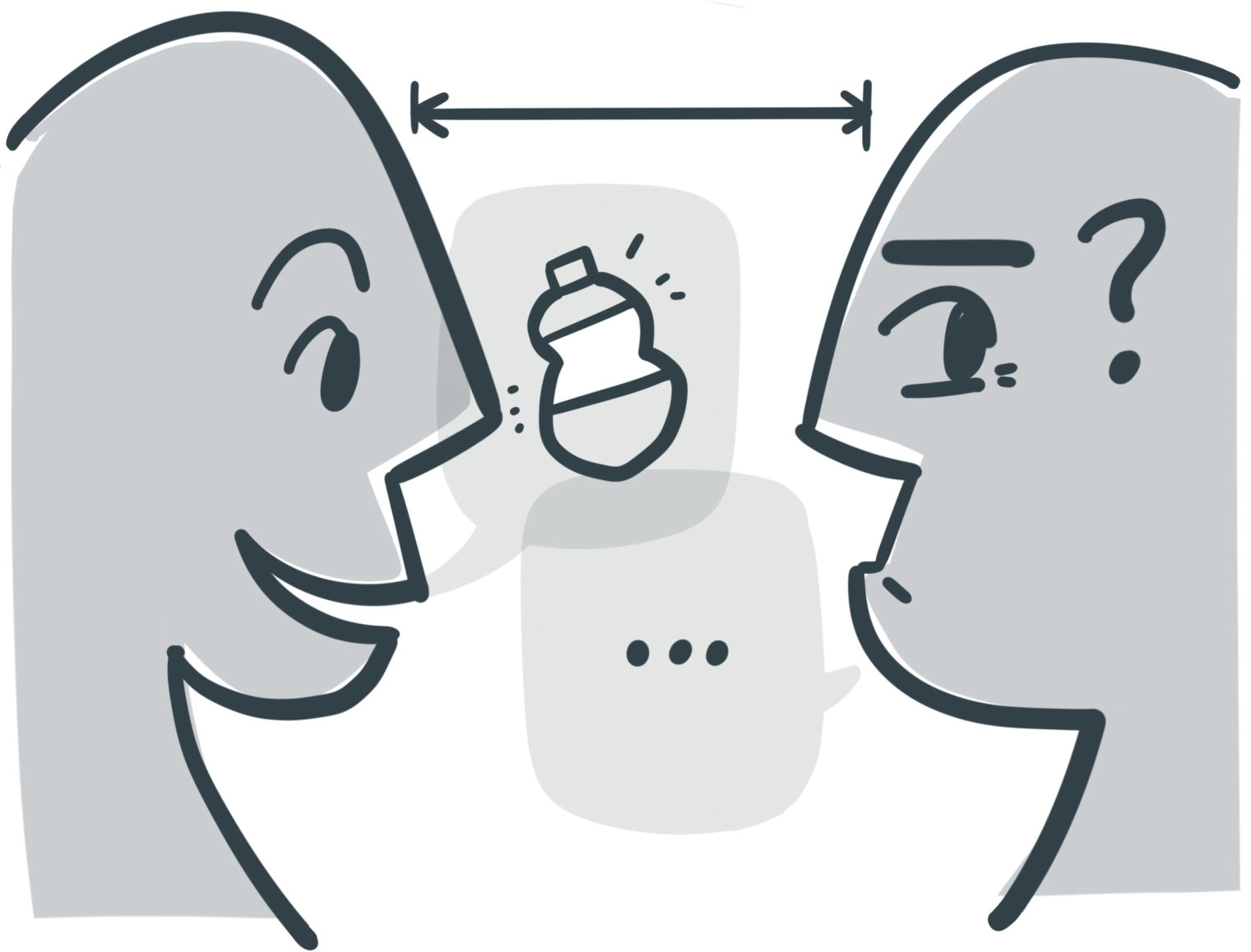


Rethinking the Attitude-Behaviour Gap



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Glossary and Key Terms

Circular economy - the term used by various stakeholders with slight variations to emphasise a holistic approach to reducing plastic pollution by considering impacts and activities throughout the entire lifecycle, both before and after consumption. This approach involves retaining resources through circular systems of reuse and recycling, rather than disposal.

CIWM - Chartered Institution of Wastes Management.

DRS - Deposit Return Scheme.

EPR - Extended Producer Responsibility.

HDPE - High Density Polyethylene.

IOM3 - The Institute of Materials, Minerals and Mining.

Mono materials - packaging made from one polymer (or other material) only, without additional material layers, components or adhesives that make separation and reprocessing more complex.

NERC - Natural Environment Research Council, the UK's leading public funder of environmental science research aimed at advancing scientific breakthroughs, sustaining natural resources, predicting and responding to natural hazards, and understanding environmental change.

Net Zero - a policy term to denote the aim to reduce greenhouse gas emissions as much as possible, with the remaining amount produced being offset via carbon sinks or carbon capture schemes, in order to address the climate crisis.

Non-target materials - materials that can be recycled but are not identified as target material by a Material Recycling Facility that receives them¹.

NGO - Non-Governmental Organisation.

OPRL - On-pack Recycling Labels. OPRL Ltd is a not-for-profit company limited by guarantee.

PET - Polyethylene terephthalate.

Polymers - any class of natural or synthetic substances made of macromolecules, which are multiples of monomers, e.g. cellulose, proteins, nucleic acids, plastics, rubber, concrete, glass, and paper are polymers.

PPiPL - Plastic Packaging in People's Lives.

REACH Regulations - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulations.

Social and environmental life cycle assessments (S-LCA) - assessment technique to evaluate the social and socio-economic dimensions of products, tracing their impacts across the life cycle, from extraction and processing of raw materials to final disposal, passing through manufacturing, distribution, use, reuse, maintenance, and recycling².

SUPP - Single use plastic packaging.

Target materials - material/s identified by a receiving Material Recycling Facility for separation from other waste materials and/or to produce bulk quantities of specific materials¹.

UKPP - UK Plastics Pact, a national voluntary initiative that brings together businesses from across the plastics value chain with government and NGOs to address plastic waste.

Virgin feedstock - petrochemical feedstocks, derived from fossil fuels (e.g. crude oil and natural gas).

Virgin plastic (packaging) - plastic packaging composed of virgin feedstocks that have been extracted, refined and processed.

Wishcycling - the process of depositing items in recycling bins in the hope that they will be recycled, without having a clear understanding of whether such items are recyclable.

WRAP - Waste and Resources Action Programme.

Executive Summary

Challenge

Plastic pollution is an urgent concern globally, sparking debates about its environmental impact, health consequences, and the efficacy of alternative materials. The UK Plastics Pact was developed to support the elimination of unnecessary single-use packaging and increase the reusability, recyclability, and compostability of packaging by 2025. But how do we ensure the UK Plastics Pact is achieved? Our research examines various dimensions of this issue, shedding light on challenges and potential solutions across the plastic value chain.

Methodology

The project used different research methods to gather insights and drive meaningful change towards sustainable packaging practices. This included: an extensive literature review, a household ethnographic study, in-depth interviews with industry experts and representatives, workshops, case studies, site visits, and pilot projects in collaboration with industry partners.

Collectively, these actions aimed to map the landscape of plastic packaging; explore, understand, and appreciate the perspectives and practices of a broad array of stakeholders; and implement actionable initiatives to reduce plastic usage.

Key findings

Across the project, five recurring themes frame the core issue of plastic pollution along the value chain.

+ Moralities and paradoxes of plastic

- Plastic pollution is central to complex moral debates about the role of food plastic packaging in globalised food systems.
- Household research suggests that prioritising the reduction of food waste takes precedence over reducing reliance on plastic packaging for food.
- Supply chain research reveals how most types of alternative food packaging also pose environmental challenges.
- Waste management research indicates that over-emphasising plastic recycling may hinder net zero targets.

+ Identification as a tacit and experiential activity

- On-pack recycling labels and terminology used can be confusing for consumers.
- This leads to consumers often relying on tacit and experiential knowledge to distinguish between recyclable and non-recyclable packaging.

- A basic 'knowingness' about recycling plastic food packaging prevails across the value chain, especially when operating under time-pressured conditions.

+ Convenience

- As consumer and market practices evolve, so too does their reliance on the material functionality of food plastic packaging.
- The convenience of plastic-packaged foods is embedded in consumers' everyday lives.
- Retailers attempt to create shifts in consumers' food shopping and storage habits to decrease reliance on single-use plastic. Yet, these innovative systems may cause inconvenience for consumers.
- From a waste management perspective, there is a considerable amount of work that takes place out of the public eye to maintain levels of convenience for household recycling.

+ Contamination

- Household-level contamination volumes are central to discussions aimed at enhancing local council recycling rates.
- Our supply chain organisations emphasise the importance of avoiding contamination at source (e.g. packaging design).
- Consumer concerns about household contamination can lead to recyclables being either discarded in the general waste bin or placed in recycling bins unwashed.
- Incorrect disposal of food plastic packaging contaminates recycling streams, potentially degrading the value of recycling pathways.
- Different forms of contamination can emerge at different stages as food plastic packaging moves through the value chain.
- Inconsistency in waste collection services across UK councils further complicate matters.

+ Extending from private to public practices

- Domestic practices impact on and are impacted by public practices related to plastic.
- Consumers designate informal spaces at home for recycling.
- In their public lives, consumers are detached from their household routines and exposed to different workplace waste regimes and regulations, amplifying confusion and contamination.
- For waste management, the competition for space and resources among waste and recycling operations, alongside more attractive and profitable land uses, significantly shapes waste management practices.

