

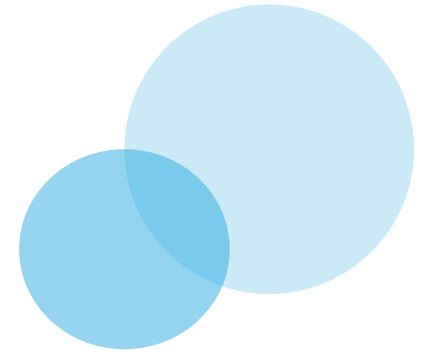
“CAN I RECYCLE THIS?”

A GLOBAL MAPPING AND ASSESSMENT OF STANDARDS, LABELS AND CLAIMS ON PLASTIC PACKAGING





One planet
inform with care



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This publication is an output of the Consumer Information Programme of the One Planet network. The One Planet network is the network of the 10 Year Framework of Programmes on Sustainable Consumption and Production. The Consumer Information Programme is a global platform supporting the provision of quality information on goods and services, to engage and assist consumers in sustainable consumption. It implements and supports projects; undertakes research; shares good practice and policies; and provides collaboration opportunities. The Programme is led by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Germany; the Ministry of Environment and Forestry of Indonesia; and Consumers International. It brings together a network of public, private and third sector actors. More information, including ways to participate, can be found at: <http://www.oneplanetnetwork.org/consumer-information-scp>, or by contacting: ciscp@un.org



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety



Ministry of Environment and Forestry
Republic of Indonesia



**CONSUMERS
INTERNATIONAL**



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Lead Authors:

Ellie Moss and Rebecca Harris

Supervision, technical editing and support:

Nils Heuer (United Nations Environment Programme), Naomi Scott-Mearns (Consumers International), and Susannah Fitzgerald (Consumers International).

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FOREWORD - UNITED NATIONS ENVIRONMENT PROGRAMME



LIGIA NORONHA

DIRECTOR ECONOMY DIVISION, UNITED
NATIONS ENVIRONMENT PROGRAMME



As we publish this report, our world is suffering from a global pandemic. The immediate priority is to protect people by limiting the spread of COVID-19. Working together, we believe we can get through this human crisis. In the aftermath, we need to increase our efforts to “build back better” for a more resilient and sustainable future.

Plastic production has increased exponentially in the last few decades. Many of its products, particularly packaging, are designed for single-use and little attention is paid to its proper disposal. Globally, only about 9 per cent of plastic waste is currently recycled and about 12 per cent is incinerated. The vast majority ends up in landfill or leaks into the environment. There is mounting evidence of the problems this uncontrolled plastic pollution is causing for our planet and its inhabitants.

At the 4th United Nations Environment Assembly, the urgency for action was recognised in Resolution 6 on Marine litter and Microplastics. The 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, known as the One Planet network, was tasked to develop supporting guidance for consumers, businesses and governments to foster more sustainable consumption and production of plastics.

In response, the One Planet network launched a network-wide Plastics Initiative. It focuses on plastic packaging as the main source of marine litter and the use stage of the plastic value chain where most of the material loss and environmental leakage occurs. More sustainable consumption and production of plastic requires the transformation of the current linear model towards greater circularity, where the material value of plastics is maintained, resources more efficiently used, and waste minimised. More concretely for plastic packaging, the vision is to make it 100% reusable, recyclable or compostable.

In this, the One Planet initiative is aligned with the commitments of the New Plastic Economy, a collaborative effort of the Ellen MacArthur Foundation and the United Nations Environment Programme. Public and private sector need to lead efforts towards this transformation, but the crucial role of consumers should not be overlooked. They can drive change from the demand side and have a responsibility to properly return or dispose of plastic packaging.

This report contributes to the plastics initiative by providing a global mapping and assessment of consumer information found on plastic packaging. It was developed by Consumers International and

the United Nations Environment Programme as a joint output of the One Planet network Consumer Information Programme. Consumers are increasingly concerned about plastic pollution and their consumption of plastics. They have an important role to play in the transition towards a new plastics economy. But they need reliable information to make more sustainable choices in the purchase and disposal of plastic packaging.

The findings show that there is a wealth of sustainability information about plastic packaging provided to consumers. Rising public awareness and concern about plastics has encouraged businesses to increasingly communicate this information about their packaging. However, the information is not always clear or actionable for consumers, leading to confusion and mistrust. This report highlights these issues and provides recommendations for policymakers, standards setters and businesses on how to improve the information on plastic packaging communicated to consumers. Better sustainability information about plastic packaging empowers consumers in their purchase, use and disposal of plastic products so that they can make their contribution towards a more circular plastics economy.

FOREWORD - CONSUMERS INTERNATIONAL



HELENA LEURENT
DIRECTOR GENERAL
CONSUMERS INTERNATIONAL

As we share this report, a pandemic is impacting every country in the world. Weathering this will take vast effort. The challenge was great before. Rebuilding from where we stand now towards a fair, safe and sustainable economy and marketplace for us all will require unprecedented leadership and the most practical, principled and clear action across all sectors.

As we rebuild, Consumers International believes that the sustainable choice can, and should, be the easy choice for consumers. If we do this well, consumer demand for sustainability could help power a circular and regenerative economy. There are many levers for system change we need to use and unusual partnerships we will need to construct.

Accessible information is one of the most basic ways to support consumers in their everyday purchase decisions and create positive change. This report takes one aspect of sustainable consumption with a focused look at consumer communications on plastic packaging, examining the global status quo and making recommendations about communication and recycling approaches. At the same time, we know that labelling and consumer communication are just a few of the innovative and ambitious suite of approaches and interventions needed. For example, strong national recycling systems are required to achieve net zero plastic leakage into the marine environment.

The level of systemic change we need is only possible by working together. We are collaborating with the United Nations Environment Programme

(UNEP) and the Secretariat of the One Planet network under the One Planet network-wide Plastics Initiative. Several of our members contributed to this report and particular thanks are extended to Colectivo Ecologista Jalisco (CEJ, Mexico), Associação para Defesa do Consumidor (ADECO, Republic of Cape Verde Islands), Consumers Lebanon, the Consumer Council of Zimbabwe (CCZ), Citizen consumer and civic Action Group Chennai (CAG) and the Consumer Council of Fiji (CCF).

We hope this report provides some practical ideas and we will continue to take action on this issue with our members across 100 countries for consumers around the world.



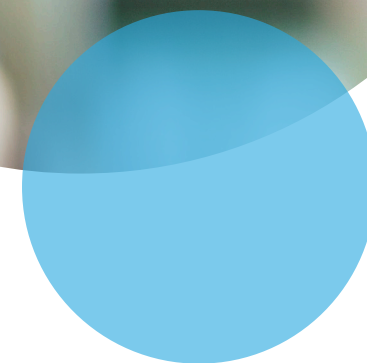
EXECUTIVE SUMMARY

With an estimated 8 million tonnes of plastic entering the marine environment every year (Jambeck et al. 2015), finding workable solutions to plastic pollution is an urgent challenge of global scale. Resolution 6, adopted at the fourth session of the UN Environment Assembly (UNEA-4) in 2019, recognises this issue and highlights serious concerns about the ways in which growing levels of marine litter and microplastics are impacting the ecosystems and livelihoods based in and around our oceans.

While there has been increased action from businesses and policymakers in the fight against plastic pollution, far more needs to be done to achieve a transition to sustainable consumption and production patterns, and a circular economy where input materials, like plastics, are maintained at their highest economic value for as long as possible and waste is avoided. The scale of the problem and the urgency of achieving a circular solution are clear: it is estimated that only 9 per cent of all plastic ever produced has been recycled (Parker 2018).

A crucial but often overlooked element of this transition are consumers. The decisions they make about what products to purchase and how to dispose of them have a crucial influence on production processes and levels of plastic leakage. However, too often the onus is placed on consumers to understand an array of confusing, contradictory, or misleading information.

To address this situation, the United Nations Environment Programme and Consumers International carried out a global mapping and assessment of standards, labels and claims on plastic packaging, regarding information about materials, production, recyclability, and disposal. The report is global in scope and focuses on plastic packaging for fast-moving consumer goods and food and beverage products.



The findings of this report map the current landscape of consumer information, highlighting good practices and areas where action should be taken. An international, cross-sector consultation revealed five key insights and recommendations for clearer and more effective consumer communication on plastic packaging:

- **Businesses should follow the *Guidelines for Providing Product Sustainability Information (UN Environment and ITC 2017)* in their plastic packaging communications.** There is considerable room for improvement across the current landscape. The mapping and assessment highlights that there are wide variations in the reliability, relevance, clarity, transparency and accessibility of labels and claims on plastic packaging. All labels and claims should be amended to correspond with the five fundamental principles of the *Guidelines for Providing Product Sustainability Information*.
- **Definitions about the content and reusability of plastic packaging need to be harmonised at a global level.** One of the clearest messages from the consultation is that the current landscape of labels and claims is very confusing for consumers. There needs to be global consistency when it comes to definitions relating to the content and reusability of packaging or disposable items. Labels and claims should be updated to reflect global standards.
- **Standards, labels, and claims need to better reflect actual conditions.** The definitions and technical requirements used in standards related to recyclability, compostability, and biodegradability should better reflect real world conditions and be more attentive to accessibility and consumer understanding. At present, there is a disconnect between these claims and what is likely to happen in reality.

- **The use of the 'chasing arrows' symbol should be restricted to indicating recyclability.** The consultation highlighted that using the 'chasing arrows' for labels and claims other than recyclability leads to consumer confusion, risking contamination and reduced consumer confidence. Businesses using this design for claims other than recyclability should redesign their logos without the arrows. The design of labels and logos should seek to minimise the potential for misinterpretation.
- **Informative and verified recycling labels should be adopted and their proper use enforced.** Well-designed recycling labels can be effective in increasing responsible consumer behaviour in plastic waste disposal. Businesses should adopt recyclable plastic packaging and commit to using clear and well-designed recyclability labels. The organisations that manage these labels should seek to align their requirements to reduce consumer confusion and ensure that proper use policies are strictly enforced. Governments have a responsibility to ensure adequate recycling infrastructure is in place.

There is a growing consensus that we need concerted action on tackling plastic pollution and that changes need to be made quickly and extensively. Consumers are keen to participate in these efforts. With the support of key stakeholders, they can play a more effective and engaged role in broader waste reduction strategies, the shift to circularity, and the creation of more sustainable forms of consumption and production.



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1. INTRODUCTION

Plastic pollution is one of the most visually striking environmental challenges we face. Whereas other issues may seem distant or even abstract, images of beaches and oceans clogged with plastic waste are both shocking and increasingly ubiquitous. Nine out of the top ten waste items found on beaches are plastic, and the impact on the communities and wildlife that depend on the marine environment is becoming impossible to ignore (Ocean Conservancy 2019).

As awareness of the problem grows, increasing action is being taken by governments, businesses, and civil society to reduce plastic pollution from all stages along the value chain. At the international level, Resolution 6 on Marine Plastic Litter and Microplastics was adopted at the fourth session of the UN Environment Assembly (UNEA-4) in 2019, calling for urgent action to tackle plastic pollution. The resolution *“requests the Executive Director, through UNEP’s 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, to develop guidelines for the use and production of plastics in order to inform consumers, including about standards and labels; to incentivise businesses and retailers to commit themselves to using sustainable practices and products; and to support governments in promoting the use of information tools and incentives to foster sustainable consumption and production”* (United Nations Environment Programme [UNEP] 2019a, p. 3). This report serves as a contribution to the formation of the 10-Year Framework of Programmes on Sustainable Consumption and Production’s guidelines as requested through Resolution 6, providing a global mapping and analysis of standards, on-package labels and claims related to plastic packaging.

Consumers themselves have also become increasingly active on the topic of plastic pollution and they play a critical role in any solution. Communication on plastic packaging through labels and claims, and the standards that underpin them, are an important tool for informing consumers about packaging materials and proper disposal. Where plastic packaging and foodservice disposables continue to be used or cannot be replaced, some companies are using on-package communications in an attempt to alleviate consumers’ concerns about the sustainability of plastic packaging. These





communications seek to highlight changes companies have made, such as improving the recyclability of the packaging or using recycled, biodegradable or compostable materials, and guide consumers to properly dispose of plastic packaging waste. While this is a positive development with the potential to improve consumer understanding and reduce plastic pollution, a crucial question is: *How effective are on-package communications at delivering clear, understandable information about sustainability to consumers?*

At a time when tackling plastic pollution is more urgent than ever, it is essential to develop an informed understanding of the current state of relevant standards, labels and claims and establish best practice with regards to on-package communications. Creating more effective communications can ease the burden on consumers, minimise confusion, and empower them to play a more productive role in the transition towards more sustainable consumption and production patterns, and a circular economy for plastics.

To assess and understand the effectiveness of plastic packaging consumer communications on sustainability, this report aims to:

- (1) provide a global mapping of standards and on-package labels and claims related to plastic packaging,
- (2) create a framework to categorise labels and claims by type, focus, geography, and other relevant characteristics,
- (3) assess how well the on-package labels and claims align with the *Guidelines for Providing Product Sustainability Information* (UN Environment and ITC 2017), and
- (4) identify opportunities to use standards, labels and claims to more effectively tackle plastic pollution.

2. APPROACH

2.1 Scope

This report examines on-package communications to consumers about the sustainability of plastic packaging and disposable plastic food-ware. Reusable packaging or food-ware is out of scope, as well as plastic products. The focus on plastic packaging and disposable food-ware was selected due to its prevalence in marine litter (Ocean Conservancy 2019). Moreover, while plastic pollution encompasses a range of products and industries, packaging is one of the most problematic items: 40 per cent of plastic produced is packaging and discarded after one use (Parker 2018). Shifting away from this system is therefore a priority for achieving circularity.

The focus is specifically on labels and claims found on plastic packaging and the standards or certifications which underpin them. Eco-labels (for example, type 1 eco-labels) may include the impact of packaging in the assessment or scoring of a product, but it is not always immediately clear which ones do and which do not. Given this uncertainty and the wider focus of general eco-labels, they are considered outside the scope of this report.

The geographic scope of this analysis is global. The research covered more than 20 languages, working with in-country personnel in four countries to identify local labels and carrying out interviews with 33 experts from around the world. While efforts have been made to ensure that coverage is as comprehensive as possible, the mapping does not capture all existing labels worldwide and only provides a sample of claims found on plastic packaging.

2.2 Definition of terms

In this report, as outlined in Figure 1, the following definitions derived from other internationally recognised sources are used to distinguish standards, certifications, labels, and claims.

Figure 1: Definitions of Standard, Certification, Label, and Claim

Standard refers to specific criteria or norms of material goods or services, including packaging, which may also serve as benchmarks.

Certification refers to a formal accreditation process, in which it is confirmed that the certified entity or product/package meets a given set of (minimum) standards.

Label describes a logo or stamp highlighting a product or service's specific characteristic(s), which may also be used as a form of trademark. A label may or may not represent a certification.

Claim refers to assertions made by companies about beneficial qualities or characteristics of their goods and services.

