Journal of Sustainability (2026) 2:1, 1-14
https://doi.org/10.55845/jos-2026-2132

PERSPECTIVE

# Waste is Not a Waste: The Material and Temporal Value of Waste in the Anthropogenic Era

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Received: 12. May 2025 / Accepted: 10. March 2026 / Published: 18. March 2026


## Abstract

Waste has had a persistent material and cultural presence that has co-evolved with human societies. Throughout history, waste has functioned as both a life-sustaining resource and a destabilising force when neglected. Contemporary consumer economies have produced unprecedented waste volumes, leading to increasing instances of environmental pollution. Simultaneously, advancements in infrastructure systems have led to waste outputs becoming increasingly invisible, distancing the public from accumulation volumes. This distancing reinforces stigmatisations of waste as valueless, dirty, and external to human life, obscuring its material continuity and ecological agency.

A review of environmental history, waste infrastructures, cultural narratives, and artistic practices reveals that the designation of items as waste is not intrinsic to materials, but socially constructed. This perception perpetuates psychological barriers in designating value in waste, a vital component in meeting circular economy objectives. Reframing waste within an ongoing "Anthro-cycle" can reposition humans as embedded agents within cyclical flows of matter. Greater visibility of waste across its lifecycle, alongside cultural, behavioural, and regulatory shifts, is essential for developing equitable and genuinely circular socio-ecological systems. Such revaluation redefines waste as a resource and an opportunity.

**Keywords** Waste · Circular Economy · Sustainable Systems · Waste-to-value

## Highlights

- Waste is intrinsically linked to the rise and falls of humanity.
- The term waste has been stigmatised to imply no value.
- Historical use of waste can point to future uses for a circular economy.
- To reach a truly circular economy, barriers of stigmatisation must be addressed.
- The Antro-cycle, where waste is positioned not as the *end* but as a *process*, is proposed.

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# 1. Introduction

Waste is an unavoidable reality of life. It originates from natural processes, through digestion and excretion, or unnaturally through the disposal of manufactured products, ranging from fragmented palaeolithic tools to the modern plastic bottle (Kachef and Chadwick, 2023). Even the end of life itself creates waste through corporeal decomposition. It is no surprise then, as global population and consumption trends increase, society and the environment face ever-increasing pressures in the need to collect and dispose of waste (UNEP, 2024).

Contemporary waste management and associated processes pose a risk to every aspect of our planet. Landfills encroach on natural habitats, leach hazardous contaminants into the ground, and cause serious health risks to nearby communities (Ozbay *et al.*, 2021). The transport, processing, and burning of waste create high volumes of toxic air pollutants (Gómez-Sanabria *et al.*, 2022). Dangerous greenhouse gases are released when resources are extracted to manufacture packaging materials destined to become waste (Behrens *et al.*, 2007) In the UK, 1.7 billion pieces of plastic packaging are bought and thrown away every week (Sedgwick, 2024). Waste is often lost to the environment, with vast amounts of plastic litter polluting oceans (Jambeck *et al.*, 2015); while untreated sewage released into freshwaters is a significant source of chemical and biological contamination (Brion *et al.*, 2015). From cradle to grave, waste has a significant impact on the environment, perpetuating issues of pollution, water scarcity, and global resource depletion (Wang *et al.*, 2024).

Unfortunately, the rate of waste generation is fundamentally unsustainable, where accumulation far exceeds localised capacities for assimilation (Brion *et al.*, 2015). As such, a circular economy, where the reduction, reuse and reinjection of waste materials into production are essential for long-term environmental and social wellbeing (Savini, 2019).

Unsurprisingly, the 16% of the global population that lives in categorically high-income countries generate 34% of yearly municipal solid waste (Gómez-Sanabria *et al.*, 2022). Effective waste management systems are a standard in developed countries, while developing nations often struggle to build infrastructures to accommodate urban growth (Kumari and Raghubanshi, 2023). Although the Global North rarely thinks twice about the luxury of putting bins out on rubbish day, these systems are a privilege and a vital aspect of all 17 sustainable development goals (UNEP, 2024). Unfortunately, efforts in these regions have been unsuccessful in promoting lifestyles that prioritise the reduction of waste-generating products, particularly within capitalist industries that perpetuate a culture of over-consumption as the representation of affluence (O'Brien, 2012; Reno, 2015).