Recommendations



National Level: Voluntary and Public

1. Communication campaign to rethink the role of plastic
2. Reframe UK Plastics Pact targets
3. Continue to promote collaboration for wider packaging sustainability

Policy: Central Government

1. Net Zero Future
2. Prioritise waste prevention
3. Widen simplification and uniformity

Policy: Local Government

1. Communication campaign
2. Optimise community bonds

Supply Chain: Producers and Brands

1. Packaging design and labelling
2. Protection-oriented packaging
3. Educate, consult, involve, and learn from consumers
4. Transparency regarding the environmental and social impacts of packaging
5. Waste prevention and reduction

Consumers and Households

1. Paying attention to plastic packaging when purchasing food
2. Washing recyclable resources
3. Regular checks of local authority guidance
4. Share best practice with the community

Waste/Resource Management

1. Future resource-use
2. Showcasing polymer recycling

Implications for other packaging contexts and future UK Plastics Pact Agreements

Extending the insights from this work to consider the broader applications in various contexts and materials, the findings serve as a roadmap for future considerations. Key lessons learned, applicable to other packaging contexts, include addressing moral responsibilities, understanding functional aspects, refining identification processes, enhancing ease in closing the recycling loop, and empowering consumer agency. These insights provide valuable guidance for dealing with different types of plastic materials, thereby ensuring a comprehensive approach to developing sustainable packaging solutions in different contexts.

Resources

CONSUMERS:

- + Cartoon - Moral subordination of plastic waste to food waste.
- + Little Book of Plastic Packaging in Everyday Lives.
- + Video - Sort, Wash and Squash.
- + 7 blogs on tips to go plastic free.
- + Graphic of disposal bread bag, milk bottle and microwave tray.

CONSUMERS, INDUSTRY, AND POLICY

- + 6 videos - Responsibility and Plastic Packaging: Exploring the issues for the packaging supply chain.

INDUSTRY AND POLICY:

- + Rethinking the attitude-behaviour gap.
- + Mapping the plastic packaging landscape.
- + Sustainable Packaging Innovation: Hampered by the Consumer Attitude-Behaviour (A-B) Gap?
- + Household Recycling: Managing Plastics at the Home & Hearth.
- + Waste (Resource) Matters.
- + 54 Degrees - The Pressing Problem of Plastics.

Future research

Future research agendas emerged from our study, aiming to support transitions towards sustainable packaging solutions, including: mapping alternative packaging landscapes; examining perspectives on convenience in alternative food packaging; exploring household relationships with waste containers; investigating simplification policies in public and commercial spaces; and, analysing circular material and social flows in plastic recycling streams to understand their efficacy and implications for a sustainable world.

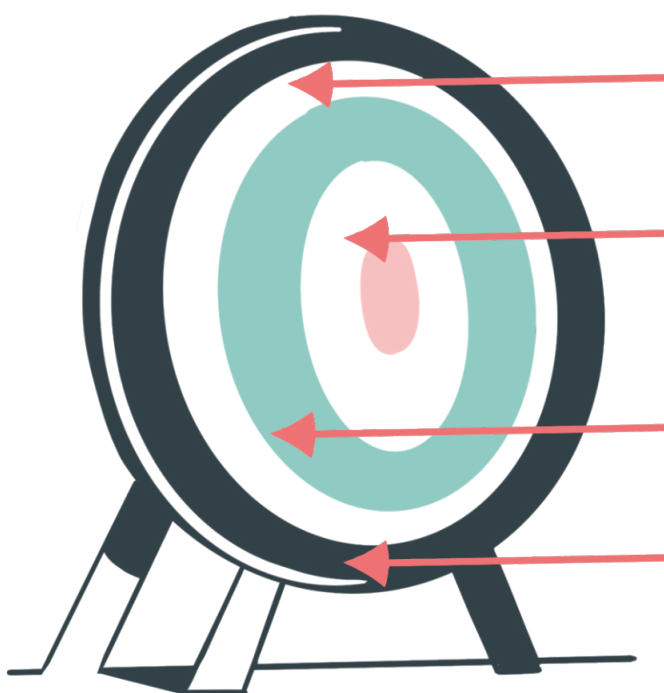
Plastic Packaging in People's Lives Project Background

The problem of plastic packaging: The UK Plastics Pact

Approximately five million tonnes of plastic are used annually, with almost half of that used for packaging³. Plastic is the third most common material in tonnage for packaging⁴, and yet it is one of the least recycled. Despite the critical environmental implications of the excessive use of plastic⁵, plastic production and consumption continue to rise⁶. Managing and reducing plastic waste is a significant challenge for society today⁷.

To address this challenge, the UK Plastics Pact, led by the organisation Waste and Resources Action Programme (WRAP), has brought together UK government, businesses, and NGOs to commit to eliminating unnecessary single-use packaging. As well as reducing single-use packaging, the pact aims to considerably increase reusability, recyclability, and compostability of plastic packaging by 2025⁸.

The UK Plastics Pact targets



ELIMINATE PROBLEMATIC OR UNNECESSARY SINGLE-USE PLASTIC PACKAGING

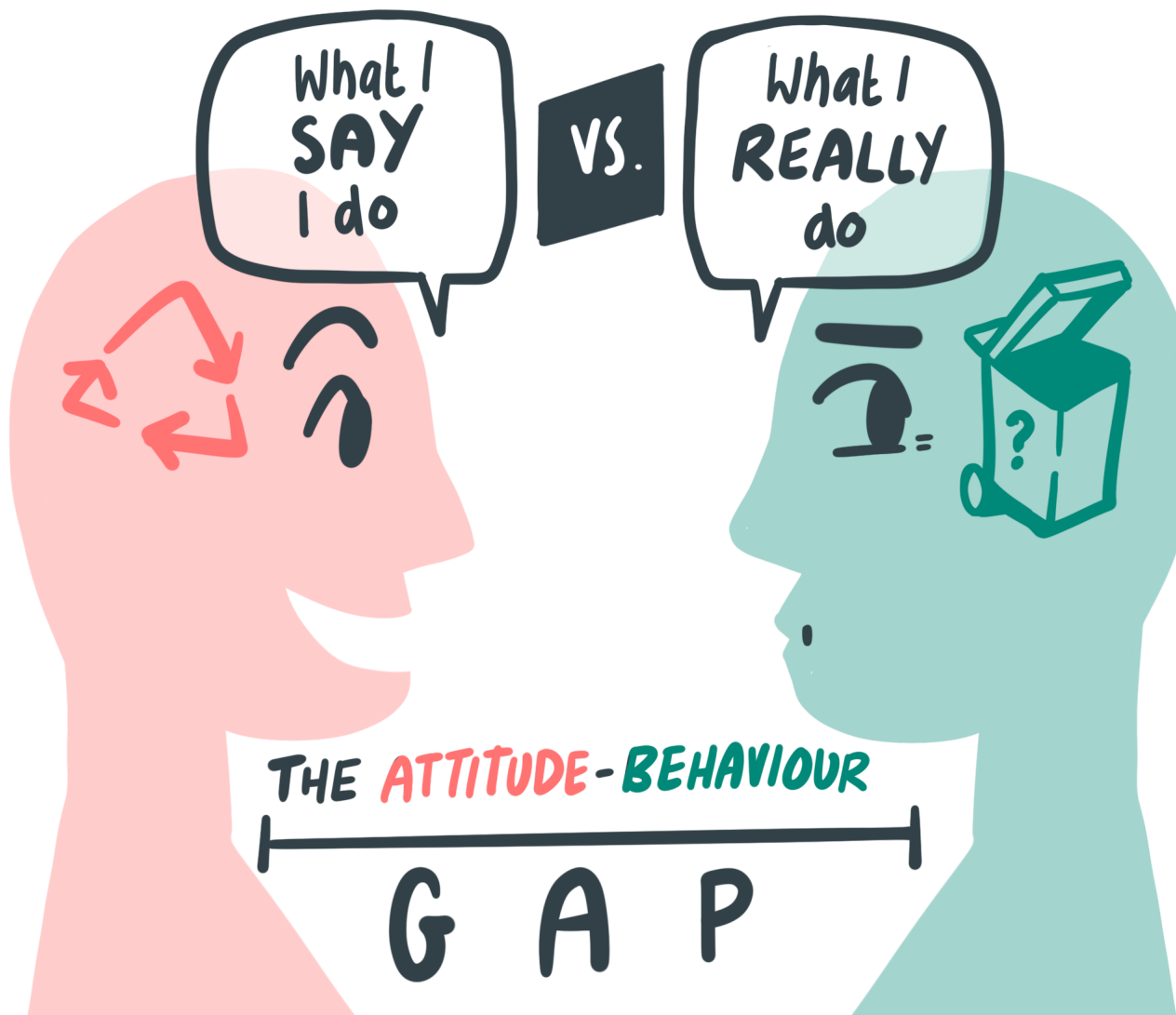
100% REUSABLE, RECYCLABLE/COMPOSTABLE

70% RECYCLED/COMPOSTED

30% RECYCLED CONTENT

Despite the ambitious targets and the ongoing public discourse about the environmental and societal impacts of plastic, academic research suggests that actual consumption practices remain largely at odds with consumers' views about plastic packaging⁹. This points towards an attitude-behaviour (AB) gap and highlights a lack of understanding of the factors that shape, influence, and contextualise this gap.

In this report, we outline the key findings from our project. We used a range of research methods to comprehensively address sustainable packaging, by understanding consumer behaviour, analysing supply chain and waste management responses, and implementing actionable initiatives. We propose a set of recommendations to reduce plastic usage, and contribute towards the UK Plastics Pact goals.



The policy landscape



1990

The statutory responsibilities for waste management in England are set out in the 1990 Environmental Protection Act. Waste collection duties are allocated to Waste Collection Authorities, while Waste Disposal Authorities handle waste disposal responsibilities and are required to treat waste¹⁰, prioritising methods with the least environmental impact. Recent government policies prioritise waste reduction and follow the waste hierarchy.

The 2021 Environment Act sets a target to reduce residual waste per person by 2042 to 2019 levels.