Sources: (ISO 14020); (UN Environment and ITC 2017); (Organisation for Economic Co-operation and Development [OECD] 2011)

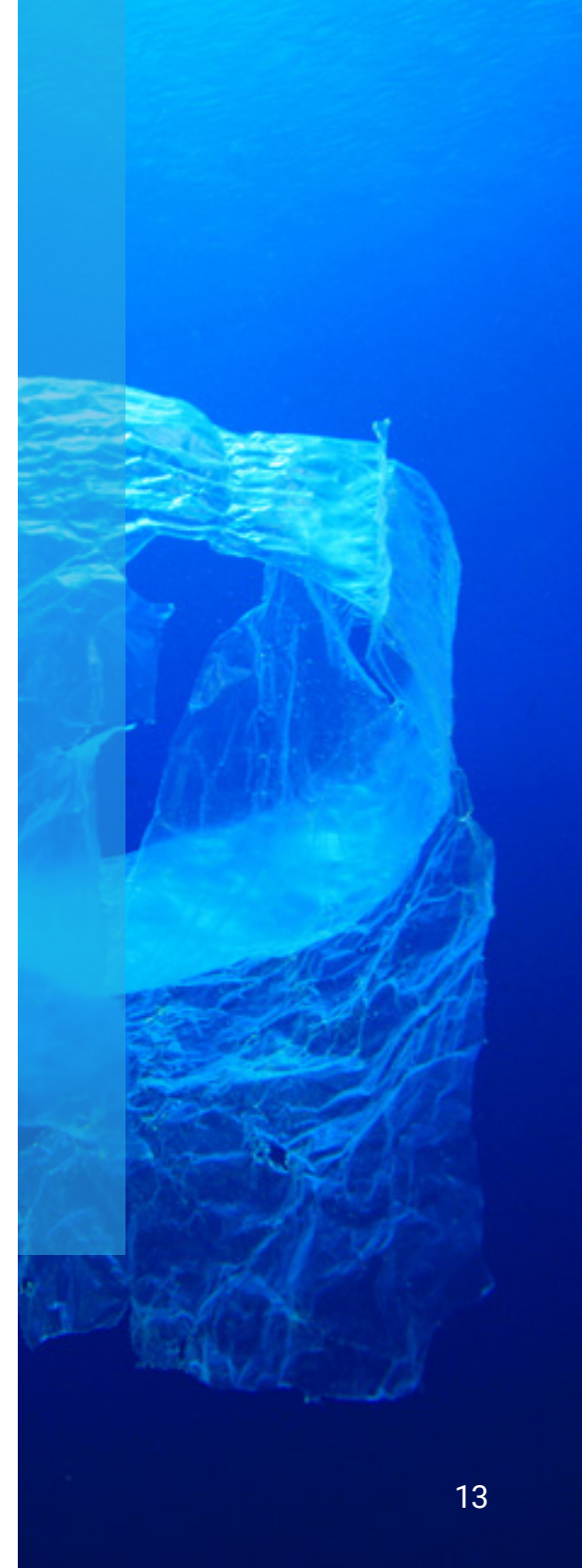
Improper use of labels or claims can result in 'greenwashing'. Greenwashing is:

“an attempt to mislead consumers and to market products more environmentally friendly than they actually are. This can be an exaggeration or misrepresentation of an improved environmental performance, a claim that cannot be verified, is irrelevant or is simply false.” (UN Environment and ITC 2017, p. 50)

There are also several terms specifically related to plastics that are used throughout this report, the definitions of which are outlined in Table 1.

Table 1: Definition of Additional Terms

Term	Definition and Context
Biobased plastics (also called bioplastics or plant-based plastics)	Plastics produced from renewable feedstocks such as corn, potatoes, and sugarcane, or other biomass, rather than fossil fuels. The feedstock used to produce plastic is independent of its ability to be biodegraded or composted.
Biodegradable plastic	Biodegradable plastics are plastics that can be broken down by living organisms into elements that are found in nature, such as CO ₂ or methane, water, and biomass. When true biodegradation is complete, no microplastics should remain. Biodegradable plastics can be manufactured from renewable feedstocks or fossil fuels. Soil biodegradable plastics can be broken down by organisms found in soil. Marine biodegradable plastics can be broken down by organisms found in seawater.



Term	Definition and Context
<p>Compostable plastic</p>	<p>Compostable plastic is designed to biodegrade in a certain period of time under managed conditions, predominantly characterised by forced aeration and natural heat production resulting from the biological activity taking place inside the material.</p> <p>Compostable plastic will biodegrade during composting but does not contribute to the value of the compost product, since it does not contain nutrients in its composition.</p> <p>Industrially compostable plastic is plastic that requires conditions only achieved in industrial composting facilities (i.e. temperatures over 50°C) in order to biodegrade. Standards exist to specify the conditions and time required in order for a material to be labelled as compostable.</p> <p>Home, or backyard, compostable plastic is plastic that is capable of breaking down at the soil temperature and conditions found in home compost piles.</p>
<p>Oxo-degradable (also called oxo-biodegradable or oxo-plastics)</p>	<p>Oxo-degradable plastics are created with the addition of additives that cause them to break down under favourable conditions, most often UV radiation or heat. Oxo-degradable plastic fragments into smaller and smaller plastic particles but has not yet been shown to truly biodegrade, raising concerns that oxo-degradable plastics are a source of microplastics.</p>
<p>Recyclable</p>	<p>The definition for recyclable used in this report is the definition developed by the Ellen MacArthur Foundation: “A packaging or packaging component is recyclable if its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale” (Ellen MacArthur Foundation 2018, p. 12).</p>

Sources: (UNEP 2015); (UNEP 2017).



2.3 Research Methodology

The research for the global mapping included the following elements:

- Identifying known labels and claims on plastic packaging for fast-moving consumer goods and food-ware through an initial mapping.
- Mapping labels and claims found globally through (1) targeted online searches in key regions and 22 languages, and (2) local searches by in-country personnel in China, India, Indonesia, and Kenya.
- Grouping these labels and claims according to the theme being addressed.
- Developing a framework for the assessment of labels and claims.
- Identifying relevant standards for each theme.
- Using expert knowledge to review the global mapping and ensure comprehensive coverage.
- Developing a comprehensive catalogue of relevant standards, labels, and claims on plastic packaging based on these findings.

The assessment phase for this report was carried out via an expert consultation. The consultation process consisted of interviews and written exchanges with 33 experts on consumer rights, packaging, labelling and standards from a range of organisations around the world.

The consultation included perspectives from:

- Civil society (including environmental advocacy, consumer advocacy, and ecolabelling groups);
- Business (including consumer packaged goods, plastic packaging manufacturing, retail, and consultancy);
- Industry alliances;
- Governments;

- Academia; and
- Foundations.

The consultation also represented geographically diverse perspectives, with experts based in Africa, Asia, Europe, the Middle East, North America, and South America. Global perspectives were provided from multinational companies.




2.4 Assessment Methodology

In 2017, the United Nations Environment Programme and the International Trade Centre published the *Guidelines for Providing Product Sustainability Information* (hereafter referred to as the Guidelines). This publication was an output of the Consumer Information Programme of the One Planet network, which is co-led by Consumers International and the German and Indonesian Environmental Ministries. The Guidelines were developed through an international multi-stakeholder process engaging experts and key stakeholders from around the world.



The Guidelines establish guidance for how to make effective, trustworthy claims to consumers on product-related sustainability information (UN Environment and ITC 2017). The Guidelines outline ten best practice principles for how to provide information about sustainability to consumers. There are five fundamental principles and five aspirational principles.

Table 2 presents an abbreviated description of the fundamental principles, which are the minimum level that must be met when providing consumers with product sustainability information, and how these principles can be applied to labels on plastic packaging and disposable food-ware.

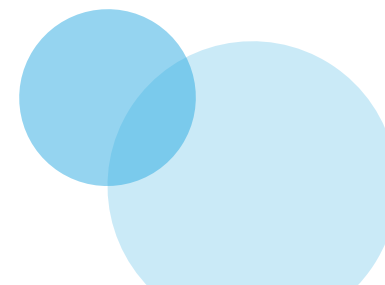
Table 2: Summary of Fundamental Principles

Fundamental Principle	Description	How the Principle Applies to Labels and Claims on Plastic Packaging and Disposable Food-Ware
<p>Reliability</p> 	<p>Build your claims on a reliable basis</p> <ul style="list-style-type: none"> • Accurate and scientifically true • Robust and consistent • Substantiated data and assumptions 	<ul style="list-style-type: none"> • Is the label consistent? • Is the label's claim consistent with applied methods and standards? • Does the label accurately communicate packaging attributes? • Is the label substantiated by scientific evidence?
<p>Relevance</p> 	<p>Talk about major improvements, in areas that matter</p> <ul style="list-style-type: none"> • Significant aspects ('hotspots') covered • Not masking poor product performance, no burden shifting • Genuine benefit which goes beyond legal compliance 	<ul style="list-style-type: none"> • Does the label allow the consumer to evaluate the sustainability of the packaging? • Is the label relevant to the packaging? • Is the label relevant to the local context?
<p>Clarity</p> 	<p>Make the information useful for the consumer</p> <ul style="list-style-type: none"> • Exclusive and direct link between claim and product • Explicit and easy to understand • Limits of claim clearly stated 	<ul style="list-style-type: none"> • Does the label clearly and simply communicate what it means? Is there text or iconography that explains the label? • Does the label communicate the proper handling of the packaging? • Does the label contain enough information to correctly guide consumer behaviour?



Fundamental Principle	Description	How the Principle Applies to Labels and Claims on Plastic Packaging and Disposable Food-Ware
<p data-bbox="174 454 376 491">Transparency</p> 	<p data-bbox="459 454 1243 526">Satisfy the consumer's appetite for information, and do not hide</p> <ul data-bbox="459 566 1265 758" style="list-style-type: none">• Developer of the claim and provider of evidence published• Traceability and generation of claim (methods, sources, etc.) published• Confidential information open to competent bodies	<ul data-bbox="1294 534 2128 686" style="list-style-type: none">• Is the label based on a third party standard or verification process?• Is the information provided comprehensible for the consumer and can the label be evaluated by the consumer?
<p data-bbox="174 845 376 882">Accessibility</p> 	<p data-bbox="459 845 1220 917">Let the information get to the consumer, not the other way around</p> <ul data-bbox="459 957 1265 1077" style="list-style-type: none">• Clearly visible: claim easily found• Readily accessible: claim close to the product, and at required time and location	<ul data-bbox="1294 885 2128 1037" style="list-style-type: none">• Is the label easy to read?• Are there size specifications that companies must comply with when applying the label?• Is the label translated into local languages?

Source: (UN Environment and ITC 2017)



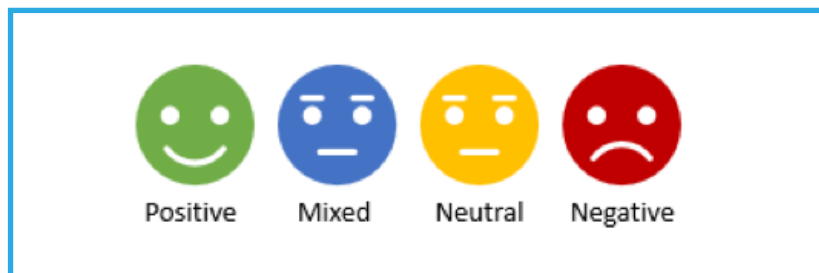
Assessments of the individual labels are based on input gathered from experts during interviews and via evaluation forms. Experts were asked to score each label against each of the five fundamental principles and to provide overall comments. The results of the individual assessments were aggregated and areas of alignment and misalignment were identified, leading to a 'Net Assessment' score as well as key findings from the individual assessments.

The results of the assessment are presented in conjunction with the global mapping in Tables 5-9 in Chapter 6. For each label, the tables provide:

- an image of the label (where labels may be customised depending on usage, a representative example has been provided);
- the name of the label, a description of what the label communicates and how it is used;
- the geographic relevance of the label;
- a 'Net Assessment' of the label; and
- representative positive and negative rationale for the Net Assessment.

The 'Net Assessment,' labels on which experts were generally positive in their evaluations are denoted with the 'Positive' green face. A 'Neutral' yellow face indicates experts' scores were generally in the mid-range of the scale. A 'Mixed' blue face indicates that experts had divergent opinions. A 'Negative' red face indicates the experts were aligned in their negative scores (see Figure 2).

Figure 2: Net Assessment Rating Scale








Rather than evaluating individual claims, representative examples were identified that highlight both helpful and problematic practices in use today for environmental claims on plastic packaging and disposable food-ware. The results of this analysis are presented in Chapter 7 on Claims.

The Guidelines also established a set of aspirational principles intended to improve sustainability leadership over time: the three dimensions of sustainability, behaviour change and longer-term impact, multi-channel and innovative approach, collaboration; and comparability.

The labels and claims that were assessed in this report were not evaluated individually against the aspirational principles; however, the table below provides a brief commentary on how the assessed labels and claims compare to the aspirational principles.

Table 3: Summary of Aspirational Principles

Aspirational Principle	Description	Commentary on Assessed Labels and Claims
<p>The Three Dimensions of Sustainability</p> 	<p>Show the complete picture of product sustainability</p> <ul style="list-style-type: none"> • Environmental, social, and economic dimension considered • Burden shifting between the dimensions avoided • Complementary certification schemes combined 	<ul style="list-style-type: none"> • Assessed labels and claims primarily focused on the environmental dimension of sustainability.
<p>Behaviour Change and Longer-Term Impact</p> 	<p>Help move from information to action</p> <ul style="list-style-type: none"> • Insights from behavioural science applied • Consumers actively encouraged to play a role, where appropriate • Longer-term relationship built with consumer 	<ul style="list-style-type: none"> • On-package recycling labels help inform consumers about proper action. • Providing credible information about plastic packaging can guide consumers towards more sustainable behaviour in purchase decisions, product usage and disposal of a product.
<p>Multi-Channel and Innovative Approach</p> 	<p>Engage with consumers in diverse ways</p> <ul style="list-style-type: none"> • Various complementary communication channels used • Different user groups addressed with different channels • Not overloading the consumer with information 	<ul style="list-style-type: none"> • On-package labels and claims can be an effective component of a multi-channel approach. • Multi-channel and other innovative approaches may also be a helpful tool in localisation of disposal guidance for consumers as they can provide more locally customised information, as well as providing varying amounts of information depending on consumer interest.

Aspirational Principle	Description	Commentary on Assessed Labels and Claims
<p>Collaboration</p> 	<p>Work with others to increase acceptance and credibility</p> <ul style="list-style-type: none"> • Broad range of stakeholders included in claim development and communication • Joint communication channels employed • Inclusive language used to make consumers feel part of a movement 	<ul style="list-style-type: none"> • Evaluation of the label or claim development process is outside the scope of this report.
<p>Comparability</p> 	<p>Help consumers choose between similar products</p> <ul style="list-style-type: none"> • Product comparisons must be objective and useful for the consumer • Participate in collaborative approaches initiated by government or third parties • Make sure that product comparisons are based on very strict and objective rules relevant to the specific product 	<ul style="list-style-type: none"> • Except for labels and claims that provide specific thresholds within the same criteria (e.g. per cent recycled content), comparability is quite difficult. • A comparison of plastic packaging should also consider the packaged product and the implications of its production process to evaluate overall sustainability. However, this level of detailed information is usually unavailable or too complex to be communicated to consumers.



