to the production of food in ways that can help to reduce food and packaging waste'*.



Having this in mind, there is no way one can ignore how **reusable packaging systems** are a crucial element to this equation. According to a UNEP report¹⁷ based on a series of LCA studies, the more times a product can be used, the lower its negative environmental impact, regardless of its material. In fact, a study comparing the LCAs of single-use vs reusable packaging has shown that a reusable glass bottle has 85% less emissions than its single-use counterpart; 70% less emissions than a single-use PET bottle; and also 57% less emissions than a single-use aluminium can.¹⁸ According to this study, these reductions seem to occur, on average, between the second and the tenth use of the glass bottle, depending on the specific case scenario. Also, another study on e-commerce packaging

¹⁵ Zero Waste Europe (2020). *France's law promoting bulk and reusable packaging*. Available at: zerowasteurope.eu/wp-content/uploads/2021/11/zwe_11_2021_factsheet_france_en.pdf

¹⁶ Rethink Plastic Alliance, Zero Waste Europe, Friends of the Earth Europe (2018). *Short Food Supply Chains*. Available at: ieep.eu/uploads/articles/attachments/3d1dabdc-68d5-4472-a213-970dbb58b46b/Short%20food%20supply%20chains%20-%20Unwrapped%20Packaging%20and%20Food%20Waste%20IEEP%202018.pdf?v=63690511118

¹⁷ United Nations Environment Programme (2021). *Addressing Single-use Plastic Products Pollution Using a Life Cycle Approach*. Available at: www.lifecycleinitiative.org/wp-content/uploads/2021/02/Addressing-SUP-Products-using-LCA_UNEP-2021_FINAL-Report-sml.pdf

¹⁸ Zero Waste Europe, ReLoop Platform (2020). *Reusable vs single-use packaging: a review of environmental impacts (executive summary)*. Available at: zerowasteurope.eu/wp-content/uploads/2020/12/zwe_reloop_executive-summary_reusable-vs-single-use-packaging_-_a-review-of-environmental-impact_en.pdf

has shown that reusable packaging has a carbon footprint which is 80% smaller than those of single-use cardboard boxes or plastic wrapping.¹⁹



Alongside packaging redesign for reuse, setting up well-managed **pool systems for reusable packaging**²⁰ is a key instrument to make efficient and effective reuse systems work. These enable a central governance structure; ownership; shared access; and self-imposed quality and efficiency standards - thus avoiding problems that have emerged in contexts where only standard packaging is used, without centrally managing the pool.

Specifically on **safe, toxic-free packaging**, an ambitious reform of both the EU's food contact materials and chemical policy frameworks is an opportunity to phase-out of the most hazardous chemicals from packaging and ensure packaging put on the market are safe for use, reuse and recycling. Nevertheless, progressive manufacturers and businesses can immediately start this transition by introducing new models and innovative solutions, and/or by scaling up existing safer solutions for packaging (e.g. avoiding toxic glues and inks, using glass or metal containers for reusable options). Certain contexts, such as shorter supply chains, generally need less food processing and use of chemicals.



While there isn't really such a thing as sustainable packaging, we can put in place/achieve sustainable packaging systems - and take-back systems such as **deposit return schemes (DRS)** do enable such systems. Closed-loop systems avoid the need to extract and use virgin materials, and consequently, their CO₂ emissions. DRS enables the return of packaging to the system to be preferably reused, or recycled; and it should be among the high-priority solutions and measures to achieve true circularity for packaging.

¹⁹ RePack (2017). "Carbon footprint of reusable packaging", in RePack. Available at: www.repack.com/news/carbon-footprint-of-reusable-packaging

²⁰ Further information at: <https://zerowasteurope.eu/library/the-need-to-set-essential-criteria-for-setting-up-managed-pool-systems/>

A move to fewer packaging, as well as more sustainable ones, requires thinking about the entire lifecycle of a product and its packaging, so that the whole system can be circular by design. The **ban on the export of plastic waste outside of the EU**, which is currently being discussed,²¹ is an opportunity to rethink, redesign, and explore reusable systems for packaging.

By redesigning packaging with circularity in mind - notably by reducing the complexity of packaging (e.g. fewer layers, materials, polymers and chemicals used) and designing it to last - it is possible to reduce uses of hazardous chemicals; reduce food waste; and get rid of 75% of the waste that is currently being exported, thus mitigating climate change impact through the reduction of carbon footprints. It will also allow us to ensure that this packaging is primarily reused and effectively recycled in Europe at the end of its life.

²¹ Zero Waste Europe (2021). "European Commission acknowledges the EU's plastic waste trade crisis with proposal, but falls short of bringing appropriate response", in Zero Waste Europe. Available at: zerowasteurope.eu/press-release/european-commission-acknowledges-the-eus-plastic-waste-trade-crisis-with-proposal-but-falls-short-of-bringing-appropriate-response