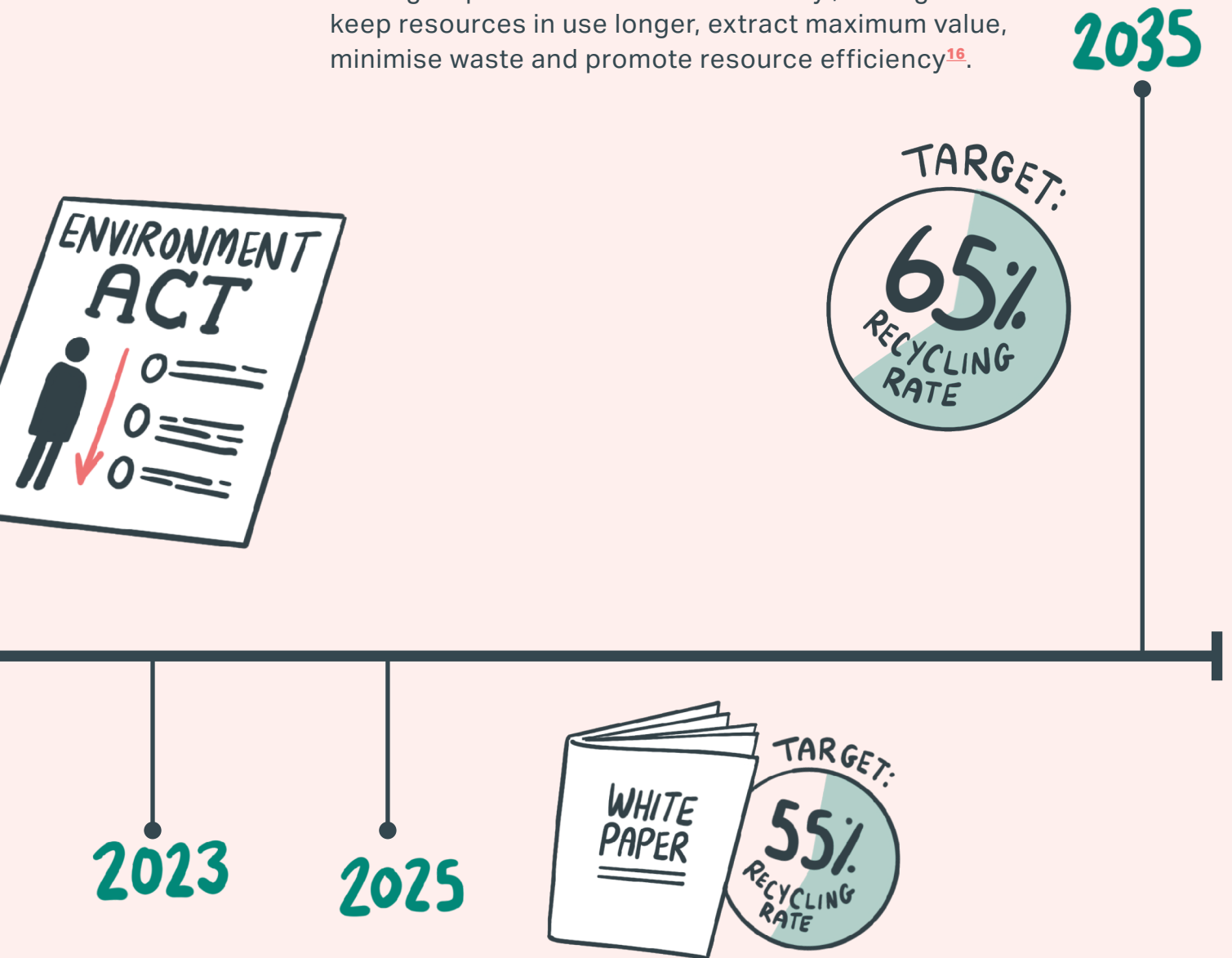
2021



2018

This includes the 2018 25-year Environment Plan¹¹, the 2018 Resources and Waste Management Strategy for England and the 2021 Environment Act¹². These policies aim to eliminate avoidable waste and include a ban on single-use plastics implemented in October 2023.

A 'new simpler common-sense approach' to recycling¹⁴ - allowing individuals across England to recycle the same materials in their homes, workplaces, and schools - is to be introduced, accompanied by tougher regulations¹⁵. Government policies and strategies promote a 'circular economy', aiming to keep resources in use longer, extract maximum value, minimise waste and promote resource efficiency¹⁶.



A 2023 government white paper Waste Prevention Programme for England: Maximising Resources, Minimising Waste emphasises reuse systems. However, no significant reduction in tonnage of household waste has been achieved¹³.

Recycling targets have been set for local authorities, with current targets of at least a 55% recycling rate by weight by 2025, and 65% by 2035.

'Closed loop' recycling is a key part of the circular economy, where materials are reprocessed and remade into the same products they came from (e.g., creating HDPE milk bottles from HDPE milk bottles). This is generally more environmentally beneficial than 'open loop' recycling, which converts materials into different products (e.g., HDPE bottles to pipes)¹⁷. However, in most cases recycled content replaces virgin feedstock only partially rather than completely¹⁸.

In 2022, the UK Government introduced a Plastic Packaging Tax on plastic packaging containing less than 30% recycled content to encourage the use of recycled content in packaging.

The concept of 'food grade' or 'food contact' standard recycled content has recently been a source of EU policy development¹⁹. Food safety legislation and legislation such as the REACH Regulations on chemical use²⁰ mandate that packaging manufacturers comply with stringent standards for food packaging and when incorporating recycled content that will be, or could be, in contact with food.

Plans for an Extended Producer Responsibility (EPR) scheme and a Deposit Return Scheme (DRS) are being developed at the time of writing.

Intersections with other policy goals such as Government commitments to address the climate crisis and reach 'net zero' to decarbonise the economy by 2050, have influenced debates about plastic packaging and its management. These debates have directed focus towards the subjects of carbon emissions and food waste²¹. The subjects have been used to advocate for the retention of plastic packaging but also to move more quickly to reuse systems and to local food production and distribution.

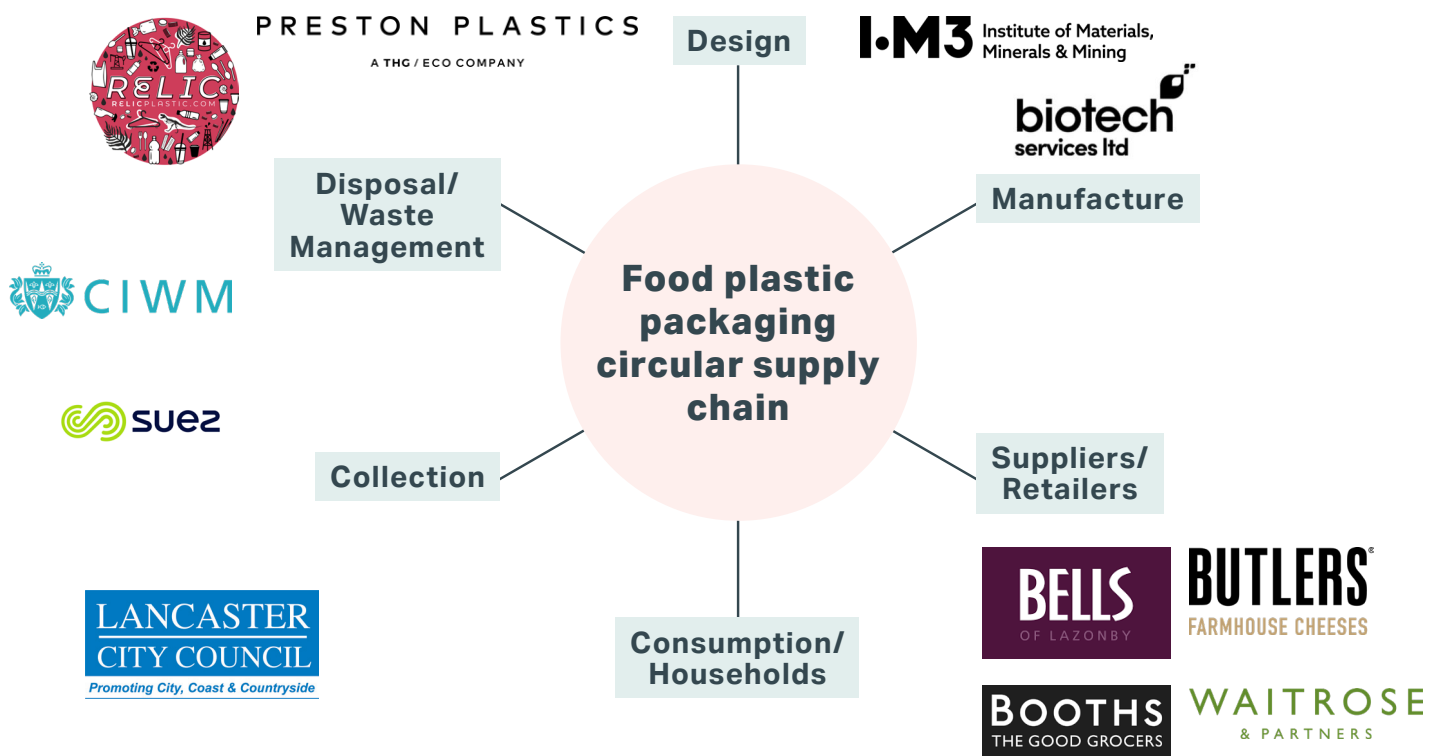
While Government can set recycling targets, it is the market that largely decides what happens after collection. Company activity is shaped by regulatory requirements, financial stimuli such as the Plastic Packaging Tax, voluntary engagement with Government research collaborations and innovation funds²² as well as collaborative opportunities such as those provided by the UK Plastics Pact.

Research Approach

Our research: Plastic Packaging in People's Lives (PPIPL)

Lancaster University's Plastic Packaging in People's Lives (PPIPL) project is a collaborative project with Lancaster University researchers specialising in consumer insights, supply chain management, waste management, and material science, working with eleven

industrial partners. Funded by the UK Research and Innovation (UKRI) Natural Environment Research Council (NERC), our aim is to fundamentally rethink consumer attitudes and behaviours around food plastic packaging.