3. CONSUMERS AND SUSTAINABILITY COMMUNICATIONS

Understanding the role of consumers in preventing plastic leakage into the environment requires an understanding of how consumers use and dispose of plastic. Consumers are often confronted with an overwhelming amount of information when purchasing a product, and then require more information to understand how to properly use and dispose of an item and its packaging.

Guiding consumers towards more sustainable choices is the key goal of consumer information for sustainable consumption, and target 12.8 of the Sustainable Development Goals recognises the importance of good information to consumers for helping to transition to more sustainable lifestyles and sustainable consumption and production patterns. While this report focuses on direct communications via labels and claims, there is a broad spectrum of information which can influence consumers towards more sustainable choices. This can include advertising, awareness-raising campaigns, and the influence of family and friend networks, alongside the use of new technologies to better facilitate these processes.

The following chapter provides key contextual information on how consumers experience sustainability communications, the role of labels and claims within this field, and comments on the broader consumer communications landscape and its role in reducing plastic pollution.

1. On-Package Communications

While labels and claims that provide sustainability information are a key aspect of preventing plastic leakage, it is critical to remember that consumers do not view these in isolation. Space on the packaging of consumer-packaged goods is highly prized for marketing content and must also accommodate information required by legal and regulatory



reasons. For a label to be placed voluntarily on a product packaging, it must be expected to increase the appeal or differentiation of the product to the consumer or provide other value to the company. For example, recycling guidance labels that instruct the consumer on how to separate and prepare packaging elements for recycling may allow the company to then characterise that package as recyclable, which can then count towards targets or commitments that the company has made.

Research indicates that a growing number of consumers expect to see recyclability information on packaging. A poll by the Institute of Scrap Recycling Industries (ISRI) and Earth911 found that 65 per cent of respondents say they do not understand what plastics are acceptable in roadside collection (Pierce 2014). Likewise, a survey by the Carton Council of North America found that 67 per cent of respondents say they would assume a package is not recyclable if it did not have a recycling symbol or language indicating that it was; the survey also reveals that a majority of consumers (57 per cent) first look at a product's packaging for recycling information before turning to other sources (Recycling Today 2016).

2. Consumer Understanding of Sustainability Information for Plastics

Growing consumer expectations about recycling information on packaging reflects a broader shift in which consumers increasingly consider sustainability in their purchasing habits. Research in the US found that 50 per cent of growth in consumer packaged goods between 2013 and 2018 came from sustainability-marketed products (Whelan and Kronthal-Sacco 2019). Concerns about plastic pollution have become a particular focus for consumer behaviour shifts and activism, offering a tangible focus for concerns about the environment; in 2018, over 1 million people around the globe participated in activism based on reducing single-use plastic (Greenpeace International 2018). In Globescan's 2019 Healthy and Sustainable Living Report, single use plastics were identified as a serious environmental concern amongst consumers in seventeen different countries.

Nonetheless, despite concern of the effects of plastic on the environment, consumer confusion around plastic items and their proper disposal continues. On-package labels clearly detailing proper behaviour can be effective where recycling infrastructure exists, and packaging experts consulted for this report suggest that improved labels are helping. However, consumers generally do not understand the difference between biobased, biodegradable and compostable and the implications of these claims. It is therefore important that these claims include instructions on how to properly dispose of these types of plastic packaging. In a recent study of German consumers comparing correct disposal of recyclable fossil-fuel based plastics and biobased plastics, despite the perceived environmental benefit of biobased plastics, consumers were more likely to dispose of them incorrectly than fossil-fuel based plastic packages (Taufik 2019).

Other research suggests consumers are more likely to litter biodegradable packaging. According to one survey, "18 per cent of UK consumers admit that they've dropped 'compostable' food and drink packaging outside, mistakenly thinking it's okay to do so in the belief it will quickly rot down where it is" (Packaging News 2019). According to European Bioplastics, "Bio-waste represents 40-50 per cent of the municipal waste streams in Europe, but only about 25 per cent are separately collected and organically recycled at the moment" (European Bioplastics 2018).

In Latin America, there has been a recent move by several companies to replace plastic items with biobased alternatives, for example straws made from items including paper, plants and avocado pits. However, these alternative items are often more expensive to produce and these costs are passed onto consumers (Mendez 2018). Therefore, consumer education campaigns and information are needed, to raise awareness about these materials and aid consumer understanding (ibid.). While the solution to this problem may be broader than on-package communications – for example taxes or bans, which more than 140 countries have implemented so far, including more than 30 African countries (Lerner 2019) – clearer and more informative labels and claims could play a crucial role in reducing consumer confusion and misinterpretation, and ultimately reducing plastic leakage into the environment.

3. The Broader Sustainability Communications Landscape

While this report focuses on on-package communications, consumers experience a range of other forms of communication from companies and other stakeholders about plastic packaging. To provide the full context of the current consumer experience, it is worth noting some examples of off-package efforts to increase the recycling and composting of plastic packaging and disposable food-ware:

- Some companies, such as Sealed Air, a manufacturer of protective packaging materials, are embracing tech-enabled packaging to have a deeper engagement with consumers and assist in proper recycling of their packaging products. They are printing Quick Response (QR) codes that consumers can scan with their phones to visit a website with detailed instructions on how to properly dispose of the packaging materials.
- Various smartphone apps facilitate recycling either by providing consumers with more information about what and how to recycle, or by connecting consumers directly with collection and recycling for hard-to-recycle plastics.
- The Holy Grail 2.0 project, led by Proctor & Gamble within the New Plastics Economy initiative run by the Ellen MacArthur Foundation, seeks to remove consumers from the sorting process altogether. The stated goal of the initiative is “improved sorting of post-consumer packaging with the help of chemical tracers and digital watermarks.” (Holy Grail Report 2019)

These examples highlight two key points. Firstly, innovation by businesses and organisations is helping to develop creative solutions to the plastic pollution problem. This demonstrates both increasing awareness of the scale of the problem we are facing and cross-sector momentum behind taking the actions needed to change. While this increased sense of urgency should be welcomed, far more still needs to be done. Secondly, these examples demonstrate that on-package communications are one of a suite of tools being used to drive changes in plastic production and consumption. Nonetheless, they are of critical importance from a con-

sumer perspective; they provide the most immediate source of information when a consumer decides to purchase an item and when they decide how best to dispose of it. Moreover, effectively communicated labels and claims can have an important impact on consumer behaviour, which is crucial for overcoming the attitude-behaviour gap and driving more sustainable choices. For example, “one recent report revealed that certain categories of products with sustainability claims showed twice the growth of their traditional counterparts” (White, Hardisty and Habib 2019, np).



4. THE PLASTICS LANDSCAPE

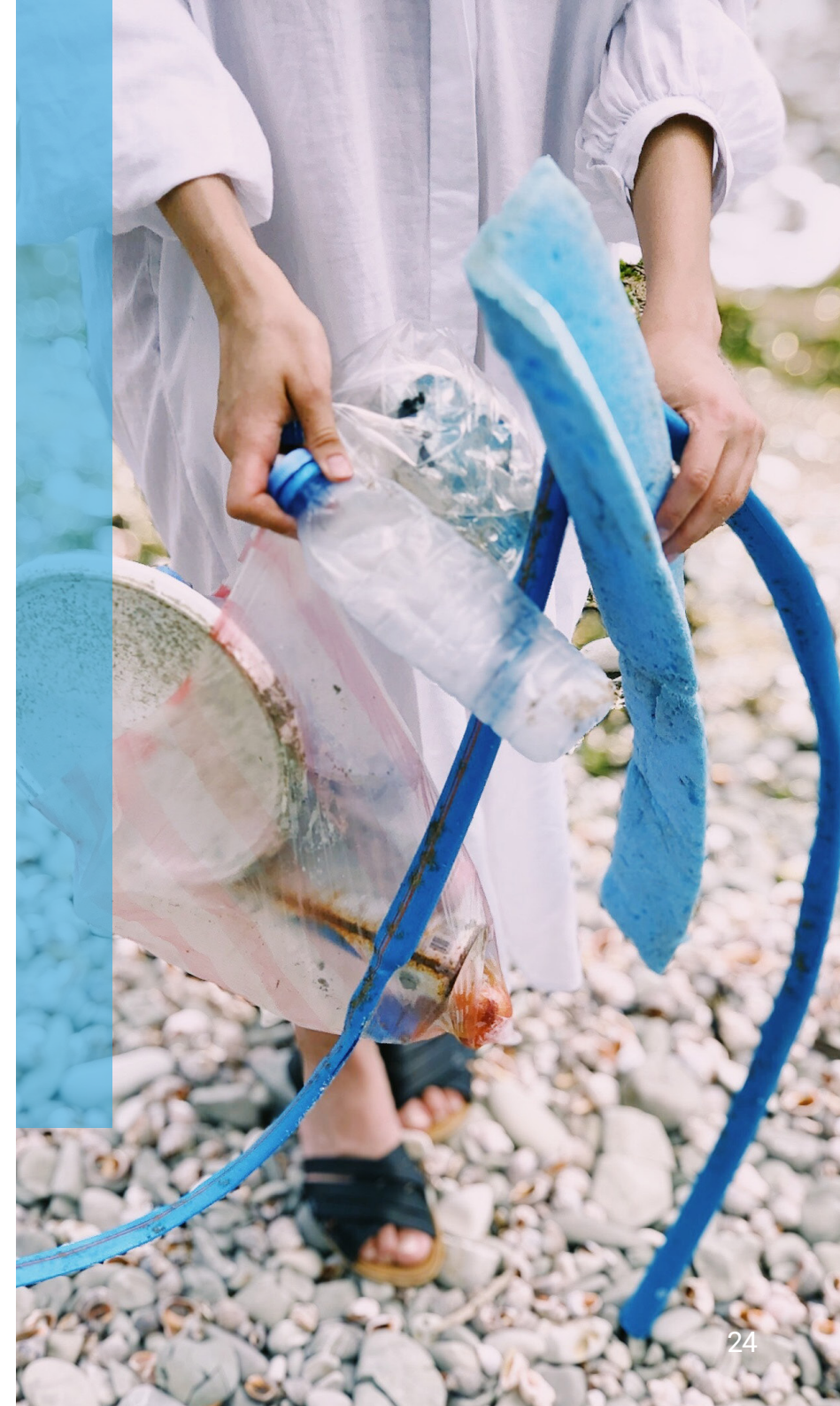
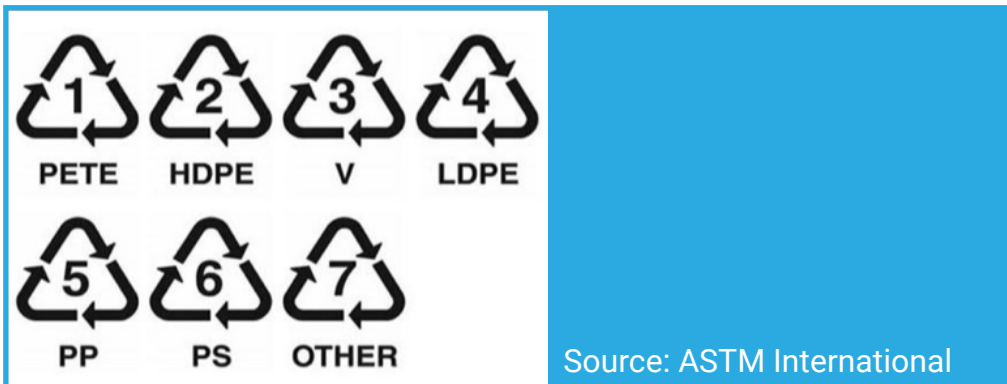
As outlined in Chapter 3, consumers already face a confusing and contradictory landscape of sustainability communications. However, the technical nature of plastic production and disposal poses a further challenge. The following chapter outlines key information regarding how the specificities of plastics materials and structures for recycling and compostability further impact consumers' ability to make sustainable choices.

4.1 Plastic Materials

4.1.1 Resins and Additives

Resins are made from one or more polymers and are a base material for applications such as packaging. A common misconception for consumers is that the Resin Identification Codes (RIC), typically stamped in plastic items, are the guide to whether the material is recyclable (See Figure 3, Original Resin Identification Codes).

Figure 3: Original Resin Identification Codes



ASTM International (formerly known as American Society for Testing and Materials), the standards organisation that controls the Original Resin Identification Codes, states:

“Resin Identification Codes are not ‘recycle codes.’ The Resin Identification Code is, though, an aid to recycling. The use of a Resin Identification Code on a manufactured plastic article does not imply that the article is recycled or that there are systems in place to effectively process the article for reclamation or re-use. The term ‘recyclable’ or other environmental claims shall not be placed in proximity to the Code.” (ANSI 2019)

According to the Sustainable Packaging Coalition, “These numbers were developed in the 1980s for people behind-the-scenes of recycling; they were not designed as a consumer communication tool” (Sustainable Packaging Coalition 2017). As discussed further below, there are several factors that determine whether a material is recyclable, one of which is the type of resin.

The confusion over the meaning of the resin codes is likely due, at least in part, to the fact that the original icons included the ‘chasing arrows’, which resemble the universal symbol for recycling (see Figure 4). The universal symbol for recycling was originally designed by Gary Anderson in 1970 as part of a contest for the Container Corporation of America (CCA) and initially described paper recyclability. While CCA initially sought to trademark the symbol, it later dropped the trademark application and the symbol became part of the public domain (Resource Recycling 1999) (See Figure 4, Universal Symbol for Recycling).

The Resin Identification Codes’ symbol was updated in 2013 to an equilateral triangle in an attempt to eliminate consumer confusion (see Figure 5, Updated Resin Identification Codes); however, it appears that very few companies have changed to the new icons and many continue using the ‘chasing arrows’ symbol (as in Figure 4).

One reason may be outdated local or national legislation: for example, in the United States, at least 39 states require the usage of the original Resin Identification Codes on plastic bottles and containers due to legislation. Where this is the case, ASTM defers to local laws (Keller and Heckman LLP 2019). Another complicating factor which may have influenced the delayed uptake of the updated codes is the associated cost of developing new moulds with the updated stamp.





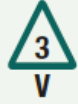









In 1997, the European Commission established a numbering system for packaging materials which goes up to 99 and includes plastic, paper and fibreboard, metal, wood, textiles, glass and composites. In other countries, such as China, the Resin Identification Code system has been expanded to account for 140 different plastic resins. This means that a resin code of 22, for example, refers to a different substance in one country compared to another, which could lead to further consumer confusion. The use of resin codes beyond number 7 is based on country or region-specific expansions to the resin codes and is therefore not internationally harmonised.



Figure 4: Universal Symbol for Recycling

Source: Public Domain

Figure 5: Updated Resin Identification Codes

Resin	Resin Identification Code-Option A	Resin Identification Code-Option B
Poly(ethylene terephthalate)		
High density polyethylene		
Poly(vinyl chloride)		
Low density polyethylene		
Polypropylene		
Polystyrene		
Other resins		

Source: ASTM International

It should be noted that plastic packaging materials are made from more than just resins. There are thousands of chemical additives that can be added to resins to produce a plastic material with the desired aesthetic and performance characteristics. Additives can influence a material's recyclability and compostability. From an

overall health and sustainability perspective, some additives are considered toxic to humans and the environment (Meeker 2009).