Where efforts to promote lifestyles of reduction are less effective, a focus on the reuse of waste materials presents several opportunities to alleviate associated pressures; stemming the flow of products to landfill or incineration, reducing demand for material extraction, and eliminating their potential to be lost in the environment. There is, however, one exceptional barrier in promoting an ethos which places value on what is typically seen as waste - the perception of waste itself.

Often considered to have no or negative value, waste has developed a reputation where it is held at arm's length.

The word waste itself is a polyseme; the Oxford English Dictionary lists 29 meanings of the word (Oxford English Dictionary, 2024). Waste is used in several contexts, a level of flexibility that arguably lends itself to a skewed public perception. Contemporary perceptions of the word waste are stigmatised; it represents the detritus or by-product of something that was once of value. This is in keeping with the etymology of the word, which originates from *vastum*, old French for empty and desolate (Barles, 2014), leading to the word waste evoking images of voids and worthlessness.

This is, however, far from the truth. Although we perceive waste as, well, a waste, society's tumultuous relationship with the discarded tells a story of dramatic twists of symbiosis and conflict. Waste has undeniably influenced the development of societies, driven technological advancement, and, through its persistence, accumulated an ever-increasing presence on this earth.

The following essay is the outcome of the musings between a scientist and an artist. Although perspectives are fundamentally dichotomous in nature, by extracting ourselves from discipline norms, threads of synergies extended our respective practices, gracefully weaving the empirical and abstract. Here we present to you the story of how humanity's relationship with waste has evolved, from origin through to the predicament we find ourselves in today. We choose to tell this story not to impose a specific point of view; instead, we ask that you embrace this tale without bias and reflect on your associations with waste. Most importantly, we hope you explore your own perspectives on how we got here and how, if possible, we can move forward.

## 2. The first date

The creation and disposal of waste dates as far back as the oldest known human species, at least 2.4 million years ago (Foley and Lahr, 2015). A portion of this waste was in a tangible form, comparable to the broken glass or ripped bags found in contemporary landfills. This consisted of pottery pieces, arrow heads, buttons and the like, the items we often see under glass displays in museums across the world (Kachef and Chadwick, 2023). This type of material is how we have been able to track the capabilities, evolution, and movement of nomadic tribes throughout the world (Rathje and Murphy, 2001). This is not just reserved for the manufactured things - it was through faecal biomarkers that irrefutable evidence of migration to the Americas has been confirmed (Vachula *et al.*, 2019).

Up until 10,000 years ago, people maintained a nomadic hunting and gathering lifestyle (Davis, 1974). These tribes moved on when they had exhausted the resources in a particular area, often following repeated paths that allowed them to maximise seasonal resources - faeces were instrumental in supporting life during these times.

Plants mostly depend on external vectors to distribute their seeds. This is done through natural forces like wind and water, as well as via animal intervention (González-Varo *et al.*, 2024). Seeds often cling to fur and feathers, ultimately getting dropped through a process called Epizoochory; however, the most effective long-distance seed dispersal method is through ingestion and defecation, a process called Endozoochory (Costa *et al.*, 2014).

Although the seeds in foods such as tomatoes, guava, figs, cucumbers, and berries are hard, they are small and tend to be eaten, where the process of digestion prepares the seed for germination (Traveset, Robertson and Rodríguez-Pérez, 2007). When defecated - with special thanks to their own personal reserve of fertiliser - these seeds grow into fruit-bearing plants. There are unverified reports of tomatoes growing wild in areas where wastewater is regularly discharged (Webb, 2021). As early nomadic tribes often followed seasonal corridors (Huigens, 2018), the waste they dropped along their path ensured they would have food to eat when they, their livestock, or any other tribe returned through that area (Tulowiecki, 2025).

With help from the warming of the earth, the start of the Holocene (approximately 12,000-10,000 years ago) saw the invention of structured agriculture, leading to an increase in settlements and a sedentary lifestyle (Richerson and Boyd, 2001). It was at this point that dynamics were switched. In a nomadic scenario, tribes walked away from their waste, whereas in settlements, residents suddenly became aware of the accumulation of waste, and for the first time, solutions needed to be explored (Rathje and Murphy, 2001).

Early waste disposal began with the digging of pits within the vicinity of personal dwellings, a practice which persisted for several thousand years. The displacement of these pits outside of settlement perimeters (between 5000-4400 BC) evidences collective efforts in waste management, history's first attempts to organise communities (Květina and Řídký, 2017). The need for waste management was the catalyst for structured urban management and localised governing bodies, leading to the first examples of communal infrastructure (O'Brien, 2012).