A driving question for our research is how do we rethink the consumer attitude-behaviour gap? We completed five studies to answer this question.

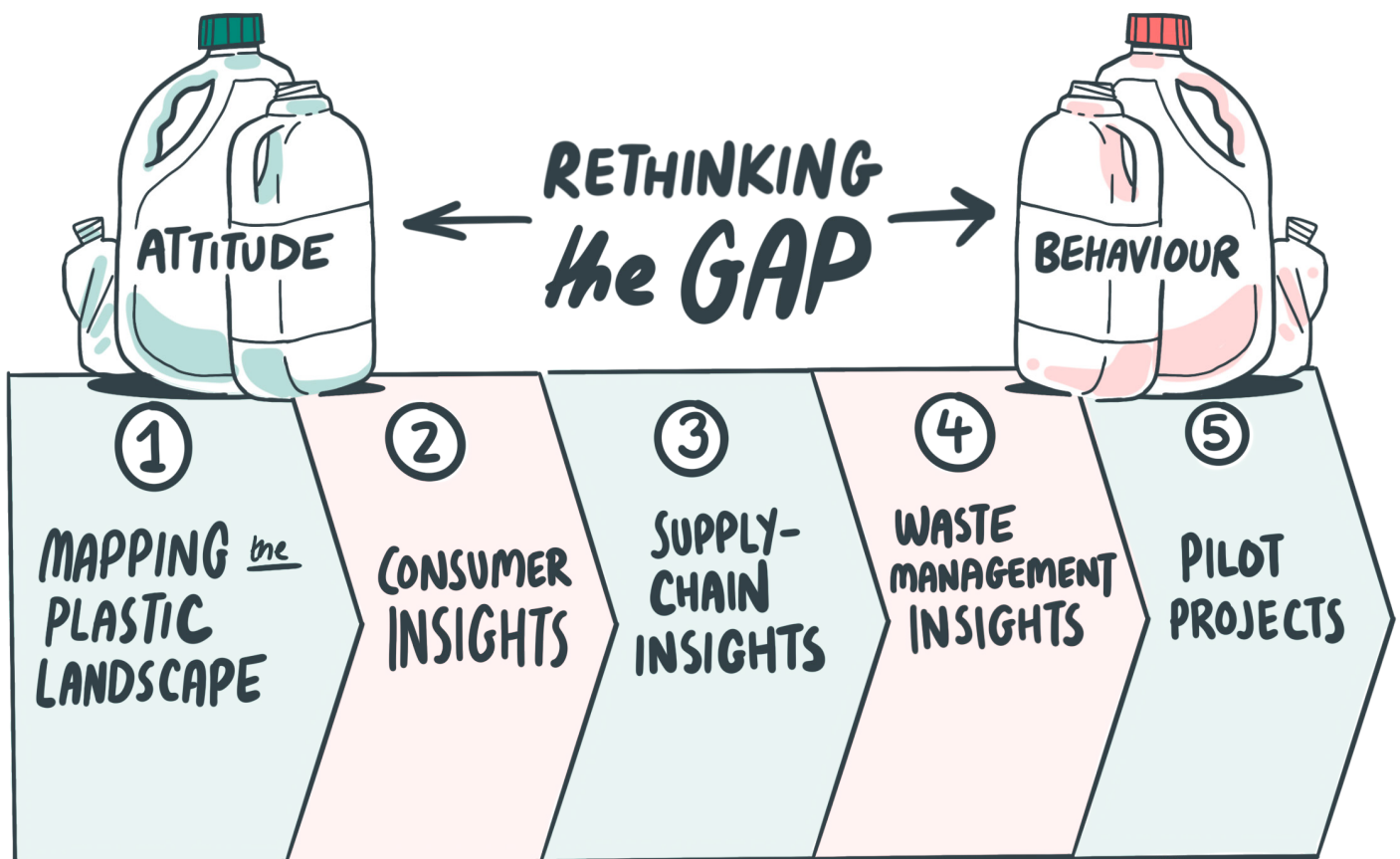
The multi-disciplinary project team gathered insights to enable policymakers, industry-professionals, and consumer households to critically rethink, recontextualise, and reimagine the gap that exists between consumers' attitudes to plastic packaging reduction and their actual enacted behaviours. By drawing upon a range of empirical, historical, and observational data, the life-course of plastic packaging in the UK was traced to identify, problematise, and map solutions to the key pinch points that inhibit the drive towards cleaner, greener growth.

Our approach

This research focuses on understanding how consumption - in its various forms - impacts, and is impacted by, decisions across value chains and throughout society. We have explored how consumption impacts, and is impacted by, both the day-to-day decisions people make, and the way supply chains are set up.

Across different parts of the UK, we undertook consumer interviews and household studies, stakeholder interviews and workshops. We also had a series of site visits with supply chain and waste management stakeholders.

In total, 91 organisations and 552 people have participated in the project.



Summary of data collection

STAGE	APPROACH	OUTCOME
Mapping the landscape	Literature review: 120 sources (white/grey literature, media).	Map of the socio-cultural, historical, legal, and industrial conditions leading to the perceived legitimacy and normalcy of plastic packaging material in the UK.
Consumer insights	<p>Literature review.</p> <p>27 household studies (6 weeks per household) in two 2 UK counties (one in the North, one in the South).</p> <p>15 one-to-one conversations between household members and a chemistry expert.</p>	Generated a deep understanding of the personal and social context to consumer attitudes and enacted behaviours with packaging materials.
Supply chain insights	<p>Literature review.</p> <p>34 stakeholder interviews.</p> <p>3 industrial workshops (19 supply chain stakeholders).</p> <p>2 food processor case studies (cheese and meat) took place over 3 months and 6 months respectively (22 supply chain stakeholders involved).</p> <p>34 organisations.</p>	Deep analysis of multiple supply chain stakeholders' responses to customer attitudes and behaviours. Map of the mechanisms for collaboration across the circular supply chains and sectors to drive change.
Waste management insights	<p>Literature review.</p> <p>32 stakeholder interviews.</p> <p>5 workshops (71 industry and waste experts).</p> <p>28 site visits with 29 participants.</p> <p>65 organisations.</p>	Deep understanding of the values attributed to plastic packaging waste and disposal practices by everyday experiences from waste management.
Insights into action: Pilot Projects	<p>Pilot interventions with 2 partners.</p> <ul style="list-style-type: none"> + Sort, Wash and Squash (community engagement intervention with local City Council). A door-to-door survey involving 77 households. + Recyclate Matters for Whom? (in-store intervention with retailer). A consumer survey at two retail sites involving 240 consumers. 	<p>Actionable insights for authentic consumer and business behaviours across the supply chain; sustainable change measures to significantly impact on consumer demand and use of plastic packaging.</p> <p>Developed new ways of influencing the attitude-behaviour gap in relation to plastic packaging.</p>

Key Findings

1. Moralities and paradoxes of plastic

- + Plastic pollution is central to complex moral debates about the role of food plastic packaging in globalised food systems.
- + Household research suggests that prioritising the reduction of food waste takes precedence over reducing reliance on plastic packaging for food.
- + Supply chain research reveals how most types of alternative food packaging also pose environmental challenges.
- + Waste management research indicates that over-emphasising plastic recycling may hinder net zero targets.



When it comes to recycling, consumers are under too much pressure. Responsibility should be spread across the plastic value chain, and producers should take more responsibility.

(Waste Management Workshop 3)

Diverse perspectives on plastic's durability and characteristics - intertwined with its environmental impact, health implications, and the efficacy of alternative materials - underpin **complex moral debates** regarding plastic's role in our globalised food production-consumption systems. Plastic pollution, denoted as the presence of harmful materials in the environment, constitutes a key aspect of these debates.

However, the concept of pollution takes on different meanings depending on the research perspective. In our study, we move beyond a purely scientific definition of pollution and acknowledge the symbolic weight of pollution. We recognise plastic pollution as a threat to nature, communities, businesses, households, and individuals alike.

Our landscape mapping shows a growing public concern, fuelled by media reports, about the implications that plastic can have on wildlife, our ecosystems, and the natural environment, more broadly. Pollution from this perspective is understood as the effect of plastic as a harmful material damaging our environment. Consistent with our landscape mapping, our household study reveals that consumers care about the environment and the impact that plastic food packaging can have on the environment. Alongside this, our household study revealed how the moral outrage over food waste overshadows concerns about plastic waste. As a result, plastic waste reduction gets sidelined.

A recurring theme emerged highlighting the environmental benefits of **alternative packaging**, but challenges remain, including confusion with traditional plastics and the absence of a dedicated recycling infrastructure for handling alternative packaging materials.

Our supply chain research indicates that most alternative packaging materials come with inherent environmental challenges. While the push to reduce the reliance on food plastic packaging is evident, supply chain stakeholders emphasise that there is a need for clarity regarding the circumstances under which food packaging alternatives are the preferred option.

Diffusion of innovations, particularly related to plastic packaging and its alternatives, can encounter several challenges. These can range from initial cost and convenience considerations, through to the challenge of aligning incentives across the supply chain. Additionally, ensuring that alternative packaging solutions maintain product functionality while achieving sustainability goals can be a complex balance.

When consumers are presented with plastic packaging made from recycled content, there is a tendency to view recycled plastic packaging as environmentally friendly. But there remain persistent issues around misinformation and lack of trust, which lead to consumer confusion. There is a need to build trust among all members of the value chain, to address these questions and promote responsible plastic use and disposal.

From our waste management research, when efforts to alter consumer behaviour fall short, there is a notable trend of **shifting the responsibility and moral obligation** to address disposal and recycling issues onto other stakeholders in the value chain.