However, there is no mandatory disclosure of the use of these chemicals in plastic packaging. Some certification processes are able to confidentially review which additives are being used and take this into consideration in rating or approving those products or packages. Beyond that, there is no way for consumers to know what chemical additives are in their products or packaging.

4.1.2 Feedstocks

Plastics are most commonly derived from petrochemicals (i.e. fossil fuels), however, plastics can also be made from renewable biomass sources such as sugar cane, corn starch, agricultural waste, and other organic feedstocks (see Table 1 for definitions). According to European Bioplastics (2019), biobased plastics make up about one per cent of worldwide annual plastic production.

Plastic can also be made from recycled plastic, either from post-industrial plastic waste (for example, scrap from manufacturing processes) or post-consumer waste (for example, a used plastic water bottle). Post-consumer plastic waste can be sourced from the formal waste management system or it can be recovered from dumps or the environment, including land, waterways, beaches or the open ocean. As outlined in the recycling definition by the Ellen MacArthur Foundation, recycling efforts should be focussed on post-consumer plastic waste for a more circular economy that includes the use stage of the plastic value chain. It can be argued that manufacturers should always have an incentive to maximise material use and minimise waste of their manufacturing processes. A plastic packaging produced with post-industrial recycled content could still become post-consumer waste that ends up in landfill or leaks into the environment.

4.2 Overview of Plastic Recyclability and Compostability

Recycling and composting plastics are crucial elements of the circular economy. Nonetheless, they are complex processes that are influenced by a number of factors.

4.2.1 Factors that Impact Recyclability

The term 'recyclable' is ambiguous and requires consideration of multiple aspects of packaging, as well as the local infrastructure and existence of end markets for recycled material. The definition for 'recyclable' used here is the definition provided by the Ellen MacArthur Foundation in its New Plastics Economy Global Commitment (2018, p. 12):

“A packaging or packaging component is recyclable if its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale.”

As is clear from this definition, the plastic resin that an item is made from is only one of multiple factors that determines whether a product can be considered recyclable. There are several different standards that cover recyclability in detail (these are listed in Table 4, Selected Standards for Plastic Packaging), and there are a range of guidance documents which provide assistance to companies looking to improve the recyclability of their packaging (discussed in 5.2 Packaging Guidance).

Some of the key considerations regarding whether a product can be considered and labelled as recyclable are listed below:

- **Resin type:** While most if not all plastic resins are theoretically recyclable, resins 1 (polyethylene terephthalate) and 2 (high-density polyethylene) are the most readily and economically recycled ones today. Technologies and programmes to recycle other resins exist, but these are limited in practice and scale.



- **Size, shape, colour:** In places where sorting is done with advanced technology such as optical sorters, items must conform to certain size, shape or colour requirements to be recognised as recyclable. Items that are too small or that do not conform will be discarded as contamination even if they are made out of the correct material. In countries where manual labour is used for sorting or where there is informal sector collection, certain characteristics can still be helpful in identifying recyclable items. For example, the shape of a plastic bottle or its colour can signal whether an item is of recyclable value.
- **Linings, labels, components:** Most packages have more than one element of composition. A plastic bottle, for example, often has a tag showing brand and product characteristics, and an adhesive to affix the tag. For more complex packaging, such as a hand soap dispenser, the packaging may contain ten or more pieces made from different materials. These different materials used, whether they can be readily separated by consumers or recyclers, and the size of the individual elements all influence the recyclability of the item as a whole.
- **Contamination:** The recycling process has a limited tolerance for contaminants. Contamination can be as a result of the wrong type of plastic (for example, PP in PET recycling stream), a different material (for example, paper or PLA in PET recycling stream), food or beverage residues, or other materials or foreign objects entering recycling streams. Some contamination can damage recycling machines, which leads to recyclers being cautious about accepting potentially contaminated material.
- **Additives:** The presence of various Persistent Organic Pollutants (POPs) and other potentially toxic substances contained in plastic products has a negative impact on the environment and human health and these impacts must be considered in all phases of the life cycle of plastic products.



- **Available infrastructure:** No matter how readily recyclable a piece of packaging may be, if collection or recycling infrastructure is not available where consumers live, then it does not get recycled and should not be considered recyclable.
- **Economics and end markets:** Some plastics are technically recyclable but the economics are unfavourable, and therefore the material is not being recycled. Similarly, if there is insufficient demand for a certain type of recycled material, then items made from that material cannot be considered recyclable.

4.2.2 Factors that Impact Compostability

- **Available infrastructure:** Industrial composting infrastructure is still quite limited globally, though some cities have developed strong municipal composting systems.
- **Organic waste separation:** Cities and countries that have wet/dry separation of waste for their collection systems already have a helpful foundation both in infrastructure and behavioural norms for use of home compostable and soil biodegradable plastic materials.

4.2.3 Geographic Variations in Recycling and Composting

Policies and regulations governing what can or must be recycled or composted vary locally, regionally and nationally, as does the financing available to support them. A recent UNEP report, *The Role of Packaging Regulations and Standards in Driving the Circular Economy* (2019b), provides an overview and analysis of a range of policies in the EU, Japan and ASEAN that impact packaging and the circular economy. The report found that there were three themes that were common between the successful policy efforts of the EU and Japan:

- employing a waste hierarchy approach to packaging in which disposal is the least favoured option compared to more sustainable alternatives, such as reuse;
- setting national targets for recycling and recovery; and
- creating a circular economy or life cycle approach to packaging.

Local behavioural norms also influence the degree to which people comply with guidelines or regulations on what and how to recycle. Germany is cited as an example of a place where the culture of recycling and environmental stewardship is strong (Brown 2015), while South Korea is recognised for having achieved a significant shift in



recycling behaviour (Bahraini 2019) and having the third highest recycling rate in the world, behind Germany and Austria (Gray 2017).

Places with a culture of backyard or home composting will be better prepared to integrate home compostable products. However, plastic items that are industrially compostable but not clearly understood as such will be problematic in these contexts as they will likely contaminate organic waste streams. Variations in recycling and composting rates across geographies also reflect varying levels of access to infrastructure and end markets.

4.2.4 The Role of Retailers in Facilitating Recycling

It is also worth noting that retailers, as the interface between producers and consumers, are playing a role in providing guidance on sustainable packaging design and labelling. Several retailers have taken leadership roles in catalysing the implementation of standardised labels for recycling. Examples include the following:

- In the US, Walmart has worked with the Association of Plastic Recyclers (APR) and the Sustainable Packaging Coalition, the creators of the How2Recycle label, to label all private brand products with a How2Recycle label and encourage its national brand suppliers to do the same. Walmart has also developed a Sustainable Packaging Playbook (Walmart, Inc. 2018) and a Recycling Playbook (Walmart, Inc. 2019) to help its suppliers create packaging that is designed for existing recycling infrastructure.
- In the UK, Marks & Spencer was one of the first retailers to adopt the On-Pack Recycling Label (see Table 7) and continues to lead the industry with its goals for recyclable packaging and participation in multi-stakeholder efforts to increase recycling rates. The company announced in early 2019 that plastic recycling bins will be set up in hundreds of its stores in a scheme to take back plastics that are not currently recycled in local recycling systems. Marks & Spencer has teamed up with the chemical company Dow to ensure the plastic that is collected is recycled and turned into useful products (Poulter 2019).
- In Australia, Woolworths partnered with Planet Ark and APCO to be the first Australian supermarket to commit to adopting the Australasian Recycling Label (ARL) across its Own Brand range (Woolworths Group 2017). Woolworths also launched the On-Pack Recycling label in its stores in South Africa to address the gap between messaging on packages and what could be recycled in practice with the limited technology of the local recycling system (Packaging News South Africa 2013).

An additional role for retailers is to serve as a collection point for packaging materials that cannot be recycled through local infrastructure. For example, major retailers in the US, including Target, Walmart, Lidl, and Wegmans, have plastic bag, wrap and film collection bins outside their stores to collect materials that cannot be recycled in most municipal recycling systems (GreenBlue 2019a).



5. STANDARDS AND GUIDANCE

Standards and guidance are an important but often hidden element of consumer sustainability information, laying the foundations for a safer and more sustainable world across a range of products and services. Standards are developed and agreed by consensus with input from a range of stakeholders and, although generally non-binding, they often form the backbone of legislation, compliance regimes, processes and product design. Guidance documents support this regime, translating the requirements of standards and offering advice on the practical aspects of plastic production, consumption, and disposal.

5.1 Standards

There are three primary standard-setting bodies that govern the relevant standards for sustainable packaging claims:

1. The International Organization for Standardization (ISO; standards begin with “ISO”),
2. ASTM International (ASTM; standards begin with “ASTM”), and
3. The European Committee for Standardization (CEN, standards begin with “EN”).

These organisations have established tens of thousands of standards covering almost every conceivable topic. In some cases, essentially identical standards are overseen by more than one of the standards organisations. For example, ASTM 6400 and EN 13432, for compostable and biodegradable packaging, are the same standard but one is set by ASTM and the other is set by CEN. Companies must pay to access the technical details of the standard and they



must work with certifying bodies to demonstrate compliance with these standards.

Table 4 outlines a selection of key standards for plastic packaging and provides a description of what the standard covers. It is important to note that these standards do not require specific consumer communication.

Table 4: Selected Standards for Plastic Packaging

Category	International Standards
<p>Recycled Content</p>	<p>ISO 14021 For Self-Declared Environmental Claims, including Recycled Content and Recycled Material. This standard provides definitions for “Recycled Content” and “Recycled Material” that certifiers such as SCS and UL reference in their standards (SCS Global Services 2014).</p> <p>EN 15343 Plastics. Recycled plastics. Plastics recycling traceability and assessment of conformity and recycled content. This standard aims to encourage proper recycling of plastics by standardising it, particularly focusing on the process for the traceability and assessment of conformity and recycled content of recycled plastics (Association Européenne des Recycleurs de Plastiques 2019).</p>
<p>Materials & Recyclability</p>	<p>ISO 18604 Material Recycling. Introduced in 2012, this standard was intended to give guidance on which packaging can be classified as recoverable by material recycling and end the fragmented approach to recycling by jurisdictions, regulators, packaging manufacturers, or certification bodies to date (Bell 2013).</p>
<p>Compostable & Biodegradable</p>	<p>These standards cover plastics and products made from plastics that are designed to be composted in municipal and industrial aerobic composting facilities (ASTM International [ASTM] 2019).</p> <p>ASTM D6400 Standard Specification for Labelling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities, and/or ASTM D6868 Standard Specification for Labelling of End Items that Incorporate Plastics and Polymers as Coatings or Additives with Paper and Other Substrates Designed to be Aerobically Composted in Municipal or Industrial Facilities.</p> <p>ISO 18606 Packaging and the environment – Organic recycling.</p> <p>EN 13432 Packaging. Requirements for packaging recoverable through composting and biodegradation.</p> <p>Home compostability is not currently addressed through international or European standards. This French standard is based on ISO 18606 but adapts it for home composting.</p> <p>NF T 51-800 Plastics - Specifications for plastics suitable for home composting.</p>

Category	International Standards
Biobased	ASTM D6866 Test Methods for Determining the Biobased Content of Solid, Liquid and Gaseous Samples Using Radiocarbon Analysis.
General Eco-Labels	<p>ISO 14020 Environmental labels and declarations – General principles</p> <p>ISO 14024 Environmental labels and declarations – Type I environmental labelling – Principles and procedures. The definition of an ISO 14024 Type 1 label is: “a voluntary, multiple-criteria based, third party programme that awards a license that authorizes the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle considerations” (ISO 2018).</p> <p>ISO 14025 Type III environmental declarations – Principles and procedures. Type III environmental declarations as described in ISO 14025 are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication under certain conditions is not precluded (ISO 2019).</p>

5.1.1 Limitations of Standards

There are some variations across standards, which are not visible to most consumers. For example, experts noted that the requirements and calculations for recycled content percentage of packaging vary by the different certifiers who are implementing them.

Further, standards provide the testing requirements for specific claims, but they are often disconnected from what may be happening in real life. Standards do not consider accessibility or availability of necessary

infrastructure or how real-life conditions may impact the potential for the claim to be fulfilled. One example is the mismatch in timeframes on composting: most industrial composting standards use 12 weeks as the maximum amount of time it can take a plastic item to fully biodegrade, while many composting facilities that have accelerated their processes take only half that time and drive greater throughput and financial viability. This often means that composters either no longer accept ‘compostable’ plastic items or they may be filtered out as contamination from otherwise finished compost.

Finally, standards do not provide guidance on relative importance of different claims. The existence of a standard is not evidence that it is the right approach to take in any given situation, or that the impact of the claim that the standard is certifying is relevant in that context. With regards to plastic packaging, a standard on plastic will only assess the packaging of the product and not the actual product itself; however, the overall sustainability of the product will also depend on the actual content of the product. Labels that only apply to the packaging can give a halo effect to the product, which could be seen as a misleading claim about the overall sustainability of the product. To really determine the overall sustainability of a product and its packaging, comprehensive life cycle assessments are required, but this detailed level of information is complex and costly and therefore currently not usually provided to consumers.

5.2 Packaging Guidance

There is a variety of guidance documents that help in the practical implementation of recycling standards and sustainable packaging design. Guidance documents may be issued by government agencies or intergovernmental organisations, industry associations (often in collaboration with individual members), or non-governmental agencies.

Examples of these guidance documents include:

Government agencies and intergovernmental organisations

- The United Nations Environment Programme and International Trade Centre's (2017) *Guidelines for Providing Product Sustainability Information* provide both fundamental principles and aspirational principles for organisations looking to communicate about their sustainability efforts.
- In December 2018, China's State Post Bureau issued the *Express Delivery Industry Green Packaging Guide*, which includes guidance for more recycling of packaging materials (Soo 2018).

- The US Federal Trade Commission (FTC), the agency which promotes consumer protection against false business claims, developed the *Green Guides* (United States Federal Trade Commission 2012) as a response to concerns over greenwashing.
- EUROOPEN, the European Organization for Packaging and the Environment, developed its guide *EUROOPEN's Essential Requirements for Packaging in Europe: A Practical Guide to Using the CEN Standards* to help companies assess whether their packaging complies with the mandatory EU "Essential Requirements" set out in Directive 94/62/EC on packaging and packaging waste (European Organization for Packaging and the Environment [EUROOPEN] 2005). The European Union [EU] has also taken steps towards cleaning up recycling; it will no longer allow materials containing a class of toxic, globally banned flame retardants known as Polybrominated Diphenyl Ethers (PBDEs) to be recycled (IPEN and Arnika 2020). Researchers had revealed that across Europe, alarming levels of toxic banned flame retardants and related chemicals, which originated largely from discarded electronics equipment, were contaminating the recycling stream and new consumer goods made from recycled plastics (ibid.).

Industry associations

- The Association of Plastics Recyclers, the international trade association representing the plastics recycling industry, developed the *Design Guide for Plastics Recyclability* (Association of Plastic Recyclers 2018) to help package design engineers create packaging that is fully compatible with plastics recycling systems in North America.
- Packaging SA, representing converters, raw material suppliers to the packaging industry, brand owners and other affiliated organisations in South Africa, produced *Design for Recyclability for Paper and Packaging in South Africa* in 2015, at the request of the Department of Environmental Affairs.