It wasn't until 3500-2500 BC that management began to distinguish between bodily and domestic waste, bringing about the first examples of sewage drainage systems in Mesopotamia (Lofrano and Brown, 2010). Interestingly, these systems remain largely unchanged and globally consistent since their inception – Minoans, Harappans, ancient Greeks and Egyptians leveraged either existing waterways or constructed drainage systems to carry waste, dumped from chamber pots and communal toilets, to larger bodies of water or pits (De Feo *et al.*, 2014). The collection of waste waters did not always go to waste, and early societies assigned value to the discarded. In Ancient Egypt, human excrement was used in cooling balms for burns and wounds (Pećanac *et al.*, 2013), while urine was used to whiten beards and teeth, to set dyes on fabric, to clean and prepare wool before dyeing, and to remove hair and soften leather in the tanning process (McLeay, Austenfeld and Nangia, 2021).

The Romans advanced sewage technology in developing the first hydraulically engineered system, the Cloaca Maxima (616-578 BC); a combined underground system which not only repurposed bath water, but managed rainwater, sewage, and facilitated swamp drainage (Lofrano and Brown, 2010). As the Roman Empire began to crumble, as did effective waste management systems, the practice of open-air defecation, public dumping of sewage and domestic waste into streets, was common practice through the Middle Ages to the Industrial Revolution (De Feo *et al.*, 2014). In this era, as much as waste has had the power to sustain life and bring communities together, if neglected, it has the power to rip societies apart.

## 3. Dark ages of waste

It goes without saying that the flippant attitude towards waste culminated in a past which was far from pleasant. In 1213, a moat was built to keep the sewage in the River Thames from flooding the streets of London. It regularly overflowed (O'Brien, 2012). This was the norm well into the 19th century: the dumping of waste in open sewers, the emptying of cesspools by night soil men, the repurposing of human excrement as fertilisers, and outdoor privies were common all through Victorian England (Kluwick, 2018; Thielman, 2024). History tells stories of streets awash with waste, having a lasting cultural impression. Victor Hugo places sewage central in Les Misérables, leveraging the tunnels as a method of escape, commenting on the potential value of what, and who, society rejects (Barles, 2014; O'Neil-Henry, 2016). In the world of fashion, despite their common link to the birth of Disco music, platform shoes were first introduced in the 18th century to keep the hem of dresses above the grime (O'Brien, 2012).

These living conditions were highly unsanitary, and the practice, or lack of, waste management is intrinsically linked to most major epidemics. Waste-filled streets kept rats abundantly fed, leading to outbreaks of the Bubonic Plague throughout the 14th century, killing a third (25 million) of Europe's population (Glatter and Finkelman, 2021). Stagnant water pooled in waste materials is a perfect mosquito breeding ground, responsible for outbreaks of yellow fever, malaria, dengue and Zika (Banerjee, Aditya and Saha, 2013; Dom, Malip and Camalxaman, 2016; Krystosik *et al.*, 2020; Okin *et al.*, 2024). Direct contact with waste and contaminated water can cause dysentery and typhoid fever, which continue to claim millions of lives across the globe (Buckle, Walker and Black, 2012; Brockett *et al.*, 2020; Veidis *et al.*, 2021).

While early efforts to evade these ailments were mostly founded on folklore and superstition, the study of outbreaks opened the doors to a deeper understanding of disease and epidemiology. Between 1834 and 1854, London experienced several devastating cholera outbreaks (Underwood, 1948). At the time, it was believed that cholera was spread via airborne or communicable means, leading to many self-isolating during outbreaks to avoid contracting the disease (Smith, 2002). The 1854 outbreak in Soho was particularly deadly, claiming the lives of over 500 people in just over a week (McLeod, 2000), inspiring the physician John Snow to pursue his theory that the disease was indeed waterborne (Newsom, 2006). To explore his hypothesis, Snow began monitoring the individual locations of cholera deaths, placing dots on a map for each reported (Shiode *et al.*, 2015). The map quickly identified the areas surrounding a specific well on Broad Street as a hot spot of mortality, leading to the closure of the well and wider acknowledgement of the spread of waste-contaminated waterborne diseases (Smith, 2002). Snow's space-time pattern analysis is now a widely employed methodology in geographical analysis, and he is considered the founder of spatial epidemiology (Shiode *et al.*, 2015). You can still visit a replica of the Broad Street Pump in Soho, just outside of the aptly named pub, John Snow.