Despite the existence of the Competition and Markets Authority's Green Claims Code, intended to prevent misleading environmental claims on packaging, consumer interpretations may still be influenced more by socio-cultural beliefs than the information presented on packaging labels.

Our study of waste management pathways indicated that an exclusive **emphasis on plastic recycling may impede progress towards achieving net zero**. Greater emphasis on solutions beyond recycling, such as re-use and reduction strategies, is also needed. There is a lack of clarity about who is responsible for devising and implementing such solutions.

Key Learnings 1

While growing awareness of plastic pollution is crucial, effective action requires collective effort and clearly defined responsibility.

- + We need to address public knowledge gaps surrounding plastic types and solutions, beyond just recycling.
- + Clarifying roles and responsibilities across the chain is essential to navigate the complexities of reducing, reusing, and recycling plastics effectively.
- + Aligned with the resourcification argument²³, these insights suggest a potential shift towards a bottom-up approach, emphasising the household as the starting point and empowering consumers with agency over their roles in sustainable resource management.

2. Identification as a tacit and experiential activity

- + On-pack recycling labels and terminology can be confusing for consumers.
- + This leads to consumers often relying on tacit and experiential knowledge to distinguish between recyclable and non-recyclable packaging.
- + A basic 'knowingness' about recycling plastic food packaging prevails across the value chain, especially when operating under time-pressured conditions.

Identification of plastic packaging as a tacit and experiential activity emerged as a theme across all research activities. Visual inspections, conducted by both individuals and optical sensors in recycling machinery, as well as touch, intuition, and a sense



Because I feel like the plastic can just go in the plastic and then the other is paper, so I didn't understand why they don't [accept]. But I thought if I separated it they might take it. And I just feel bad putting it in the general waste...I feel like it could be recycled, and it seems like a waste of paper and plastic that could have been.

(Householder, 28, professional, semi-detached house)

of familiarity, emerged as mechanisms for consumers and employees to make decisions regarding product purchases, disposal methods and the perceived value of materials in the recycling process.

Our literature mapping highlighted the challenges consumers face when purchasing and disposing of products. **Labelling on plastic packaging can be confusing**, including guidance on alternative options such as biodegradables. Consumers frequently misunderstand what can be recycled, resulting in improper disposal of plastic waste and, in some cases, alternative materials.

In supply chain research, hospitality workers threw away dirty food plastic packaging instead of cleaning it, based on their work and home experiences, leading to putting it in the wrong waste bins. As found elsewhere in our research, this highlights the common challenge of confusion arising from conflicting information on food labels regarding the recyclability of different parts of the packaging for similar products.

Labelling confusion heightened when supermarkets declared acceptance of film and other items such as crisp packets, but the product labelling systems failed to align or comply with these guidelines. An illustrative example was given regarding a supermarket's own brand cereal labelled as recyclable. The inner lining of the cereal box could be returned to in-store collection for recycling, introducing additional confusion when compared to another seemingly similar brand that was without a 'recyclable' label.

In our household research, consumer identification of packaging indicated a **reliance on tacit or experiential knowledge bases**, as well as labelling, guidance from supermarkets/retailers and local councils. Examples were given where product labelling presented conflicting guidance, including a case where the same product and brand featured two different labels. While labelling and labelling uniformity can help with nudging consumer behaviour, our research reveals that recycling and identification are deeply ingrained in daily practices (habits) and become an unreflective process.

A basic **'knowingness' about recycling plastic food packaging** was discussed. Households appeared to base their food packaging disposal decisions on informal personal judgements and mental shortcuts, or heuristics. Consumers often rely on tactile cues, distinguishing between "hard" or "sturdy" plastic food packaging, perceived as recyclable, and "soft" or "flyaway" plastics, leading to the misconception that the latter is non-recyclable. Decisions based on tacit or experiential knowledge are subjective, leading to variations between households in what is considered recyclable; such judgments may be unreliable and outdated, potentially not aligning with the latest guidance from packaging labels or local councils, contributing to wishcycling (namely, the disposal of consumer waste in a recycling bin in the hope of it being recycled, when it cannot or is unlikely to be recycled).

In the waste management research, visual and tacit identification played a crucial role when collection crews, facing time pressures, made decisions about contamination levels in mixed dry recycling collections, determining whether the bin would be directed to residual waste or recycling. Work experience played an integral role, as individuals knew by looking at the bins whether they could be recycled. In addition, employees referred to tactile tests, such as "stretch tests," to aid in the identification of plastic packaging. The operation of recycling machinery also depended on individuals identifying non-target materials that could potentially cause equipment breakdown.

Key Learnings 2

Acknowledging that consumers and employees rely on tacit and experiential knowledge for identifying plastic packaging highlights the importance of ongoing efforts to design packaging that is visually and tactilely recognisable as recyclable.

It emphasises the continuous development of uniform and consistent labelling and the necessity for a shared understanding across the value chain to prevent losses of recyclable material.

3. Convenience

- + As consumer and market practices evolve, so too does their reliance on the material functionality of food plastic packaging.
- + The convenience of plastic-packaged foods is embedded in consumers' everyday lives.
- + Retailers attempt to create shifts in consumers' food shopping and storage habits to decrease reliance on single-use plastic. Yet, these innovative systems may cause inconvenience for consumers.
- + From a waste management perspective, there is a considerable amount of work that takes place out of the public eye to maintain levels of convenience for household recycling.



Produce is always a challenge. People always, for a customer perspective, they always talk about they like the look of loose, but they want the convenience of prepacked. They don't want to have to pick up five separate apples. They want to pick up a bag with five apples. It's just quicker and more convenient for them.

(Buying Packaging Manager, retailer)

Changes in food plastic packaging continually shape consumer and markets expectations regarding packaging standards. Equally, as **consumer and market practices have evolved**, they have become increasingly connected to and **dependent upon the material functionality of food plastic packaging**.

Our household research shows **how the convenience of plastic-packaged foods is embedded** in the wider context of consumers' everyday lives. For example, residents living in shared accommodation use individually packaged microwaveable vegetables to reduce their dependence on the communal kitchen for cooking and cleaning. Time-stretched consumers benefit from the ease of purchasing and consuming plastic-packaged goods as it gives control and efficient use of time, in the wider context of their personal and professional lives. Similarly, consumers with disabilities benefit from the labour-saving convenience of plastic packaged foods to make cooking activities easier.

From our work with supply chain stakeholders, we observe that retailers are developing systems to provide convenience through food packaging with lower levels of single-use plastic (SUPP) or designed for reuse. In doing so, they are helping consumers to reduce their reliance on SUPP. However, retailers have highlighted a challenge: consumers are hesitant to return or bring back their packaging to stores. This means that what appears convenient from the retailer's viewpoint (such as making packaging easy to return) can be inconvenient for consumers. While retailers and food producers are looking to alternative, more sustainable materials

for packaging, these same materials may not meet the consumer standard or idea of convenience. Tensions emerge in terms of the **pace of material innovation and evolving consumer perceptions and expectations regarding packaging and convenience standards.**

From a waste management perspective, convenience is described in terms of a system of space, time, and complexity:

- + boxes and bins must not take up too much room;
- + there cannot be 'too many bins' to make things confusing;
- + collection must not take too long.

This also applies to domestic waste collection settings, where consumers expect not to have to do too much work to manage their recycling. A significant amount of **work takes place**, out of the public eye, **to ensure household recycling remains convenient for the public.**

Key Learnings 3

Taken together, we see a picture where convenience is a key feature across the value chain.

- + The convenience of plastic-packaged foods in consumers' daily lives, coupled with challenges in reducing single-use plastic and the tension between sustainability and consumer expectations, highlights the need for user-friendly waste collection systems aligned with residents' expectations from a waste management perspective.
- + Devising solid recommendations and actions, that resonate with all stakeholders, is crucial for addressing convenience-related challenges across the value chain, extending from production to waste management.



4. Contamination: A recurring challenge

- + Reducing household-level contamination is crucial for improving local council recycling rates.²⁴
- + Supply chain organisations emphasise the importance of avoiding contamination at source.
- + Consumer concerns about household contamination can lead to recyclables being either discarded in the general waste bin or placed in recycling bins unwashed.
- + Incorrect disposal of food plastic packaging contaminates recycling streams.
- + Different forms of contamination can emerge at different stages of the food plastic packaging value chain.
- + Inconsistency in waste collection services across UK councils adds complexity.



We did a trial and we gave them all leaflets of what they were to put in the bag. We did 10 weeks and when we had the material there was everything in there. It was so contaminated. [...] Even though they were all told... people went to the houses, explained what you had to put in the bag, and they still did whatever they wanted to do.

(Director, reprocessor/converter company)

Contamination emerged as a major concern across all strands of our research. Contamination is the interaction between two or more materials (including food residue) that impacts upon the value of polymers for recycling.

Our supply chain research emphasises the importance of **avoiding contamination at its source**. Retailers invest time in educating staff about the potential value of packaging and the need for sorting and separation. Some packaging manufacturers design new packaging with mono-materials to enable separation and overcome material contamination.

Household research demonstrates how contamination materialises in the form of food residue and unpleasant food odours emanating from food plastic packaging. These odours symbolise disorder and can disrupt efforts to maintain a clean, ordered home. **Consumer unease about household contamination** translate into concerns about health, hygiene, and cleanliness. Worries about food bacteria residue and cross contamination lead some households to avoid rinsing potentially contaminated packaging altogether. **Consumers' reluctance to rinse soiled packaging** leads to either the recyclables being thrown into the general (residual) waste bin, reducing the volume of recyclable materials that are recycled at home; or they are placed in recycling bins unwashed, **contaminating the waste stream**.

Despite local council guidance informing households about packaging that can be recycled, the fate of recyclable food plastic packaging is partly determined by consumers' perceived risks of contamination and the steps required to mitigate against that risk. The spaces, systems, and practices surrounding recycling processes are critically important.