- The Australian Packaging Covenant Organisation (APCO) produced the *Sustainable Packaging Guidelines* as part of the Australian Packaging Covenant, which includes Australia's 2025 National Packaging Targets (Australian Packaging Covenant Organisation 2019).
- The Sustainable Packaging Coalition offers the *Design for Recycled Content Guide* (Sustainable Packaging Coalition 2019b) as well as *The Essentials of Sustainable Packaging*, which is complemented by *The Essentials of Bioplastics*, *The Essentials of Compostable Packaging*, *The Essentials of Ocean Plastic Pollution*, and other resources for packaging professionals (Sustainable Packaging Coalition 2019c).

Non-governmental organisations

- The Ellen MacArthur Foundation, which launched the New Plastics Economy Global Commitment in collaboration with the United Nations Environment Programme in 2018 to drive the circular economy, has created a practical definition of 'recyclable' that many in the industry have endorsed (Ellen MacArthur Foundation 2018, pp. 11-13).

6. LABELS

Labels are one of the most easily recognisable on-package consumer communications; with distinctive visual designs, they can be immediately apparent to consumers in a way that claims are not. Nonetheless, their design can also create scope for confusion. The following chapter contains a mapping of labels found on plastic items and an assessment of their effectiveness in line with the fundamental principles of the Guidelines.



The identified labels were grouped by topic into six categories:







- 6.1 Recycled content (Table 5)
- 6.2 Biobased plastics (Table 6)
- 6.3 Recycling guidance (Table 7)
- 6.4 Recycling financing (Table 8)
- 6.5 Compostability and biodegradability (Table 9)





6.1 Labels for Recycled Content

Five labels were identified as relating to the certified levels of recycled content in plastic packaging. All of the labels identified for recycled content are globally applicable, though patterns of adoption across geographies are not known.

Where the label is compliant with or applying relevant international standards, this has been noted in the description. Labels are presented in alphabetical order by name. Note that some of these labels refer to themselves as 'standards,' but in the terminology adopted for this report, they are in fact certifications with associated labels.

Table 5: Labels for Recycled Content

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>Global Recycle Standard (GRS) is a holistic certification for products with recycled content owned by Textile Exchange. The Recycled Claim Standard (RCS) is a chain of custody standard to track recycled raw materials through the supply chain. RCS and GRS are primarily labels for recycled materials in the apparel industry and are growing to other industries, including metal, plastics, electronics, packaging and beyond. ISO 14021 compliant (Control Union 2019).</p>	<p>Global</p>	 Neutral	<ul style="list-style-type: none"> - Relevance: Includes pre-consumer recycled material - Clarity: Implies recyclability + Reliability: Verified
	<p>GreenCircle Recycled Content Certified – Certifies products for total recycled content based on pre- and post-consumer recycled content definitions. Compliant with ISO 14021 and FTC Green Guides requirements (GreenCircle Certified 2019).</p>	<p>Global</p>	 Mixed	<ul style="list-style-type: none"> - Relevance: Includes pre-consumer recycled material + Reliability: Verified
	<p>Intertek's Recycled Content Verification Program – helps suppliers and manufacturers validate and communicate the pre-consumer and/or post-consumer recycled content in their product. ISO 14021 compliant (Intertek 2019).</p>	<p>Global</p>	 Mixed	<ul style="list-style-type: none"> - Clarity: Imagery confusing + Accessibility: Simple to identify + Reliability: Verified

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>SCS Global Recycled Content Certification for products and recycling programmes. Recycled Content Certification measures the percentage of recycled content for the purpose of making an accurate claim in the marketplace. Compliant with ISO 14021 and FTC Green Guides requirements (SCS Global Services 2019).</p>	Global	 Mixed	<ul style="list-style-type: none"> - Clarity: Imagery confusing + Reliability: Reputable organisation + Reliability: Verified
	<p>UL Environmental Claim Validation Mark / UL Recycled Content Validation – enables products to showcase recycling efforts at a consumer level. Claims typically consist of the manufacturer indicating either an average percentage or minimum percentage of content. ISO 9001, UL 746C & 746D compliant (UL 2019).</p>	Global	 Mixed	<ul style="list-style-type: none"> - Clarity: Imagery confusing + Transparency: Specifies threshold of recycled content and gives URL + Reliability: Verified

Summary Assessment of Labels for Recycled Content

None of the labels in this category received high marks from all of the experts consulted, primarily due to a lack of clarity. Many labels could be confused with general eco-labels and, with the exception of the UL label, they generally lack transparency. While each of these labels validates that a certain level of recycled content has been used in the plastic packaging, there are differences in the requirements of different certifiers. For example, Global Recycled Standard/Recycled Claim Standard and the GreenCircle Recycled Content Certification allow pre-consumer recycled material to count towards the total percentage

of recycled content, while the other labels refer only to post-consumer recycled content. Additionally, there are technical differences in the way that different certifiers calculate the percentage of recycled content, which means there is inherent inconsistency between the labels. The consultation also highlighted that some businesses feel these certification programmes can be too expensive relative to the perceived value of the brand. In other words, businesses question if consumers care enough about recycled content to shoulder the costs of certification.



There are, however, also some positive remarks about Labels for Recycled Content. As they are based on the content of the packaging rather than offering guidance on proper disposal, these labels are globally applicable and do not need to be adapted for different geographies. As with Labels for Biobased Plastics (see below), Labels for Recycled Content reflect something that has already occurred. In terms of levers for driving sustainable use of plastic in packaging, use of recycled content is one of the most impactful.







6.2 Labels for Biobased Plastics

Biobased plastics, as defined in Table 1, are plastics produced from renewable feedstocks rather than fossil fuels. Due to the widespread lack of understanding of this term, good biobased claims must avoid potential confusion with biodegradability by clearly defining the term. All labels in this category can apply to a product, its packaging, or both, and all labels assessed in this category are third-party verified.



Table 6: Labels for Biobased Plastics

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>DIN-Geprüft Biobased / DIN Certco of Germany has three quality levels to identify the biobased content of products. Products which are wholly or partly produced from biobased raw materials can be certified under this scheme if they are at least 50 per cent organic and have at least 20 per cent biobased content. ASTM D6866, DIN 18128 compliant (Beta Analytic Testing Laboratory 2019).</p>	Germany/ EU	 Neutral	<ul style="list-style-type: none"> - Clarity: Mixed messages: organic and biobased + Transparent: specifies biobased percentage

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>OK biobased by TÜV Austria – certifies products on the basis of the determined percentage of renewable raw materials (percentage Biobased) (TÜV AUSTRIA 2019a).</p>	<p>EU</p>	 <p>Negative</p>	<ul style="list-style-type: none"> <li data-bbox="1798 212 2101 411"> - Relevance: Does not address sustainability of feedstocks <li data-bbox="1798 451 2101 571"> - Clarity: use of 'chasing arrows' misleading
	<p>USDA Certified Biobased – the label displayed on a product certified by USDA is designed to provide useful information to consumers about the biobased content of the product, though it does not certify whether the biobased content was sustainably sourced. ASTM D6866 compliant (United States Department of Agriculture [USDA] 2019).</p>	<p>North America</p>	 <p>Mixed</p>	<ul style="list-style-type: none"> <li data-bbox="1798 651 2101 850"> - Relevance: Does not address sustainability of feedstocks <li data-bbox="1798 882 2101 1002"> + Clarity: specifies that it refers to the product
	<p>Roundtable on Sustainable Biomaterials (RSB) Excellence in Biomass and Biofuel Certification – verifies that biomaterials, biofuels and biomass are socially responsible, environmentally sustainable and credibly sourced (Roundtable on Sustainable Biomaterials [RSB] 2019).</p>	<p>Global</p>	 <p>Positive</p>	<ul style="list-style-type: none"> <li data-bbox="1798 1082 2101 1241"> + Relevance: Addresses sustainability of feedstocks <li data-bbox="1798 1273 2101 1433"> + Reliability: Credible multi-national organisation

Summary Assessment of Labels for Biobased Plastics

In general, experts want Labels for Biobased Plastics to address the sustainability and responsible sourcing of the materials in use, not just to certify that a product is made from biobased content. Some but not all labels in this category make a distinction between being made 'from biomass' versus 'from sustainably sourced biomass'. This is an important distinction since biobased plastics that are made from agricultural products can create competition for food, influence commodity prices, and accelerate the conversion of natural land to agricultural land. For example, the Roundtable of Sustainable Biomaterials (RSB) label was well-reviewed for its attentiveness to this issue.

Avoiding confusion with disposal options such as 'compostable' and 'biodegradable' is crucial to avoid contamination of waste streams with biobased products. Yet, lack of consumer understanding of the terms poses a risk. Clear and unambiguous imagery is therefore important if a label only indicates biobased content. In this regard, the TÜV Austria OK label can be misunderstood by consumers as it uses the 'chasing arrows' symbol which commonly refers to recyclability.

In general, the consultation indicated that these labels are not as frequently used on plastic packaging as other labels. As with recycled content, the cost of certification may also be a barrier to the uptake of Labels for Biobased Plastics. However, this complaint was heard less frequently for biobased labels, likely due to their more infrequent usage.







6.3 Recycling Guidance







In addition to the universal recycling symbol, which is not a controlled trademark, ten recycling guidance labels were identified globally. The Resin Identification Codes also appear on plastic packages worldwide






and are often misinterpreted by consumers as recycling guidance. As this is a misconception and Resin Identification Codes do not indicate recyclability, they are excluded from the assessment. In general, for this category of labels, more specific information is better and the local context and relevance is critical but challenging given the global flow of goods. All labels in this category apply to packaging and some to single-use items, such as plastic cups and carry-out containers.

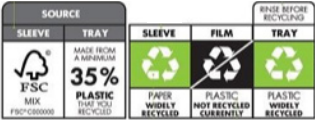



Table 7: Labels for Recycling Guidance

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>Australasian Recycling Label – on-pack labelling scheme that helps consumers understand how to recycle products correctly and assists brand owners to design packaging that is recyclable at end-of-life. Powered by the Packaging Recyclability Evaluation Portal (PREP), an online tool that assesses packaging recyclability in the Australian and New Zealand recovery systems (Organisation 2019).</p>	<p>Australia and New Zealand</p>	 Positive	<ul style="list-style-type: none"> + Clarity: Specific instructions + Accessibility: Easy to use + Reliability: Consistent
	<p>EUCertPlast – created by Plastics Recyclers Europe, works according to the European Standard EN 15343:2007 and aims at encouraging environmentally friendly recycling of plastics by standardising it (European Certification of Plastics Recycling 2019).</p>	<p>EU</p>	 Mixed	<ul style="list-style-type: none"> - Clarity: Image is hard to interpret + Transparency: Traceability is top priority
	<p>How2Recycle Label – created by the Sustainable Packaging Coalition, How2Recycle is a standardised labelling system that clearly communicates recycling instructions to the public in North America (GreenBlue 2019b).</p>	<p>North America</p>	 Neutral	<ul style="list-style-type: none"> + Clarity: Specific instructions + Transparency: Has URL - Reliability: Misuse by companies is a challenge

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>Japanese recycling symbols, such as pura māku プラマーク, from 'plastic mark' – a series of identification marks used to distinguish various types of recyclable items (Anon 2019) (PET Bottle 2019).</p>	<p>Japan</p>	 Neutral	<ul style="list-style-type: none"> - Clarity: Generic image + Accessibility: Clear direction
	<p>Le Guide du TRI (Guide to Sorting) – created by CITEO, an organisation that helps businesses reduce the environmental impact of their packaging. This label incorporates the Green Dot and also provides additional information about which product components should be recycled and which should be disposed of (Citeo 2019).</p>	<p>France</p>	 Mixed	<ul style="list-style-type: none"> - Accessibility: Hard to read + Clarity: Gives specific guidance
	<p>On-Pack Recycling Label (OPRL) – aims to deliver a simple, consistent and UK-wide recycling message on retailer and brand packaging (The On-Pack Recycling Label [OPRL] 2019). The OPRL has been in use for over 20 years and has been supported with significant consumer messaging and campaigns. While it previously featured three categories – recycle, check locally, and don't recycle – OPRL announced in January 2020 that it would be removing the check locally option to improve clarity for consumers (Benson 2020).</p>	<p>UK</p>	 Positive	<ul style="list-style-type: none"> + Clarity: New design reduces burden on consumer to seek extra information + Relevance: Acknowledges local infrastructure variation

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>Recicla al Amarillo (Recycle Yellow) – Ecoembes Symbol system for the recycling of packaging (Europa Press 2015). The yellow bins are for containers, including plastic. There are also blue bins for paper and cardboard, and green bins for glass.</p>	Spain	 Positive	<p>+ Accessibility: Good if you have national agreements on colour coding of recycling bins</p>
	<p>The Triman logo is mandatory for all marketers of recyclable products covered by Extended Producer Responsibility requirements following French Decree No.2014-15733 (ADEME, Ministère de l'Écologie, du Développement Durable et de l'Énergie 2015). The Triman must accompany Le Guide du TRI if any part of the package or product is recyclable, and it can also appear on packages that are not recyclable.</p>	France	 Neutral	<p>- Relevance: Mandatory image is not adding relevant details</p> <p>+ Clarity: Provides specific instructions for disposal</p>
	<p>Universal Recycling Symbol – the universal symbol for recycling, which initially described paper recyclability, can be found on plastic containers all over the world, sometimes accompanied by text such as “Please Recycle.” Because the symbol is not trademarked and is part of the public domain, it can be found in various colours and styles.</p>	Global	---	Not assessed

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>Woolworths Recycling Labels – the recycling instruction label used by Woolworths is supported and endorsed by the major industry organisations in South Africa, and is set to become the standard in the country (Woolworths 2018).</p>	<p>South Africa</p>	 Positive	<ul style="list-style-type: none"> + Clarity: Specific, detailed guidance + Transparency: Source material specified

Summary Assessment of Labels for Recycling Guidance

Three of the labels in this category are quite similar and generally received high marks from experts, however, there were concerns about the integrity of their use in practice. The Australasian Recycling Label (Australia/New Zealand) and the Woolworths Recycling Labels (South Africa) provide clear, specific, relevant information. While the How2Recycle label received positive reviews for clarity and transparency, there was criticism that it is widely misused and may have mixed incentives as an industry-funded organisation that needs to keep its membership on its side (Lerner 2019).

The On-Pack Recycling Label (OPRL) (UK) has been in use for almost twenty years and is highly recognised in the UK, but experts commented that it adds limited relevant information for the consumer on the package. The ‘Check Locally’ caption on the old label was seen as a limitation, as it requires more initiative from consumers to dispose of a packaging appropriately. Nonetheless, OPRL’s steps to simplify their logo to a binary design should reduce consumer confusion and increase transparency (Benson 2020).