In an effort to improve well-being in urban areas, cesspools were closed, the flushing toilet was introduced, and London's first and current wastewater infrastructure became operational in 1865 (Lofrano and Brown, 2010). Although it follows a similar system to that in the Cloaca Maxima, Joseph Bazalgette's combined sewage system neglects the potential for reuse of bath water, utilising over 2100 km of cemented underground pipes to drain wastewater and rainfall into neighbouring treatment facilities, ultimately returning resources to the River Thames (De Feo *et al.*, 2014). Following its success in mitigating wastewater issues, this infrastructural framework has set the standard for sewage systems across the globe (Sojobi and Zayed, 2022).

Through contemporary wastewater management systems, the presence of human waste has indeed become less visible, travelling straight from the privacy of bathrooms, through a network of underground pipes, ultimately leading to treatment facilities. However, the use of chemical treatments within this system has eliminated all opportunity for the repurposing of bodily waste, culminating in many of the issues of sewage contamination which modern cities now face.

## 4. One person's trash is another person's treasure

It is often observed within an economy of scarcity that strategies of extracting value from waste are prioritised. The high costs of raw materials defined a repair culture in pre-industrial societies, while availability and rationing in wartime inspired creative means of repurposing waste (Krebs and Weber, 2021). These habits and principles were ingrained in daily life. The use of personal baskets and fabric shopping bags was standard

practice in the early 1900's (Hagberg, 2016), as were milk delivery subscriptions, which featured the reuse of glass bottles (Vaughan, Cook and Trawick, 2007). It was not until the 1950's that the commercial production and use of plastics became standard, bringing with it an era of abundance - a defining moment in our relationship with waste where, for the first time, products were manufactured with the sole purpose to be used once and go to waste (Meikle, 1995). The technological advances of the 20th century arguably mark a new social dynamic and relationship with waste, one that is defined by a distancing and denial of its existence and persistence.

As influential as waste has been, it somehow continues to evade serious attention, often taking a backseat in contemporary debates on environmental preservation to seemingly more important risks. Interestingly, unseen threats such as air pollution, climate change and technology often dominate the top of the list of planetary concerns (Slovic, 2000). Waste, however, is a contaminant that is noticeable - you can see a water bottle on a beach - and perhaps one of the factors that leads to a diminished level of concern. Consider what scares you; often, it is what we cannot see that elicits the most visceral response, shadows in a dark room, or the deep blue beneath while swimming in the sea.

Indeed, the idea of an effective waste management system is largely unseen (Reno, 2015), so that what we flush away and put in our bins is so far removed from daily lives that we are out of touch with how much waste we actually create. The reality is that in England, every year, each person throws away 377 kg of household waste (DEFRA, 2025) and flushes 105 cubic metres of wastewater (Jones *et al.*, 2021). One can imagine if these volumes of waste were left to accumulate and made visible - and not conveniently carried away by waste infrastructures - perhaps there would be higher awareness of the direct connection between what we dispose of and where it goes.

In some ways, this disconnect with waste is a legacy of the nomenclature of the word, which, for all purposes, describes waste as something that is of no value or volume – a perception that is perpetuated in slang and popular culture. A late night out may lead to your friend getting *wasted*, meaning they are so intoxicated that they can no longer function. *Dirty* things are taboo and impure (Douglas, 2002), *white trash* is a slur used to describe people as unintelligent (Kim, 2024), and those who work in waste management and recovery are often marginalised (Amasuomo and Baird, 2016).

In the UK rap scene, there has been a rise in the use of *wasteman*, a disparaging term referring to an inadequate person ('Multicultural London English', 2018); often used to put down others in hits put forward by international artists such as Dizzee Rascal and Stormzy. Following his 2019 iconic Glastonbury Festival headline performance, Stormzy did a sit-down with the students at Kensington Avenue School, his childhood school. During the event, one student, referring to local rubbish collectors, asked, "Why do you not like waste men? They come every Wednesday and do a good job." (Skinner, 2019). This misunderstanding not only illustrates a disconnect between the use of the term waste and its reality, but it also highlights that the blind eye and contempt towards waste is not instinctual, but rather a learned perception developed through social and cultural constructs.