Consumers sometimes follow their own assumptions about what can and cannot be recycled and deposit non-recyclable food packaging materials in the household recycling bin, in the hope that they will be recycled. These wishcycling efforts cause contamination in household collection wagons, reducing efficiency.

Our waste management research shows that **incorrect disposal of food plastic packaging contaminates recycling streams, potentially degrading the value of recycling pathways**. This includes unwashed food plastic packaging, where residues can cause machinery problems and the subsequent loss of valuable materials, such as HDPE and PET. These materials may be redirected to lower value pathways, often through incineration. Consumers also contribute to contamination by mistakenly placing recyclable yet 'non-target' materials (e.g. a plastic bottle) into recycling collection points available at supermarkets, designed for flexible plastics. Although these items are recyclable, their incorrect disposal leads to contamination.

Different forms of contamination can emerge at different stages as food plastic packaging moves through **the value chain** from packaging design to household and public disposal to the various phases of sorting and separating. Contamination can transpire through multi-layer packaging, unwashed packaging and mixing target and non-target material together.

Our waste management research shows that bin collectors, often working long shifts, make momentary value judgements on the content of the bins. If not sorted correctly at the household, valuable materials are lost, and the waste is diverted

to low-value pathway. If concentration and attention lapses (with the long shifts) this too can result in the wrong bin being emptied in the wrong side of the wagon.

Inconsistency in waste collection services across UK councils adds complexity. Confusion among waste workers and businesses - due to a lack of standardised bin labelling and inconsistent waste collection services - contributed to unintentional contamination of recyclable materials. Recognising consumer difficulties with sorting complex and potentially unclean packaging, some supply chain stakeholders are implementing solutions. These efforts include simplifying packaging by adopting mono-material for the distinct parts of packaging.

Key Learnings 4

Contamination is a critical issue throughout the entire value chain, spanning packaging design, household and public disposal, and sorting phases.

- + Convenient but complex packaging can contaminate recycling systems designed for simpler, single-material categories.
- + Recyclable quality relies on packaging material properties and design choices made by manufacturers, retailers, and producers.
- + Sorting practices after household collection further impact the issue.
- + Focusing solely on household contamination overlooks how contamination is managed and reproduced along the whole value chain.

5. Extending from private to public practices

- + Domestic practices impact on and are impacted by public practices.
- + Consumers designate informal spaces at home for recycling.
- + In their public lives, consumers are detached from their household routines and exposed to different workplace waste regimes and regulations, amplifying confusion and contamination.
- + The competition for space and resources among waste and recycling operations, shapes waste management practices.



One of the things they have in [the City] is they have bins that have got like recycling on one side and then normal rubbish on the other side. But there's no definition of what goes into one and what goes in the other. So, every single bin that has a recycling compartment someone will put something wrong in there...But if you put a coffee cup in there with coffee inside it then now that whole bin is contaminated... And until the council wake up and put in some more stringent support then it's going to be a giant waste of time.

(Executive Chef, hospitality/restaurant)

Domestic practices impact on and are impacted by public practices related to plastic. The spatial and logistical constraints of recycling infrastructure can impede consumers and households from disposing of plastic packaging responsibly. Our landscape mapping research depicts ineffective waste management infrastructures as causing inconsistent processes in collecting, sorting, separating, and recycling plastic waste.

Our household research shows that **consumers designate informal spaces within their homes for recycling activities.** Recycling at home not only occupies valuable space, but it also requires time. Beyond washing and sorting and separating packaging materials into these informal storage spaces, additional logistical steps become necessary, contingent on the specific material earmarked for recycling. Consumers must transfer their stored packaging materials either to the external household recycling bin and/or to the public collection point. Some recyclable materials remain unrecycled due to consumers' reluctance to wash potentially contaminated packaging or endure unpleasant odours emanating from their informal storage spaces at home. Despite these additional steps, recycling at home functions effectively because these recycling activities and informal infrastructures are bound together and integrated into households' kitchen cleaning routines and everyday practices.

Household approaches to recycling are not always compatible with those outside the home, amplifying confusion and contamination. Although these informal storage spaces serve as mechanisms for routine household recycling activities, there is no assurance that food plastic packaging is consistently treated in the

same or a consistent manner beyond the confines of the home. **This translates into an extension of household routines into the public realm** as people commute to work, seeking similarities with their own household practices but often encountering the complexities of recycling in diverse locations. Exposure to different council regulations, workplace waste regimes, and various bin types (all while referencing their own household routines) has the potential to **amplify confusion about what can be recycled, where, and how**. In addition to this, beyond the home, consumers are detached from the recycling routines they have become accustomed to. Faced with these variations, some consumers tend to become complacent. Our supply chain research shows how this triggers unintentional contaminating practices, as sorting and separating waste becomes unclear in terms of space and logistics in the workplace.

In waste management, **the spatial and logistical barriers are amplified as organisations compete for space to store, sort, and separate materials**. As with households, commercial operations, public spaces, waste, and recycling infrastructures require considerable space and operational logistics to handle increasing waste volumes. Land is essential not only for end disposal sites (landfill and energy recovery facilities) and reprocessing plants, but also for waste storage and intermediate treatment (waste transfer stations, material, or plastic recycling facilities).

National waste management and self-sufficiency initiatives are crucial for addressing environmental and social concerns. However, one of the major challenges in waste management is the scarcity of suitable spaces, as they often

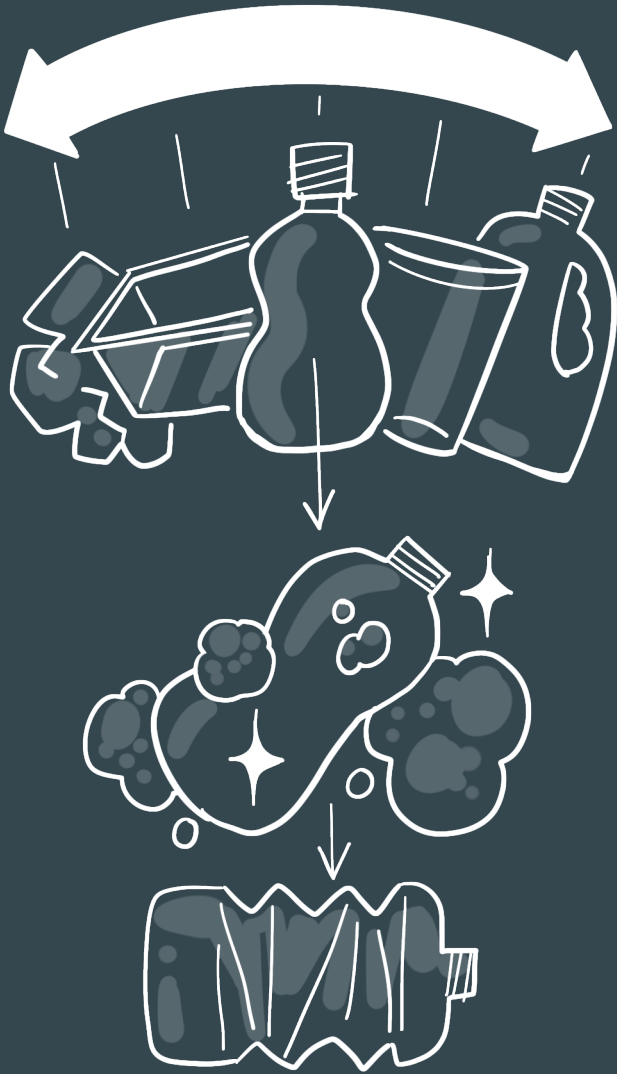
face stiff competition from more profitable land uses, such as housing developments that command significantly higher land values. The extension of domestic practices into the public sphere could account for why our 'mapping the plastic packaging landscape' research depicted ineffective waste management infrastructures as causing inconsistent processes in collecting, sorting, separating, and recycling plastic waste. While discussions often emphasise the need for convenient recycling systems at the consumer level, there may be less awareness among consumers as citizens about local and regional requirements for space. The implications of resource movements on the operational viability and environmental impacts of recycling systems may not be fully understood in the consumer mindset.

Key Learnings 5

The extension of private domestic practices to the public sphere highlights the ongoing need for uniformity, simplification, and standardisation of recycling practices to allow mechanisms that create routines to support prevention, reduction, and recycling.

- + Involving consumers in discussions about recycling plastic packaging could improve understanding throughout the value chain. Such inclusion will provide a way to ensure their routines are further examined, to collaboratively develop communications, and to support practices that help prevent waste, achieve a circular economy and meet net zero ambitions.

Spotlight



**SORT, WASH
and SQUASH**



**RECYCLATE
MATTERS
for WHOM?**

Spotlight

Introduction to Pilot Projects

From our research, we have identified five key themes underpinning the attitude-behaviour gap:

- + Moralities and paradoxes of plastic
- + Identification as an implied and experiential activity
- + Convenience
- + Contamination
- + Extending from private to public practices

Building on these key themes and working with our partners, we devised two pilot projects to explore potential interventions to bridge the attitude-behaviour gap in relation to plastic food packaging.

Sort, Wash and Squash

The first intervention, developed in collaboration with our local authority partner, merges insights on household and waste management recycling infrastructures to devise and implement interventions aimed at reducing contamination in kerbside recycling. Contamination, identified as a significant issue intersecting household and waste management infrastructures, manifests in distinct forms through household recycling practices, impacting both the volume and quality of recyclable materials collected for reprocessing.

Recyclate Matters for Whom?

The second intervention, co-produced with one of our retailer partners, explored consumer acceptance of recycled plastic packaging for own-brand food products in supermarkets. Focusing on food items packaged with recycled material and comparing them with similar products in virgin plastic packaging, this pilot initiative set out to explore consumers' perceptions, risks, and concerns regarding recyclate in food plastic packaging.

Spotlight

Pilot Project A: Sort, Wash and Squash

Pilot overview

- + Co-developed with local authority partner.
- + Explore households/residents' knowledge and engagement with sorting, washing, and squashing practices.
- + Two-phase door-to-door survey (11/2023 – 1/2024).
- + 74 households.