In contrast to the simplicity of the OPRL, Le Guide du TRI (Guide to Sorting) (France) is considered too complicated and can include the GreenDot, which is confusing to consumers (see further discussion in the next section). Recicla al Azul, Amarillo, y Verde (Spain) is an








example of a clear, relevant and accessible label, but depends upon a centralised system of colour-coded collection bins. The EUCertPlast was described as unclear, containing imagery that suggests it is an eco-label, and some of the experts even commented that visually it appeared to indicate incineration. Finally, the Triman logo (France) is mandatory for all marketers of recyclable products and must be accompanied by Le Guide du Tri if any parts of the packaging are recyclable. It can be useful if all French consumers understand what it means, but the fact that the Triman can also appear on packaging that is not recyclable without any further guidance reduces the relevance of the Triman logo as it does not provide additional information to aid proper handling on its own.













The main criticism of this type of label is that it can give the impression that an item is recyclable even if it is not practical or not likely to be recycled after collection. This arguably creates a greenwashing or ‘licence to pollute’ effect where products are credited with being recyclable when they are not. Moreover, these labels are often criticised for being unreadably small on packages. However, companies who have made commitments to put these labels on 100 per cent of their products are using this as a driver for packaging design innovation because they don’t want a ‘not recyclable’ label on their products.

6.4 Recycling Financing

The Labels for Recycling Financing indicate that companies have paid into a fund to support recycling infrastructure, deposit schemes and recycling partnerships. These labels apply to packaging only. Since labels in this category are not linked to specific standards, they are not third-party verified.

Table 8: Labels for Recycling Financing

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	Green Dot™ – the Green Dot™ on packaging means that for such packaging, a financial contribution has been paid to a qualified national packaging recovery organisation. The Green Dot™ logo merely indicates that a company has joined the Green Dot scheme, and not necessarily that the package is fully recyclable (Packaging Recovery Organisation Europe [PRO Europe] 2019a) (Green Dot North America 2016).	Primarily EU, but trademark is used globally	 Negative	 Clarity: Does not mean recyclable but imagery suggests otherwise
	Pfand - Einweg (Deposit - Single-use) – logos used to identify single-use containers for which a deposit has been paid and will be collected by the consumer when the container is returned (All About Berlin 2018).	Germany	 Mixed	 Clarity: Overly complicated  Accessibility: Tied to deposit scheme

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	Pfand - Mehrweg (Deposit - Multiple-Use) – logos used to identify multiple-use containers for which a deposit has been paid and will be collected by the consumer when the container is returned (All About Berlin 2018).	Germany	 Mixed	<ul style="list-style-type: none">  Clarity: Overly complicated  Accessibility: Tied to deposit scheme
	Pant A, B, C – Labels used in the Danish recycling system to indicate which bottles can be returned to collect a deposit refund (Denmark NU Blogazine 2018).	Denmark	 Positive	<ul style="list-style-type: none">  Clarity: Has sorting guidance  Accessibility: Tied to deposit scheme
	TerraCycle offers recycling programmes funded by brands, manufacturers, and retailers around the world to help consumers collect and recycle hard-to-recycle waste (TerraCycle 2019). Some programmes are free to consumers, while others have a cost.	Across 21 countries including USA and EU	 Mixed	<ul style="list-style-type: none">  Transparency: Limited  Clarity: Logo accompanied with specific instructions

Summary Assessment of Labels for Recycling Financing

Out of all of the reviewed labels for recycling financing, the Green Dot stands out as the least aligned with the Guidelines. Experts agree that the design of this label, with its 'chasing arrows' reminiscent of the universal recycling symbol, is easily misinterpreted as indicating that a packaging is recyclable and could be contributing to the contamination of recycling streams. The Green Dot™ label is a trademark that is protected in more than 170 countries (Green Dot North America 2016). Although the logo has the hallmark 'chasing arrows' of the universal recycling symbol, the Green Dot™ logo does not mean that the packaging is recyclable. It is the financing symbol for the organisation of recovery, sorting and recycling of sales packaging in the EU. According to Pro Europe, "When you see the Green Dot™ on packaging it means that for such packaging, a financial contribution has been paid to a qualified national packaging recovery organisation" (PRO Europe 2019b).

Although the Green Dot only applies in the EU, packaging with the Green Dot™ logo can be found all over the world where it has no relevance and can cause confusion. During the consultation, one expert shared the plastic packaging for a toy that he had bought in Brazil that had the Green Dot™ logo on it, despite its lack of relevance in this market.

Other labels in this category are for country or state-specific bottle deposit schemes. Germany has numerous labels that are used to signify how many uses a package has and how much deposit is paid and will be refunded upon return. The consultation highlighted that these labels can be unclear and overly complicated. Denmark has a deposit labelling system (Pant A, B, C) which experts found to provide clear guidance on proper sorting. Finally, the recycling company TerraCycle has partnerships with several multinational brands to collect and recycle some hard-to-recycle items, however, it is unclear how consist-

ent this labelling is and how it is communicated to consumers. For these reasons, this label received lower marks.




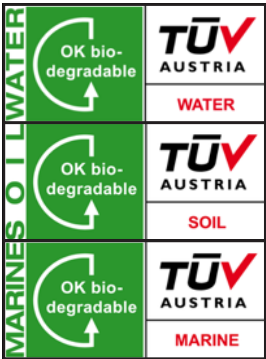

Overall, imagery suggestive of the universal recycling symbol is misleading for consumers when used on packaging that is not recyclable. However, transparency on funding mechanisms, such as deposit schemes, is seen as positive.











6.5 Compostability and Biodegradability





This category includes those labels which describe the ability of a product or package to break down into organic material. The assessed labels vary by the specific definition (e.g. biodegradable or compostable) and conditions (e.g. industrial composting facility) under which a material will break down. Each label in this category is third-party verified to a specific standard, although there is criticism about the appropriateness of some of these standards.

Table 9: Labels for Compostability and Biodegradability

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
 <p>Home Compostable AS 5810 ABAX 9999</p>	<p>Australasian Bioplastics Association Home Compostable Logo – verifies that the packaging fully biodegrades under home composting conditions. Corresponds to AS 5810 (Australasian Bioplastics Association 2019).</p>	<p>Australia and New Zealand</p>	 <p>Mixed</p>	<ul style="list-style-type: none"> - Clarity: Arrows suggest recycling, though words indicate home compostable + Transparency: References a specific credible standard
 <p>Not Yet Recyclable how2compost.info COMPOSTABLE CUP</p>	<p>How2Compost Label – created by the same organisation that created the How2Recycle label to clarify composting instructions to the public (GreenBlue 2019c).</p>	<p>North America</p>	<p>---</p>	<p>Not assessed (added after expert review period)</p>
 <p>MARINES OIL WATER OK bio-degradable TÜV AUSTRIA WATER OK bio-degradable TÜV AUSTRIA SOIL OK bio-degradable TÜV AUSTRIA MARINE</p>	<p>OK Biodegradable (Soil, Water & Marine) label by TÜV AUSTRIA. Verifies biodegradability in various conditions – soil, fresh water and marine waters – without adversely affecting the environment (TÜV AUSTRIA 2019b).</p>	<p>EU</p>	 <p>Negative</p>	<ul style="list-style-type: none"> - Clarity: Could be interpreted as license to litter - Reliability: Biodegradable in specific test environments; not reflective of real-life conditions

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	<p>OK Compost label by TÜV AUSTRIA – denotes biodegradability in light of specific requirements, in at-home garden compost heaps and industrial composting. EN 13432 and EU Packaging Directive compliant (TÜV AUSTRIA 2019c).</p>	<p>EU</p>	 <p>Mixed</p>	<ul style="list-style-type: none"> <li data-bbox="1787 312 2096 475"> + Clarity: Specifies relevance for home compostability <li data-bbox="1787 515 2096 663"> - Reliability: Test conditions may not reflect real life
	<p>Seedling Logo – trademark of European Bioplastics denotes products that are in compliance with EN 13432, meaning the product will fully biodegrade in an industrial composting plant under controlled conditions such as temperature, moisture and time frame – leaving nothing behind but water, biomass and CO2. EN 13432 compliant (European Bioplastics 2016).</p>	<p>EU, Australia and New Zealand</p>	 <p>Negative</p>	<ul style="list-style-type: none"> <li data-bbox="1787 746 2096 1054"> - Clarity: Misleading language, as it does not state that it refers to industrial composting, or reference a specific standard <li data-bbox="1787 1094 2096 1243"> - Reliability: Test conditions may not reflect real life

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
 <p>COMPOSTABLE IN INDUSTRIAL FACILITIES BPI®</p> <p><small>Check locally, as these do not exist in many communities. Not suitable for backyard composting. CERT # SAMPLE</small></p>	<p>The Compostable Logo by the Biodegradable Products Institute – Member companies that have their finished products certified as meeting ASTM D6400 and / or ASTM D6868 can use the logo to provide assurance of compostability or biodegradability (Biodegradable Products Institute 2019).</p>	<p>North America</p>	 <p>Mixed</p>	<ul style="list-style-type: none"> <li data-bbox="1778 389 2101 549"> + Clarity: Specific information, certification information and guidance <li data-bbox="1778 587 2101 895"> - Accessibility: Low consumer understanding and low access to industrial composting in market where this is being used
 <p>グリーンプラ® 生分解性プラスチック</p>	<p>GreenPla – Japan Bioplastics Association verification of biodegradable plastics. GreenPla must contain at least 50 per cent organic material and must not exceed specific upper limits for certain heavy metals such as cadmium, lead, arsenic, and mercury. ISO 18606 compliant (Japan BioPlastics Association 2019).</p>	<p>Japan</p>	 <p>Negative</p>	<ul style="list-style-type: none"> <li data-bbox="1778 975 2063 1094"> - Clarity: Resembles a general eco-label <li data-bbox="1778 1129 2063 1286"> - Reliability: No reference to standard or material

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
 <p data-bbox="212 571 383 616">Ramah Lingkungan SNI 7188.7 : 2016</p>	<p data-bbox="506 323 1146 552">Ramah Lingkungan (<i>Environmentally Friendly</i>) – Indonesian mark that indicates a package meets Indonesian National Standard (SNI) 7188.7: 2016 Ecolabel Criteria - Part 7: Product Categories for Plastic and Bioplastic Shopping Bags, biodegradable (PPID 2017).</p>	<p data-bbox="1227 323 1368 352">Indonesia</p>	 <p data-bbox="1541 416 1606 440">Mixed</p>	<ul style="list-style-type: none"> <li data-bbox="1789 323 2085 512"> - Clarity: Image and language do not clearly communicate compostability <li data-bbox="1789 555 2085 703"> + Transparency: Standard number is provided in logo <li data-bbox="1789 746 2085 855"> + Reliability: Based on a credible standard
	<p data-bbox="506 951 1160 1214">SASO OXO-Biodegradable Mark – In April 2017, Saudi Arabia began requiring exporters and suppliers of certain products to comply with the SASO Technical Regulation for Degradable Plastic Products and bear the OXO-Biodegradable logo; roll-out was postponed until autumn 2019 (XDS Solutions 2019).</p>	<p data-bbox="1249 951 1346 1018">Saudi Arabia</p>	 <p data-bbox="1525 1035 1632 1059">Negative</p>	<ul style="list-style-type: none"> <li data-bbox="1789 951 2103 1326"> - Relevance: Not a desirable characteristic. Oxo-biodegradable plastics have not yet been shown to fully biodegrade and pose a risk of microplastic creation

Summary Assessment of Labels for Compostability and Biodegradability

During the consultation, this category of labels emerged as the most problematic one and experts are still sceptical as to whether this category of labels is helping the overall environmental situation or causing more harm. While research suggests consumers prefer packaging that is compostable or biodegradable (Asia Pulp and Paper 2017), access to industrial composting facilities is very limited – according to one recent study, only 53 facilities in the U.S. can take BPI-certified compostable bioplastics products (BioCycle 2019). Therefore, these materials are often contaminating garden waste streams and recycling streams, or simply going into household waste. Furthermore, from an overall lifecycle impact perspective, these plastic alternatives may not be environmentally favourable, as shown in recent Life Cycle Assessments. Environmental research of the Federal Ministry of the Environment, Nature Conservation and Nuclear Safety of Germany found that:

“From an overall ecological point of view, these bioplastics are not necessarily better than conventional plastics but rather level with them [...] LCA results of [compostable bioplastic] packaging therefore may even show an unfavourable overall environmental performance as compared to the conventional competitors” (Detzel 2013, p. 96).

However, it is worth noting that compostable and biodegradable plastic packaging are relatively new and their characteristics could be improved. They could present a more viable alternative for countries with limited recycling infrastructure in place, as is the case in large parts of the developing world.

The Australasian Bioplastics Association Home Compostable Logo and the BPI Compostable Logo labels scored better than most in this category. All labels in this category are based on a credible standard

and most include the standards on the label. However, experts question whether the conditions under which the standards apply exist in real life. In addition, labels such as the TÜV AUSTRIA OK Biodegradable labels were considered confusing and could potentially be interpreted by consumers as a license to litter items in the environment.

The Seedling logo (EU) does not indicate that it refers specifically to industrial composting (so that consumers know not to put it in backyard compost, which is a common practice in Europe) and provides no reference to a standard. The language of the Ramah Lingkungan (Environmentally Friendly) (Indonesia) label is misleading and vague, but it provides reference to a specific standard that is considered credible. GreenPla (Japan) was regarded as vague and does not reference a specific standard. The SASO OXO-Biodegradable Mark (Saudi Arabia) is very misleading; oxo-biodegradable plastics have not been shown to biodegrade and may be a source of microplastic pollution (as noted in Table 1).



6.6 Summary of Labels Assessment

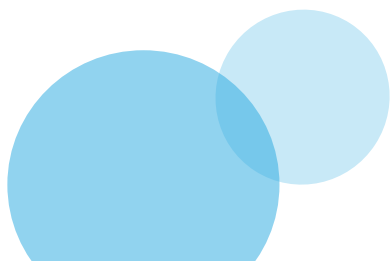
The mapping and assessment of different labels from across the globe revealed both helpful and problematic practices. In general, the recycling guidance labels received the best reviews, with four positive net assessments and no negative net assessments. To the contrary, compostability and biodegradability labels only received mixed or negative net assessments. This could reflect that recycling is a far more established and familiar process for consumers and businesses alike, as well as the difficulty in communicating the nuances of plastic compostability and biodegradability.

While the text in labels is crucial for providing the extra level of information consumers require to make sustainable choices, the visual aspect of labels can play a key role in communicating information to consumers in a quick and accessible manner. For this reason, designers should seek to ensure that symbols and colours used facilitate understanding rather than lead to misinterpretation when it comes to sustainability instructions. The most pertinent example of this is the use of the ‘chasing arrows’ symbol: limiting its use to indicate recyclability was one of the clearest findings to emerge from the consultation.

Table 10 provides a summary of the key findings for each category of labels.