Given their social and cultural influence, artists and craftspeople are particularly well-placed to explore relationships with waste in both temporal, spatial and material senses. Fine art practice, as a form of highly attuned play (Chong Kwan, 2022) leads a desire to creatively explore what a material can do, to discern a life in it, and, eventually, to collaborate more productively with it (Bennett, 2010). The relationship between art and waste reaches back and extends over time: from mud and ochre used to make hand-marks and paintings on the walls of caves; mosaics that depicted high-value food remains created to resemble strewn rubbish on the floors of Ancient Roman villas; to Marcel Duchamp's readymade sculpture, 'Fountain' (1917), a urinal that he signed with the words 'R.Mutt'.

How each artist's practice weaves together with different materials varies enormously, but common to all is that giving care, time, touch, expertise, play, and love to materials brings value. This goes beyond the monetary value of artworks created. Artists' attention to materials and materiality can act to disrupt neat binaries of useful and useless, dirty and clean, valuable and value-less, to see designations of waste as not intrinsic to the materials but instead as "matter out of place" (Douglas, 2002).

Art-science collaborations have the power to bring to the forefront future threats perpetuated by contemporary shortcomings, often benefiting all parties in extending their practice. Artist Gayle Chong Kwan, collaborating with waste researcher Randa Kachef, does just this, creating a space at the *Science Gallery London* which strives to reconnect the public with what they throw away, stressing that waste does not simply disappear once it enters waste management systems. In her exhibit, *I am the Thames, and the Thames is Me* (2024), Chong Kwan uses her own urine in fabric dyeing and sewage ash collected from the Thames Water

waste incineration process to create an installation of ten river spirits and a sewage map of London (Amsen, 2024) (Figure 1).

**Figure 1.** Chong Kwan's 2024 exhibit 'I am the Thames, and the Thames is me', illustrates the potential for engaging the public in debates of waste through art-science collaboration.

In bringing our material and temporal connections with waste closer to us, historical examples and artists' use of waste as a material can point to new perspectives on what we designate as waste and on our considerations of its value. Perhaps through such artistic, conceptual, and psychological shifts, both the visibility and usefulness of faecal matter and urine may once again be embraced. Waste contains the memories and reminiscence of what it used to be; it animates excess, pushes against neat (clean) binaries, and acknowledges life (and death) as a process of movement between matter, decay, material, order, and disorder.

## 5. Waste will tear us apart again?

The question remains whether the physical distance between us and the accumulation of our waste is sustainable. This gaslighting attitude that casts a blind eye on the agency and potential of waste is defining a dysfunctional relationship, which risks a repetition of the decrepit scenes of Victorian London. Since the 1970s, there has been a 700% increase in plastic production (PlasticsEurope, 2024) and global volumes of solid wastes are projected to increase 56% by 2050 (UNEP, 2024). However, solutions in management continue to hide accumulation, allowing it to quite literally occur out of view - large volumes of rubbish from the Global North are habitually exported to faraway destinations (e.g., Türkiye, Malaysia, Indonesia, etc.) (Eurostat, 2025).

What is driving this upward trend? Aside from steady and continuous population growth, we are a consumer society which has grown accustomed to the unwavering and instant availability of a wide array of products. As can be witnessed through the uptake of disposable plastic bags over traditional fabric ones, the current market allows for profit through innovation of the single-use, at times, developing a disposable product for which there already exists a sustainable solution. Meanwhile, regulation and market-based instruments often impose additional costs on the sale of single-use counterparts, establishing a pay-to-pollute framework in

addressing environmental externalities. This approach is, however, arguably limited in its ability to provide realistic solutions; can money alone fix damages caused by waste-related pollution, and if so, who is responsible for developing and implementing these interventions?

The story of the rise and fall of the plastic bag is one that proposes future solutions may be informed by the past. Contemporary social movements towards sustainable habits have repopularised the use of fabric bags, so much so that some may note they now possess an abundance hidden in their cabinets. Unfortunately, the benefits of fabric bags are contingent on their reuse, pollutants from their production, and their inability to be recycled or composted, far outweigh those associated with various plastic bags (Gómez and Escobar, 2022). In this scenario, the swing from waste associated with single-use to habits of over consumption of the reusable are perpetuating a wasteful future ingrained in mentalities of abundance and consumerism.