Narrative 1

Residents are washing & squashing more frequently due to the changes in frequency of recyclables collection.

Narrative 2

Residents continue washing & squashing even when uncertain about its effectiveness in managing their recyclables at home.

Narrative 3

Residents cease washing & squashing as these practices no longer help them in managing their recyclables at home.



Pilot overview

- + Co-developed with one of our retailer partners.
- + Explore consumer attitudes and views about plastic food packaging containing recycled plastic, including with visual imperfections.
- + Brief (<5 minutes) in-person consumer survey (09/2023).
- + 240 consumers surveyed across 2 retail sites.

Immediate impressions:

Consumers prefer packaging with recycled content, prioritising recycled content and environmental concerns.

Appearance:

Environmental impact and recyclability are the main concerns for most consumers.

Health risks:

Lack of clear understanding and trust regarding recycled plastic. People want more information and have concerns about potential health risks associated with the recycling process itself.

Environmental impact:

Consumers are concerned about long-term effectiveness, energy consumption, and potential downsides of recycling and plastic packaging.

Recommendations



National Level: Voluntary and Public

1. Communication campaign to rethink the role of plastic
2. Reframe UK Plastics Pact targets
3. Continue to promote collaboration for wider packaging sustainability

Policy: Central Government

1. Net Zero Future
2. Prioritise waste prevention
3. Widen simplification and uniformity

Policy: Local Government

1. Communication campaign
2. Optimise community bonds

Supply Chain: Producers and Brands

1. Packaging design and labelling
2. Protection-oriented packaging
3. Educate, consult, involve, and learn from consumers
4. Transparency regarding the environmental and social impacts of packaging
5. Waste prevention and reduction

Consumers and Households

1. Paying attention to plastic packaging when purchasing food
2. Washing recyclable resources
3. Regular checks of local authority guidance
4. Share best practice with the community

Waste/Resource Management

1. Future resource-use
2. Showcasing polymer recycling

National Level: Voluntary and Public

Communication campaign to rethink the role of plastic. Forge stronger partnerships between the public sector and voluntary organisations to launch communication campaigns, taking into account the experiential way in which individuals learn. These campaigns should aim to clarify misconceptions about packaging sustainability, how solutions work in reality and the fate of plastic waste. These could emphasise the benefits of waste reduction, reuse, and refill systems over traditional recycling, for example. WRAP would be ideally placed to run such a campaign, if supported by Government funding.

Reframe UK Plastics Pact targets.

A clearer stance on targets for reusable, compostable or recyclable outcomes is needed due to tensions with the 2018 targets. Collaborative partnerships between WRAP, waste management bodies, land use planning, and innovation funding programs can facilitate capacity-building discussions about infrastructures. This will complement work on packaging choices across the value chain.

Continue to promote collaboration for wider packaging sustainability.

Promote non-packaging systems and wider packaging sustainability discussion across material-specific trade, advocacy, and other bodies to identify actions beyond any vested material interest. Discussions could shift to the function, replacements, and how Sustainability Life Cycle Assessments can assist with engaging with sustainability on a broader scale to include social dimensions (e.g. skills, employment, communities)²⁵.

Stakeholders could include NGOs, professional networks, and think tanks, for example WRAP, IOM3, CIWM, RECOUP, the Consumer Association, OPRL, Ocean Generation, and the Ellen MacArthur Foundation and be supported by Government funding and voluntary contributions for environmental/climate issues.

Policy: Central Government

Net Zero Future. Central Government should develop a cohesive government vision that aligns plastics packaging reduction and circular economy principles with the broader net-zero objectives. This vision should reflect the systemic changes necessary for reducing reliance on plastic packaging, inspired by historical shifts in consumer behaviour and market structures.

Prioritise waste prevention. Central Government should emphasise waste prevention in line with WRAP's guidance. This includes advocating for the elimination of single-use packaging and the expansion of reuse systems, consistent with the goals set in the Environment Act 2021 for waste reduction and recycling.

Widen simplification and uniformity.

Central Government should widen the simpler 'common sense approach' to recycling to public places and commercial spaces and include national standard for recycling bin signage and colours to support the Environment Bill's provisions for consistent recycling across England. To introduce simplification will require technical modifications, new infrastructures, consumer awareness, necessitating funding and collaboration and coordination across the value chain.

Policy: Local Government

Communication campaign. Local Government should run awareness campaigns that could help consumers understand recyclability, contamination, and waste distinctions. This should not compete with the national level campaign and align with the how solutions work and the fate of plastic waste. The campaign would need to consider the experiential learning that households and employees adopt when recycling.

Optimise community bonds. Local Government should foster community bonds between collection crews and residents to reduce waste and improve recycling to obtain higher quality recycling outputs. Open dialogues can identify recyclable materials, understand disposal practices, humanise the impact of those practices on waste and recycling employees, and reframe waste as a resource. Raising public awareness and implementing clear narratives can help build consumer trust. Allocating longer kerbside collection times and increasing funding to the local authority can help to achieve this to support resourcing these activities. This action is reliant on the Net Zero Future, prioritise waste prevention and simplification strategy being realised.

Supply Chain: Producers and Brands

Packaging design and labelling. Packaging producers and brands could communicate the recyclability of their packaging using texture and colour on the packaging itself. In this way, producers and brand owners can more actively engage consumer, making the packaging more consciously noticeable in their decision-making process.

Protection-oriented packaging. Packaging producers should align packaging design and marketing with protection of food products, adhering to the principles of the UK Plastics Pact, which aims to transform the plastic packaging sector by 2025, and beyond.

Educate, consult, involve, and learn from consumers. Food producers, packaging producers, brands and retailers could support consumers through improved labelling, advertising, and target in-store activities. Creating recyclable-packaging aisles in supermarkets and sensitising consumers to changes in packaging material is crucial. Reaching consumers early on in sustainable packaging innovation, such as introducing recyclable material, is essential to build trust and encourage behavioural change.

Transparency regarding the environmental and social impacts of packaging. Packaging producers should adopt social and environmental life cycle assessments (S-LCA)²⁵ that can be communicated through technological advancements in tracking labels²⁶. Offering clear communication and further transparency about potential impacts could gain consumer trust.

Waste prevention and reduction.

Packaging producers and brands should adopt waste reduction strategies that comply with the UK Government's ambitions for reducing plastic waste, as part of the wider *Resources and Waste Strategy*.

Consumers and Households

Paying attention to plastic packaging when purchasing food.

During food shopping consumers could choose one of the purchased food items and find out more about the packaging e.g. its function, disposability, and refill options. If the information and option is available, see if there is a product that has more sustainable packaging and no packaging (if it is not needed) and buy that product instead.

Washing recyclable resources. Consumers could be encouraged to adopt the habit of rinsing plastic packaging before placing it in the recycling bin. Dishwashers can also be used for pots, tubs, and trays.

Regular checks of local authority guidance. To break habitual recycling and uncertainty around what should go into the bin, consumers should undertake regular checks against the local authority guidance. The information is available via websites, information sheets through the door and over the telephone.

Share best practice with the community.

To support consumers who are looking to engage with re-use and re-fill systems to naturalise alternative packaging approaches into their food shopping routines, consumers who are already engaging with these systems and have integrated informal,

personal routines at home could share their 'best practice' or guidance tips that help make this transition easier. For instance, through YouTube videos shared via their local council social media platforms.

Waste/Resource Management

Future resource-use. Waste/Resource management should continue to shift focus from waste collection to future resource use, shifting consumer orientations from disposal to resource suppliers and building trust of what happens to household discards. The contextual nature of packaging recyclability underscores the need for targeted communication strategies across domestic, work, and public spaces.

Showcasing polymer recycling.

Plastic recyclers should showcase polymer recycling to the public highlighting its potential, what it can and cannot achieve, how polymer markets operate and future plans to increase consumer trust, understanding of complexities and challenges²⁷.

Summary

So what, for UK Plastics Pact targets?

Our research supports the ambitions of the UK Plastics Pact's 2025 targets by providing insights and recommendations regarding: effective communication strategies; encouraging sustainable household practices; improving supply chain and waste management practices; and perceptions of the consumer attitude-behaviour gap. Additionally, we have generated open access resources that can be utilised to support the public, business, and policy with rethinking the consumer attitude-behaviour gap. In this way, our work supports the transition to greener and more sustainable solutions. Our activities are detailed below²⁸.

UK PLASTICS PACT 2025 TARGET	PPiPL ACTIONS	PPiPL OUTCOMES
Eliminate problematic or unnecessary single use packaging.	Obtain detailed and holistic understanding of consumer behaviour.	91 organisations and 27 households took part in the study. 8 industrial workshops. 2 knowledge exchange events.
100% of plastic packaging to be reusable, recyclable, or compostable.	Create guidance for industry and policy makers.	5 white papers. 7 industry and policy invited talks.
70% of plastic packaging effectively recycled or composted.	Generate plastic packaging strategies (e.g. recycling or composting).	9 viable solutions for greener, sustainable production and consumption and 12 new partnerships and coalitions developed.
30% average recycled content across all plastic packaging.	Create a co-designed roadmap for improved packaging design.	2 pilot project case studies.

Resources

CONSUMERS:

- + Cartoon - Moral subordination of plastic waste to food waste.
- + Little Book of Plastics in Everyday Lives.
- + Video - Sort, Wash and Squash.
- + 7 blogs on tips to go plastic free.
- + Graphic of disposal bread bag, milk bottle and microwave tray.

CONSUMERS, INDUSTRY, AND POLICY

- + 6 videos - Responsibility and Plastic Packaging: Exploring the issues for the packaging supply chain.