Table 10: Overview of Key Findings from Labels Assessment

Category	Key Findings
Labels for Recycled Content	<ul style="list-style-type: none"> • Methods for calculating the percentage of recycled content are not consistent • Pre-consumer content is included in some cases which weakens the claim • Costs can be prohibitive relative to value • Some logos look like eco-labels, which may be confusing
Labels for Biobased Plastic	<ul style="list-style-type: none"> • Labels for Biobased Plastic must avoid potential confusion with biodegradability • Important distinction between ‘from biomass’ and ‘from sustainably sourced biomass’
Labels for Recycling Guidance	<ul style="list-style-type: none"> • Local context and relevance is critical but challenging given a global marketplace • The best guidance offered more detailed and specific information
Labels for Recycling Financing	<ul style="list-style-type: none"> • Use of imagery suggestive of universal recycling symbol is confusing to consumers when used on packaging that is not recyclable • Transparency on funding mechanisms is positive
Labels for Compostability and Biodegradability	<ul style="list-style-type: none"> • Significant discrepancy between labelling and available composting infrastructure • Labels for marine, soil, or water biodegradability risk giving consumers the false impression that it is acceptable to dispose of plastic packaging in those environments



7. CLAIMS

This chapter presents examples of claims on plastic packaging and disposable food-ware that may or may not be backed up with certifications. The claims in this report are offered as illustrative examples and were not assessed individually. Nevertheless, general observations and recommendations are provided. It is critical to note that claims tend to be less credible than labels, this is because whilst many self-made claims will be accurate, labels are more likely to be supported by certifications and standards and therefore provide more reliable and transparent sources of information to consumers.

When undertaking a mapping of common existing claims found on plastic packaging and disposable food-ware, five main categories were identified. These claims communicate information about the content of the plastic packaging or food-ware, such as made from recycled, biobased, or ocean plastic, as well as claims regarding how the plastic can be used and disposed of, such as compostable, biodegradable, or recyclable.

The claims addressed in the following section are grouped into the following categories:

- 7.1 Made from Recycled Plastic
- 7.2 Made from Ocean Plastic and Similar Variations
- 7.3 Biobased
- 7.4 Compostable and Biodegradable
- 7.5 Recyclable

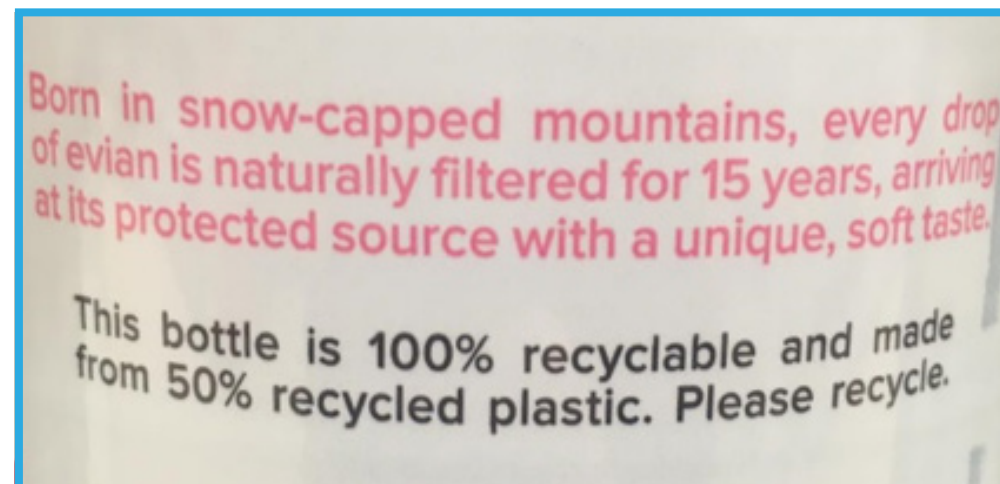
7.1 Made from Recycled Plastic

Claims regarding recycled plastic are increasingly common and also important for communicating information to consumers about the provenance of plastic packaging and its reliance on virgin feedstocks.

One issue that may arise is consumer confusion between the claims 'made from recycled plastic' and 'recyclable'. While the former refers to the content of the packaging, the latter gives guidance on how consumers can dispose of a product. If a packaging includes both types of claims, it is best to place them in close proximity to improve clarity and avoid confusion.

Figures 6 and 7 show good examples of this; both clearly state recycled content and recyclability side by side. The use of recycled plastic can be seen as a positive shift, however, as with labels, it is often unclear if these claims refer to post-consumer recycled plastic (PCR) or other types of recycled plastic. Moreover, while self-made claims are not inherently bad, the credibility of the claim is improved if it is backed by a label or transparent, credible partnership.

Figure 6: Example of recyclable and recycled plastic claim



Source: Author's own

Figure 7: Example of recycled plastic claim



Source: Author's own

It is worth noting that neither of these examples provide information on the type of recycled plastic being used for these items, such as whether the recycled plastic is post-consumer recycled content which is preferable over pre-consumer recycled content. While a more concise message may make the claim more accessible, more specific information would help consumers make meaningful comparisons when choosing between different products.

7.2 Made from Ocean Plastic and Similar Variations

Several companies are piloting packaging made from plastic that would otherwise be contaminating the environment, with a particular focus on oceans.

Definitions of this type of plastic vary from company to company and the amount of this packaging produced appears to be limited to pilots and specific product lines at present. The proliferation of different definitions means that it is difficult for consumers to know what a broad claim such as 'ocean plastic' really means. Given the potential for confusion, it is important for these claims to specify what percentage of ocean plastic has been used. For example, the recycling company TerraCycle and the hair care product line Herbal Essences have developed

a line of products that uses 25 per cent beach plastic for packaging (Packaging Gateway 2019).

There is not yet an established set of consistent terms for describing recycled plastics from these diverse sources, which may be contributing to confusion. For example, plastic recovered from the marine environment is often referred to as 'ocean plastic' or 'marine plastic,' while plastic recovered from waterways or land within a certain distance of the ocean (many use 50 km, or 31 miles) is called 'ocean-bound plastic' (Jambeck 2015). The term 'beach plastic' is used for plastic specifically recovered from beaches.

The cleaning products company Method were one of the first companies to use ocean-recovered plastic in their soap bottles in 2012 and emphasised that raising awareness about plastic pollution in marine environments was a key factor behind the decision (Dreizen 2017). However, it is critical to also consider the overall relevance of this category. While ocean plastic claims can have an emotional pull, there is also a risk of distracting from the more effective upstream solutions to preventing leakage in the first place. The use of recovered ocean plastic should be seen as a solution of last resort.

7.3 Biobased

Biobased claims communicate to consumers that biomass has been used as a feedstock for plastic packaging.

A potential issue with biobased claims is the scope for confusion with biodegradable. Like the distinction between recycled and recyclable, biobased plastic claims do not provide any information on how a product should be used or disposed of. Claims about biobased plastics should therefore be accompanied by information on recyclability, compostability, or biodegradability where appropriate.

Verification of biobased claims increases reliability. For example, claims could be verified against a standard for biobased content, such as ASTM D6866.

Figure 8 features a claim on a bottle made from biobased plastic, which is also accompanied by information on the recyclability of the packaging. This is important as biobased plastics which end up in natural or marine environments can have the same negative environmental impacts as plastics derived from fossil fuel feedstocks; proper disposal remains crucial for reducing plastic pollution.

Biomass feedstocks can reduce reliance on fossil fuels for plastic production, however, it is important that they are sourced sustainably and subject to proper life cycle analyses.

Figure 8: Example of plant bottle claim





7.4 Compostable and Biodegradable

While biobased plastic is not necessarily biodegradable or compostable, on-package claims may communicate these qualities together. Similarly, while biodegradable and compostable are often used interchangeably, they are not synonymous. As noted previously, this interchangeability may lead to further confusion.

When making claims about compostability or biodegradability, referencing compliance with a certification standard can increase the reliability of a claim. Most compostable claims refer to industrial composting (also referred to as municipal or commercial composting).

For example, Figure 9 illustrates the scope for consumer confusion around these claims. The on-package communication states that the package is both '100 per cent compostable' and '100 per cent biodegradable' but does not provide further guidance on how consumers can compost this product.

Access to industrial composting remains limited and consumers are not always aware of whether these facilities exist in their area or how to properly dispose of an item, even if facilities do exist. In such a scenario, incorrect disposal once again becomes more likely. The lack of accessibility is a critical issue for compostability and biodegradability claims because it becomes hard to describe these items as compostable or biodegradable 'in practice'. Unless this issue is resolved, the overall relevance of these disposal techniques is arguably limited.

Figure 9: Example of compostable and biodegradable claim



Source:
<https://www.flickr.com/photos/dakima-arts/3509297247>

7.5 Recyclable

As discussed earlier in this report, the Ellen MacArthur Foundation has developed a definition of recyclable that many in the industry are adopting. The definition emphasises the need for items to be recyclable “in practice and at scale.”

The growing consensus around this definition of recyclability is a positive step towards clearer guidance for consumers and greater transparency. If all companies comply with this standard definition and are required to label their packaging accordingly, it will spur innovation in packaging design for greater recyclability, drive investment in improved recycling infrastructure and technology, and improve recycling outcomes.

Figure 10: Example of recyclable claim



Source: Author's own

Figure 11: Example of claim showing separation of materials



Source: Author's own

Most recyclable plastic claims use the universal recycling symbol and a general statement directing the consumer to recycle. Some of the examples below provide additional instructions to facilitate proper recycling methods. Others are lacking in guidance or require action from the consumer to enable partial recycling of the packaging.

Figures 10 and 11 show two examples where further action is required by consumers, raising questions regarding how well-designed these products are.

While these brands should be commended for giving clear instructions to consumers, it could also be argued that they allow companies to shift the burden to consumers. Better designed products and packaging could avoid the need for consumer disassembly in the first place; a key step in the New Plastics Economy Global Commitment is taking “action to eliminate problematic or unnecessary plastic packaging” (Ellen MacArthur Foundation 2018, p. 6).

7.6 Summary of Claims Assessment

When used correctly, claims can provide important information to consumers in an accessible and concise manner. They can also serve as a leading indicator of gaps in standards and certifications, as well as enable businesses to communicate key sustainability information without incurring the costs of certification. This can be particularly important for smaller businesses or those in lower-income countries. At the same time, claims have a greater possibility of being associated with vague or unsupported statements and thus pose a greater risk of greenwashing.

Table 11 summarises the negative and positive outcomes that were identified for the different claims.



Table 11: Overview of Key Findings from Claim Assessment

Claim	Key Findings
Made from Recycled Plastic	<ul style="list-style-type: none"> • Different ways of calculating make comparability difficult. • Can be confused with recyclable.
Made from Ocean Plastic	<ul style="list-style-type: none"> • Lack of consistent use of terminology and definitions. • Brings awareness to the problem in a way that connects with consumers' concerns. • Emphasises a lower-priority solution.
Biobased	<ul style="list-style-type: none"> • Consumers may misinterpret as biodegradable. • Not all biobased sources are sustainable and responsible.
Compostable and Biodegradable	<ul style="list-style-type: none"> • Only a very small percentage of people have access to appropriate infrastructure, making this claim potentially meaningless.
Recyclable	<ul style="list-style-type: none"> • Use of universal recycling symbol is not regulated. • Actual recyclability relies on accessibility of infrastructure, which is not universal.

8. LABELS AND CLAIMS IN THE CONTEXT OF THE CIRCULAR ECONOMY

One consistent theme in the expert consultation was the recognition that, while important, recycling and composting plastic packaging represent the circular economy 'loops' that retain the least value in the system. To better inform consumers about the sustainability of plastic packaging, communications should provide a clearer perspective on how each type of label and claim supports circularity.

Types of labels and claims were differentiated into those that primarily influence consumer purchase decisions, such as 'biobased,' 'recycled' or 'recovered feedstock,' and those that primarily influence consumer behaviour at the end of the package's or product's life, such as guidance on recyclability, compostability or biodegradability, and recycling financing. Each of these types of labels and claims were then mapped onto the circular economy diagram produced by the Ellen MacArthur Foundation, with five categories of labels and claims impacting the technical materials loops and two impacting the biological materials loops (see Figure 12). It is notable that biobased plastic has the unique potential to cross over from the biological side to the technical side when plastics made from biomass feedstocks can be recycled.

On the technical materials side, the labels and claims that align with the highest value loops are 'recycled content' and 'reusable.' Recycled content drives value and demand for post-consumer recycled material and may be effective at reducing leakage. From a circularity perspective, reusable plastic packaging is a priority to enable the transition to a circular economy that maintains material at its highest possible value.

While true reusable packaging and food-ware was out of the scope of this report, it is worth noting the risks of single-use plastics being labelled as reusable when they are not. Plastic products that are not tested for reusability have the potential to leach additives and other chemicals when reused, especially if they are exposed to high temperatures. Moreover, preventing misleading claims about reusability is essential to ensure that genuinely reusable plastic packaging or food-ware items are not unnecessarily discarded. As more governments push to legislate against single-use plastic, the risk of this poor practice may grow.

Labels that indicate recycling financing support the recycling loop when providing financial incentives for consumers to appropriately return packaging. However, the impact is less transparent for initiatives like the Green Dot.

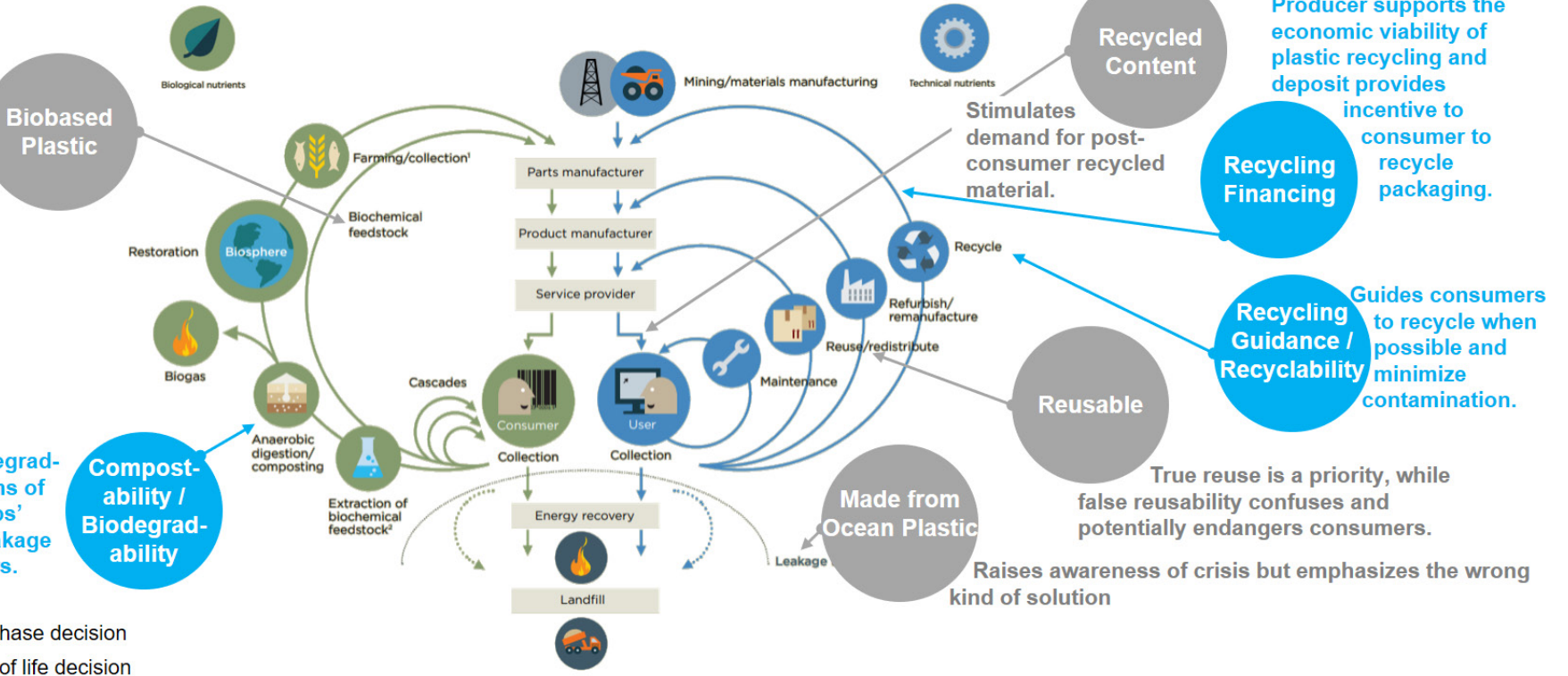
Claims that highlight the use of recovered ocean or ocean-bound plastic are seen as valuable to the circular economy because they raise awareness of the problem of marine plastic pollution, but ultimately over-emphasise the role that recovered leaked plastic can and should play as a solution to the problem. Emphasising ocean plastic as a more desirable feedstock also creates a sort of perverse incentive. In the words of one expert consultation participant, "you do not want to place a premium on something that you are trying to get rid of."