Equally, the resurgence in popularity of reusable bottles is a nod to the gourds and animal skins once used to transport water in nomadic times, while the glass milk bottle sets an example of communal reuse systems and the potential for refill schemes to address issues of waste. Unfortunately, perceptions of waste as unhygienic present a significant barrier to reuse systems (BSI Group, 2025), contrasting with generally positive attitudes towards products made of recycled waste materials (Polyportis, Mugge and Magnier, 2022). Although glass milk bottles are sanitised before refilling, this juxtaposition highlights an acceptance of waste only when it sheds its prior identity; undergoing a process of metamorphosis through the breaking down and reconstitution of waste materials, at times into the very form it previously occupied (e.g., plastic bottles made of plastic bottles).

In practice, a positive attitude towards recycling does not typically translate to a behaviour of choosing products made of recycled materials (Polyportis, Mugge and Magnier, 2022). Perception is that these products lack quality, which is indeed true. Each time plastic is recycled, it becomes increasingly brittle, leading to the materials themselves ultimately becoming no longer fit for recycling (Vilaplana and Karlsson, 2008).

Due to the problematic nature of the recycling process, a future of circularity should prioritise a focus on behaviours of reduction and reuse, with recycling as the last resort (Corvellec, Stowell and Johansson, 2022). Justifying unsustainable levels of primary production by assuming that recycling will solve problems of waste represents a "fetishised" (Valenzuela and Böhm, 2017, p. 25), a rose-tinted view which ignores the complicated nature of human interactions and tendencies to crave abundance in a capitalist ideology.

Consider consumption processes on a bodily level, where what goes in must come out, either through energy expenditure, bodily waste, or else it manifests as an adjustment to your waistline. Within a circular future, inputs must match outputs. Materials entering an economy which are not destined for reuse are, in essence, automatically designated as *waste* - regardless of promises of potential recyclability - disrupting the fragile balance of circularity. A future which is not inundated with the excess finds value in waste, drawing on creative uses to meet the demands of a public which seems to reject notions of compromise (Corvellec, Stowell and Johansson, 2022). What is needed is a future that is *waste-full* rather than one which is *wasteful*.

## 6. Waste will save us

It is undeniable that waste has had a significant influence on people throughout history. It has supported life, developed governments, and propelled medical and technological advances. Inversely, it poses serious risks to the environment and health, able to take as easily as it can give. As demonstrated, historical examples of the use and re-use of waste are abundant, while the single-use of materials is a seemingly contemporary mentality ingrained in perceptions of abundance and cleanliness.

Indeed, waste forms a position in a temporal and spatial taxonomy that is dominated by binaries – clean and dirty, wanted and rejected, inside and outside (Viney, 2014). The time of waste is one that separates and divides. The perception that the future will somehow deal with waste in a time beyond us engenders a relinquishment of the responsibilities of the waste that we create in the present. The spatial taxonomy of waste is one that also separates and divides between order and disorder as a relative idea that contains all the rejected elements of an ordered system. In essence, waste only becomes *waste* when it is named as such (Amasuomo and Baird, 2016). To acknowledge that waste is also material after it has been categorically rejected is a key aspect to achieving an equitable and respectful long-term relationship with our counterpart.

Just as the arrowheads and faecal markers told the stories of our ancestors, the creation, accumulation, and suppression of our waste define *this* era and will endeavour to tell our story. Waste is a persistent presence and

indicator of people and society; even within a geological sense, stratigraphic layers of waste are used as identifiers of the Anthropocene (Zalasiewicz, Gabbott and Waters, 2019). For decades, humans have shaped landscapes as geomorphic agents (Kachef *et al.*, 2025); in a way, waste has matured alongside our own journey of development, mirroring earth processes such as the carbon and hydrological cycles (Ellis, 2018). Within our relationship with waste, we are truly equal partners; we have shaped the volume and nature of waste, while waste has shaped us in a symbiotic relationship. Rather than positioning waste as separate from us, it must be acknowledged as a natural process; to think we are separate from nature is no longer the truth. As such, we propose that waste be repositioned as an essential element within an *Anthro-cycle*; it is a part of us, and we are a part of it. It is not created or destroyed; it continues on a transitional journey of change of state, as do we. By considering waste as the end, we limit the possibilities of finding a healthy, mutually beneficial relationship. Waste is not the end; it is the beginning of a new understanding and a wealth of opportunity.

This begs the question, how will waste save us? Solutions to finding a harmonious future are as dynamic and complex as waste itself; there is no single magic bullet. In lieu of a reversal of contemporary creature comforts, this radical repositioning of waste and us, as well as waste within us, is a step in the correct direction, rather than a pathological denial of existence. In reality, a future where waste is no longer hidden within its lifecycle (e.g. origin, use, disposal, reuse) has the power to adjust perspectives among those who produce it.