INDUSTRY AND POLICY:

- + Rethinking the attitude-behaviour gap.
- + Mapping the plastic packaging landscape.
- + Sustainable Packaging Innovation: Hampered by the Consumer Attitude-Behaviour Gap?
- + Household Recycling: Managing Plastics at the Home and Hearth.
- + Waste (Resource) Matters.
- + 54 Degrees - The Pressing Plastic Problem.

What does this mean for other packaging contexts and future UK Plastics Pact agreements?

Applying insights from this research across diverse contexts and materials provides a roadmap for future considerations. Key lessons learned, applicable to other packaging contexts, include: addressing moral responsibilities; understanding functional aspects; refining identification processes; enhancing ease in closing the recycling loop; and empowering consumer agency.

The forthcoming UK Plastics Pact targets should incorporate these recommendations, aiming for comprehensive waste prevention, reduction, and sustainable packaging solutions. Targets should encourage cross-sector collaboration and support the UK's commitment to a net zero future and a circular economy, as outlined in the government's 25 Year Environment Plan and the Environment Act.

We recommend the following considerations are included when designing future policy:

How far packaging is transported and whether the logistical arrangements support sustainability.

It is important to continue to reflect on, and challenge, our assumptions around the distances packaging travels for production, consumption, and disposal. This requires a holistic approach. Our research highlights the additional labour, resources, and time involved in managing food plastic packaging in households and professional settings. Additionally, continued questioning of existing infrastructure is crucial to ensure logistical efficiency, such as assessing whether empty lorries returning after deliveries or shipping materials across Europe outweighs shipping within the UK.

What disposal and recapture systems are in place.

To advance net zero and circular economy ambitions, it is critical to consider recapturing packaging either back into the production process or into nature if it has restorative properties. Our research highlighted instances of material losses occurring due to contamination at various stages of the disposal and recapture process, as well as through leakages.

How, where, why and by whom packaging is used.

Product purchase and use should be considered beyond the household to reflect workplace and commercial settings. Our research emphasises the significance of understanding habitual purchase and usage routines in households, which often carry over to other settings. When unfamiliar infrastructures and setting are encountered attitudes and behaviours change.



How to communicate.

Communicate narratives that encompass the function, use, type, and solutions of various aspects. This will promote a more grounded understanding of environmental damage and the climate crisis. Equally vital is a responsible transition to food supply and alternatives packaging solutions (whether through reuse, refill, or natural materials) that support sustainability.

Who to collaborate and co-create solutions with.

It is important to involve relevant stakeholders across the entire value chain, including external voices, to encourage shared perspectives from both 'inside (industry/government) out' and 'outside (NGOs, consumers, communities) in'. Our research reveals misalignments in understanding between supply chain stakeholders, households, and waste management entities, and how they view and know each other.

The role of package and the design.

Design considerations should extend beyond visual aesthetics. Our research indicates that participants identified various types of packaging through tactile sensations (touch, sound, and texture). Broadening the scope to include these sensory elements could facilitate resource recapture and improve packaging recognition.

How packaging is identified.

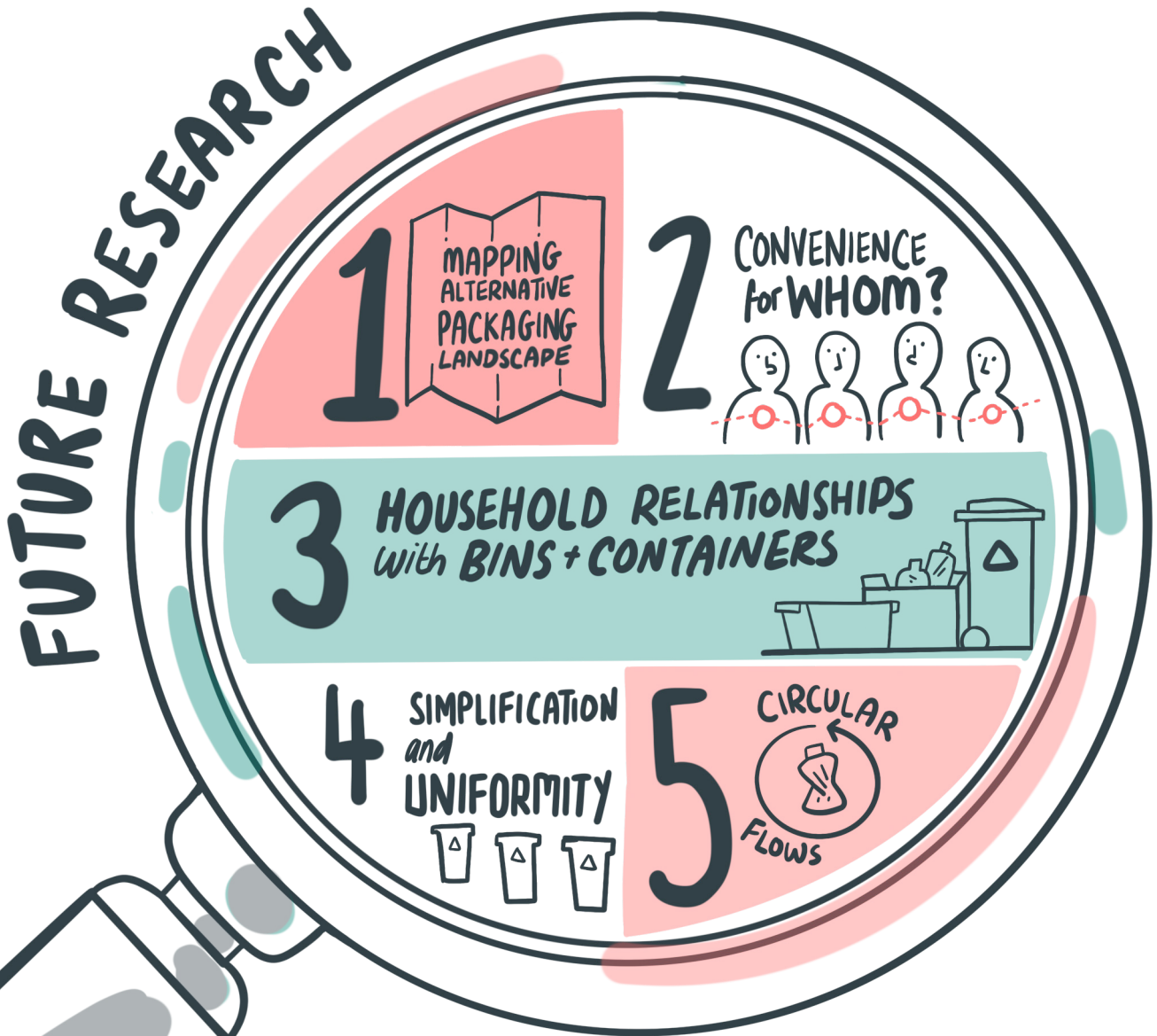
While labelling is important, ongoing attention to its content is essential. Our research revealed instances of confusion regarding similar product labels providing different recycling instructions, as well as concerns about the alignment of these instructions with local household waste management infrastructure.



These insights provide valuable guidance for dealing with different types of plastic materials, thereby ensuring a comprehensive approach to developing sustainable packaging solutions in different contexts.

Future Research

Through conducting our research, five future research agendas emerged that will support transitions towards more sustainable packaging solutions:



1. Map alternative packaging landscapes

to provide a comprehensive overview of the conditions influencing social and cultural attitudes to alternative packaging, including reuse and refill. Analysing past and current research would provide insights into public perception, policy perception, design, standards, value chain challenges, infrastructure requirements, product types, and disposal pathways. The outcomes would be useful for business, public and third sector organisations to understand what to overcome to create/mitigate against shifts and acceptances towards more sustainable forms of packaging such as colourless, naked, reuse, refill or biobased packaging.

2. Convenience for whom? A study on alternative food packaging.

Further work to examine perspectives on convenience and inconvenience (around recycling) from marketplace actors (consumers, value chain and waste management organisations) to illuminate other systems of food production, packaging, and distribution (e.g. reuse and refill) might be better appreciated. From this, we will gain a better understanding of how conveniences and inconveniences associated with plastic packaging and its alternatives shift across different stages of the value chain, considering broader structural and systemic factors. This distribution has implications for devising systems that allow for the collection of materials. There is an opportunity to build on this discussion about convenience across the value chain to have a more balanced conversation about the role of plastic packaging for food in our everyday lives, recognising the complexities and values attached to plastic packaging, where the benefits are accruing, and to whom?

3. Household relationships with bins and containers.

This research study could involve residents and local government to explore ambiguous boundaries about who owns and is responsible for waste containers, the condition in which they are maintained, and their location. This study would generate insights about differentiating waste streams and solving issues of contamination through 'bottom up' practices of personalisation and customisation, and/or fostering collaboration and shared understandings between residents and collection crews.

4. Simplification policy and uniformity in public and commercial spaces.

This research could involve local authorities, resource management, commuters, tourists, and employees to examine purchasing, disposal, and collection practices in non-residential spaces. This study would generate insights into how household habits impact practices on the move, and how routines, practices and infrastructures could be reconfigured and simplified to further encourage resource recapture.

5. Circular material and social flows, fates, and frictions.

This research would take an in-depth examination of the material and social flows, fates, and frictions of different plastic recycling streams. The aim would be to understand, the efficacy of these material flows, trade-offs (people, planet, profit) and implications for transitioning towards recycles, supporting outcomes for a sustainable world. This study would require a transdisciplinary approach that considered the social, environmental, and economic impacts of different plastic recycling streams.

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- 26** For example, see OPRL’s work available at: <https://oprl.org.uk>.
- 27** For example, please see <https://slwp.org.uk/your-waste/visit/> or <https://suffolkrecycling.org.uk/what-more-can-i-do/waste-site-visits>.
- 28** Our research did not cover compostable packaging, or composting solutions. With our research approach, engagement with our project partners and expert participants, we were guided away from these forms of packaging and solutions due to further research being required into the materials, available infrastructures, and policy directions.

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PLASTIC PACKAGING IN PEOPLE'S LIVES