To achieve a future where waste commands the respect it deserves would require several parallel shifts within personal, cultural and political realms. On a personal level, households need to begin prioritising ethical consumption and proper waste disposal with a goal to avoid shaping future generations' perceptions of waste towards negative or dismissive. This could manifest as a future where weekend family activities include mending holes, dyeing stained shirts and adding personalised touches to tiered clothing instead of buying new. In this model, mending and artistic reinterpretation of the old not only provide opportunities for personal connections, it promotes a positive shift in public perception of repurposing, celebrating the unique and reused instead of shunning it. Within these creative cosmologies of waste - such as urine as a traditional ingredient in fabric dyeing and leather - our bodies become connected in a labour exchange with the social, cultural, and creative. Imagine communities which take pride in sorting their waste so efficiently that their primary outputs enter recycling and organic waste streams and not landfills. In this model, diverting waste from landfills not only positions waste as a material resource, but shifts the disposal of waste from a financial burden to a source of profit, allowing for the opportunity to reinject funds into communities.

In informing a population which has little understanding of the volume and accumulation of waste, a visit to a local recycling facility is a visceral and immersive experience (Figure 2). These vast infrastructures, which leverage gravity and manual labour to effectively sort waste and remove contaminants, are mesmerising. The experience is enriching in that it not only conceptualises volumes of the discarded, but it also highlights that waste isn’t a singular entity. Waste is made of a wide variety of materials, with characteristics such as weight, shape, size and frictional capacity which react in different ways. Waste is dynamic, and individual responses to various forces are unique (Kachef and Chadwick, 2025). Within these facilities, the true agency and uniqueness of waste shine.

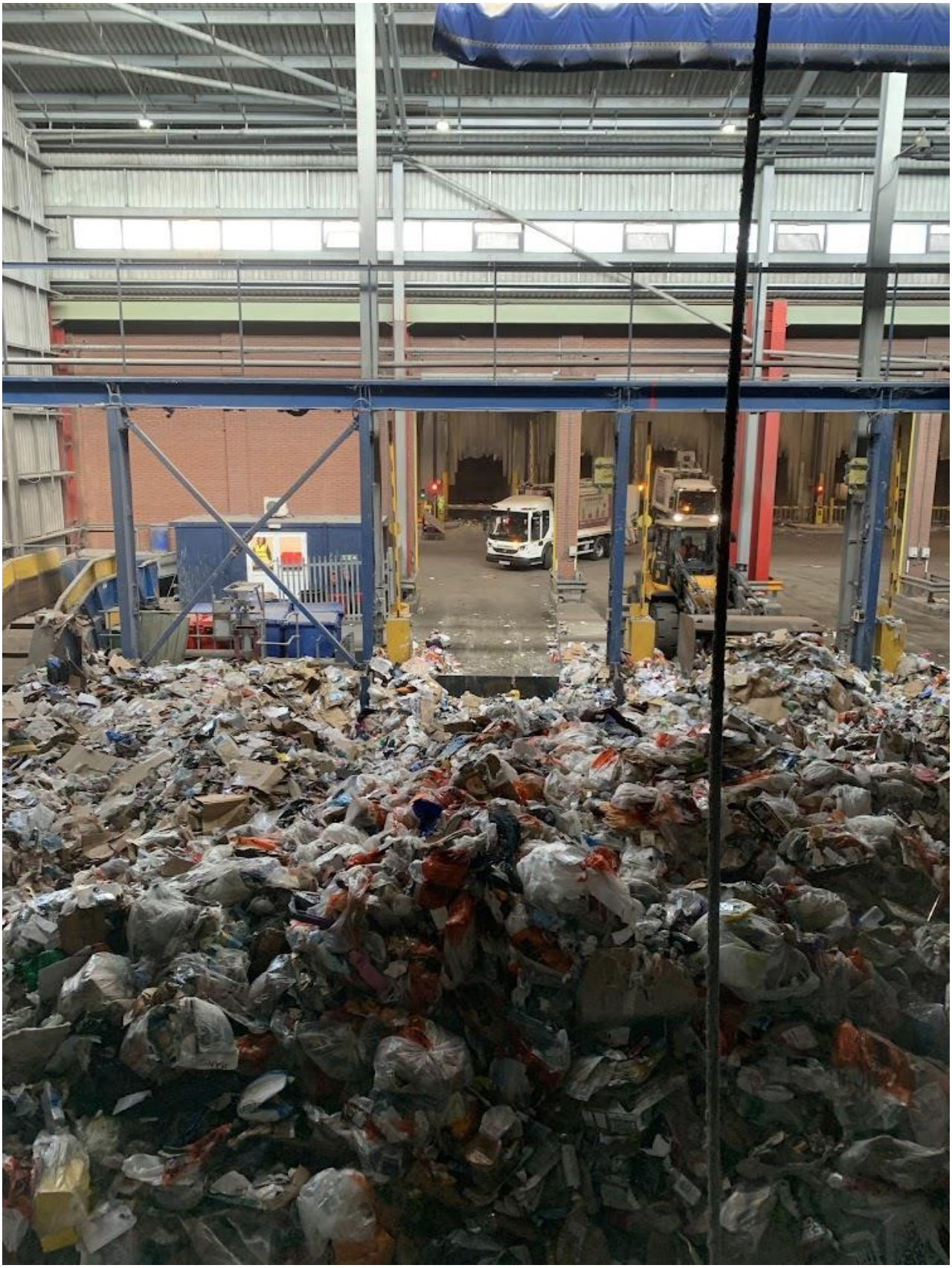

**Figure 2.** Within a few hours of the start of daily collection, the volume of waste deposited in this facility is staggering. By experiencing this accumulation, a deeper appreciation of individual contribution can be established.

It is, however, unfair to place responsibility solely on the individual. Regulation and legislative approaches often perpetuate this distance, admitting that waste is defined by attitude and not material value and quality. A truly closed circular future requires radical regulatory shifts which support households in their progress; top-down policies that maintain modern expectations of availability while supporting transitions are pivotal. For this to work, decision-making must be disruptive, breaking away from traditional approaches that accommodate wasteful behaviours and hide associated outputs. However, by accommodating public perceptions of waste, there is a level of stagnation among decision makers in establishing a waste-to-value system, translating to a lack of creativity in infrastructural innovation.

One such example is in approaches to enforcing circularity within the packaging waste sector. In establishing extended producer responsibility legislative frameworks, common practice continues to value the promotion and reward of characteristics of recyclability (DEFRA, 2026). This approach is, in essence, short-sighted, ignoring the loss of structural integrity during the recycling process. By focusing on what *has* been done, recycling, instead of what *could* be done, perpetuates the continued need for reinjection of materials into the system. Instead, a rethinking of the *purpose* and *structure* of packaging materials should be paramount, acknowledging negative repercussions and areas of loss within every step of the process, from extraction to transport, all the way to disposal and environmental intrusion.

This repetition of solutions that simply placate and do not address the root cause culminates in a mutually destructive spiral that avoids a sustainable future, sending us on a trajectory further away from closing the loop. It is only with radical and disruptive innovation that repositions items which become waste within these systems that progress can be achieved.

# 7. Conclusion

When treated with respect, waste has the power to save us. If left to run astray, it will unravel the balance that allows life, culture, and community to prosper. To move in the correct direction, we require a fundamental shift in what defines *waste* – specifically within personal, cultural, and regulatory spheres. Unfortunately, current understandings of waste are antiquated, disrupting our innate tendencies to work *with* waste and not against it.

A look at the history of items can unlock the qualities that define their negative characteristics and future impact. To command respect for waste, the true cost must be apparent, not only the disposal process, but the origin story as well. This includes an acknowledgement of the make-up of parent materials, the natural capital invested in extraction processes, as well as the social and environmental issues associated with labour and production ). A holistic understanding places waste in the centre of the Anthro-cycle, repositioning our responsibility in the cycle not as end users, but as fundamental agents within mechanisms of circularity. As it stands, progress towards a harmonious future with waste lacks creativity, simply repeating broken systems of the past. In essence, waste is useful, and we should name it as such; waste is not a waste, it is an opportunity.

**Acknowledgements** The authors would like to thank King's Culture, whose efforts to establish creative collaborations with researchers brought them together.

**Author Contributions** Conceptualisation: RLK, GCK. Writing – original draft: RLK. Writing – review and editing: RLK, GCK.

**Funding** No funding was received for this publication.

# Declarations

**Competing Interests** The authors declare no competing interests.



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