Figure 12 illustrates how the different categories of labels and claims interact with the circular economy and suggests a rough summary for how each type supports the transition to the circular economy.

Figure 12: How Labels and Claims Support the Circular Economy

How Labels and Claims support the Circular Economy

Biobased plastic from renewable, sustainably sourced biomass can be part of the solution. Biobased plastic that is recycled rather than composted keeps more value circulating.



Original diagram source: Copyright © Ellen MacArthur Foundation (2020), www.ellenmacarthurfoundation.org

9. FINDINGS AND RECOMMENDATIONS

The core function of labels and claims on plastic packaging should be to provide reliable, relevant, clear, transparent and accessible information. In doing so, they can empower consumers to be active partners in the transition to more sustainable consumption and production patterns and a circular economy. A set of five recommendations was developed based on the findings of the global mapping and assessment carried out in this report. These recommendations identify the key challenges and opportunities regarding standards, labels, and claims, and highlight what should be done to create more effective on-package communications.

1) Businesses should follow the *Guidelines for Providing Product Sustainability Information* in their plastic packaging communications.

Findings: In assessing the labels and claims found on plastic packaging, the analysis found wide variations regarding whether labels and claims met the five fundamental principles outlined in the Guidelines: reliability, relevance, clarity, transparency, and accessibility.

While there were some labels that stood out as particularly well or poorly designed, the majority of labels fell in the middle two categories of 'neutral' or 'mixed.' This means that labels have both well and poorly designed elements, or that experts in our consultation held divergent opinions.

Two conclusions can be drawn from this. Firstly, communications are inherently subjective and dependent on different experiences and understandings, even among experts. This highlights the importance of clear guidance, such as the Guidelines, which were developed through an international consensus-finding process. Secondly, there is notable room for improvement for most consumer-facing sustainability communications on plastic packaging.

Recommendation: Businesses, including manufacturers, suppliers, and retailers, should take steps to ensure their labels and claims correspond with at least the five fundamental principles of the Guidelines.

2) Definitions about the content and reusability of plastic packaging need to be harmonised at a global level.

Findings: One of the clearest messages to emerge from the consultation and assessment was that the current state of on-package communications is very confusing for consumers. A large part of this problem is that the definitions that underpin standards, labels, and claims lack consistency or real-world applicability.

The terms used in labels and claims are not all consistently defined or verified, even when they are being used in the same geographies. This is of particular concern for those that are intended to influence purchasing decisions such as recycled or 'ocean plastic' content, bi-based materials, and potentially reusability.

Inconsistency makes it more difficult for consumers to compare the sustainability characteristics of one product's packaging to another. This creates consumer confusion and enables greenwashing.

Recommendation: There should be global consistency of definitions regarding the content and reusability of plastic packaging in standards. Labels and claims should be updated to reflect these.

3) Standards, labels, and claims need to better reflect actual conditions.

Findings: While consumers would benefit from greater consistency regarding information about the content and appropriate use of plastic packaging, information about proper disposal should better reflect the local conditions that consumers experience.

At present, there are two key problems. Firstly, there is a discrepancy between what claims say and what is likely to happen to that plastic packaging in real life, particularly regarding compostability and biodegradability. This is problematic for industrial composters and for people carrying out backyard composting. Consumers may also mistakenly litter these plastic items if they do not understand the need for specific conditions to decompose.

Secondly, guidance on proper disposal is only relevant if consumers have access to the facilities and infrastructure necessary to properly carry out these processes. Just as the Ellen MacArthur Foundation's definition of 'recyclable' stipulates that products must be recyclable "in practice and at scale", the same criteria is applied to claims regarding compostability. While biodegradability encompasses a slightly different process, the need for items to be practically biodegradable is also relevant.

Recommendation: The definitions and technical requirements used in standards related to recyclability, compostability, and biodegradability should better reflect real world conditions and be more attentive to accessibility. Where possible, claims and labels should be based on recognised national or international standards.

4) The use of the 'chasing arrows' symbol should be restricted to indicating recyclability.

Findings: The mapping and assessment highlighted design practices which increase consumer confusion. Two examples are the Green Dot and the outdated but still widely used resin codes; both use the 'chasing arrows' in their design but do not indicate recyclability for consumers. This is a problematic but fairly widespread practice.

The expert consultation highlighted that consumers typically misinterpret these symbols to mean recyclability or perhaps recycled content. Confusion often leads consumers to overestimate how many items are recyclable, leading to higher levels of contamination in the recycling stream. This contamination has an impact on the economic viability of the recycling system, while confusion may also undermine consumer confidence in recycling.

In general, it is crucial that the design of labels or images intended to communicate information about sustainability are attentive to the perceived meaning of the symbols they use and the scope for misinterpretation.

Recommendation: Businesses currently using the 'chasing arrows' design for claims other than recyclability should redesign their image-based communications without the arrows. In circumstances where legislation or regulation still mandate the use of outdated resin codes, these should be revised to reflect the updated triangular design. The design of labels and logos should seek to minimise the potential for misinterpretation.

5) Informative and verified recycling guidance labels should be adopted and proper use enforced.

Findings: The mapping and assessment also highlighted good design practices which help consumers do the right thing. For example, recycling guidance labels such as the Woolworths label and the Australasian Recycling Labels were considered informative and useful. These labels can be effective in increasing responsible consumer behaviour.

Experts also argued that the adoption of these labels has spurred more sustainable design innovation by prompting brands to redesign their packages to avoid having to put the “not recyclable” label on them. It is equally important, however, to avoid contamination in recycling streams by clearly stating that an item is not recyclable when appropriate and prevent the misuse of recyclability labels and claims.

Recommendation: Businesses should use recyclable plastic packaging and adopt an established recycling guidance label appropriate to their geography and commit to placing it on all packages at a readable size. The organisations managing these labels should explore further aligning requirements and design of their labels to minimise consumer confusion and facilitate broader adoption by companies. Governments need to support recycling efforts by providing the necessary infrastructure and enacting policies to enforce proper following of recycling guidance by consumers.



10. CONCLUSION

The global mapping and assessment of standards, labels, and claims for the sustainable use of plastic packaging and disposable food-ware revealed a diverse landscape of on-package consumer communications. While direct consumer research was out of scope for this report, existing research and insights from expert interviews illustrate that the current landscape contributes to significant consumer confusion regarding the sustainability of plastic packaging. In such a scenario, it becomes difficult for consumers to make decisions consistent with transitioning to the circular economy.

The findings of the report highlight that work is needed to improve both the definitions used in labels and claims on plastic packaging, and the standards that underpin them, as well as the design of consumer communications. Greater consistency is needed for terms that communicate information about content or reusability intended to influence purchase decisions. Terms that provide information on options for end of life disposal should be more attentive to real-life conditions, accessibility, and consumer understanding.

The design and content of labels highlighted present examples of both poor and good practice. An important recommendation is the need to limit the use of the 'chasing arrows' symbol to recyclability. Some of the labels, however, are clear, informative, and verified and give an indication of what good on-package communications should look like. Key stakeholders seeking to improve their communications should look to the five fundamental principles of the Guidelines for best practice guidance, and also strive to meet the five aspirational principles.

Ultimately, it is important to remember that consumer communications alone cannot solve the global plastic pollution crisis. They are just one of a variety of tools, the rest of which lie outside the scope of this report. Nonetheless, on-package labels and claims, and the standards that guide them, are a critical element of consumer communications, especially for reducing leakage and contamination. As a higher goal, on-package communications should aim to improve consumer literacy on the circular economy and guide consumers towards more sustainable and responsible consumption choices.

Consumers, however, are only one element of the picture. Key stakeholders in government and civil society have a critical role in improving the standards and legislation that underpins the recommendations in this report. Most importantly, businesses should take action to reduce their use of plastic packaging, starting with the elimination of unnecessary or problematic plastic packaging. Furthermore, more emphasis should be placed on improving design of plastic packaging that is aligned with the objectives of a circular economy. That means implementing reuse models where possible, strengthening recyclability of plastic packaging and increasing the percentage of recycled content in the production of new plastic packaging. Clearer communication of these sustainability efforts can help consumers make better purchase and disposal decisions and lead the way to a more circular plastics economy. Providing transparent and clear messaging to consumers can play an important role in driving innovation, improved design for reuse, accelerated degradability, recyclability, and ultimately, a reduction in plastic pollution.

BIBLIOGRAPHY

ADEME, Ministère de l'Ecologie, du Développement Durable et de l'Energie (2015). TRIMAN unified recycling signage and marking system: User's handbook, December. <https://www.ademe.fr/triman-unified-recycling-signage-and-marking-system-users-handbook>. Accessed 15 December 2019.

All About Berlin (2018). The Pfand system: how to return bottles in Germany, 27 October. <https://allaboutberlin.com/guides/pfand-bottles#how-to-identify-pfand-bottles>. Accessed 7 December 2019.

Anon (2019). Japanese recycling symbols. https://en.wikipedia.org/wiki/Japanese_recycling_symbols. Accessed 19 December 2019.

ANSI (2019). ANSI Blog, 21 February. <https://blog.ansi.org/2019/02/resin-identification-codes-rics-astm-d7611/>. Accessed 14 November 2019.

Asia Pulp and Paper (2017). Paper & Packaging Consumer Trends Report. <https://asiapulppaper.com/news-media/blog/asia-pulp-paper-app-paper-packaging-consumer-trends-report-offers-insight-north-american-consumer-behavior-and-attitudes-toward-sustainability>. Accessed 13 December 2019.

Association Européenne des Recycleurs de Plastiques (2019). European Certification of Plastics Recyclers (EUCERTPLAST), 12 December. <https://ec.europa.eu/environment/eco-innovation/projects/en/projects/eucertplast>. Accessed 18 December 2019.

Association of Plastic Recyclers (2018). The APR Design Guide For Plastics Recyclability. https://plasticsrecycling.org/images/pdf/design-guide/Full_APR_Design_Guide.pdf

ASTM International (2019). ASTM D6400 - 19 Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities. <https://www.astm.org/Standards/D6400.htm>.

Australasian Bioplastics Association (2019). Home Compostable Verification Programme. <https://www.bioplastics.org.au/certification/home-compostable-verification-programme/>

Australian Packaging Covenant Organisation (2019). Sustainable Packaging Guidelines. <https://www.packagingcovenant.org.au/documents/item/1091>.

Bahraini, A. (2019). Countries with the Most Interesting Waste Sorting Culture, 19 December. <https://waste4change.com/countries-interesting-waste-sorting-culture/>. Accessed 8 December 2019.

Bell, V. (2013). New ISO global packaging standards answer the call for global harmonization, 7 January. https://www.greener-package.com/metrics_standards_and_lca/new_iso_global_packaging_standards_answer_call_global_harmonization. Accessed 14 November 2019.

Benson, I. (2020). OPRL Launches New Labelling Rules, 29 January. Resource. <https://resource.co/article/oprl-launches-new-labelling-rules>. Accessed 18 February 2020.

Beta Analytic Testing Laboratory (2019). DIN CERTCO's DIN-Geprüft Biobased Certification Scheme. www.betalabservices.com: <https://www.betalabservices.com/biobased/din-certco.html>. Accessed 19 December 2019.

BioCycle (2019). Quantifying Existing Food Waste Composting Infrastructure in the U.S. BioCycle.

Biodegradable Products Institute (2019). The Compostable Logo. <https://bpiworld.org/BPI-Public/Program.html/>. Accessed 9 January 2020.

Brown, E. (2015). Germans Have a Burning Need for More Garbage, 19 October. The Wall Street Journal. <https://www.wsj.com/articles/germans-have-a-burning-need-for-more-garbage-1445306936>

Citeo (2019). Info - TRI. <https://www.citeo.com/info-tri/>. Accessed 18 January 2020.

Control Union (2019). GRS - GLOBAL RECYCLE STANDARD. <https://certifications.controlunion.com/en/certification-programs/certification-programs/grs-global-recycle-standard>. Accessed 9 December 2019.

Denmark NU Blogazine (2018). Recycling in Denmark - How To Dispose of Your Trash Correctly, 13 November. <https://www.denmarknu.dk/recycling-in-denmark/>. Accessed 12 December 2019.

Detzel, A. K.-G. (2013). Study of the Environmental Impacts of Packagings Made of Biodegradable Plastic. Heidelberg (Germany): ifeu – Institut für Energie- und Umweltforschung Heidelberg GmbH.

Dreizen, C. (2017). Where, How and Why Ocean Plastic is Being Used as Packaging Feedstock, 22 March. Packaging Digest. <https://www.packagingdigest.com/sustainable-packaging/where-how-and-why-ocean-plastic-is-being-used-as-packaging-feedstock-2017-03-22>. Accessed 18 February 2020.

Ecopack (2019). 350ml Double Wall Coffee Cup “Kraft”. <https://ecopack.co.za/product/350ml-double-wall-coffee-cup-kraft/>: <https://ecopack.co.za/product/350ml-double-wall-coffee-cup-kraft/>. Accessed 8 January 2020.

Ellen MacArthur Foundation (2018). New Plastics Economy Global Commitment, 25 October. [ellenmacarthurfoundation.org: https://www.ellenmacarthurfoundation.org/assets/downloads/Global-Commitment-Documents-to-download-on-website-2.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/Global-Commitment-Documents-to-download-on-website-2.pdf). Accessed 12 January 2020.

Environmental Choice New Zealand (2019). Home. <https://www.environmentalchoice.org.nz/>. Accessed 7 January 2020.

EPD International AB (2019). Using EPD. <https://www.environdec.com/>. Accessed 22 December 2019.

Estamos en Peligro (2007). SUPERMERCADOS JUMBO LANZA SU NUEVA BOLSA 100% BIODEGRADABLE, 6 August. http://estamosenpeligro.blogspot.com/2007/08/supermercados-jumbo-lanza-su-nueva_05.html. Accessed 1 December 2019.

Europa Press (2015). Ecoembes crea un nuevo símbolo para facilitar el reciclaje de envases, 19 November. <https://www.europa-prensa.es/epsocial/cooperacion-desarrollo/noticia-ecoembes-crea-nuevo-simbolo-facilitar-reciclaje-envases-20151119170303.html>. Accessed 1 December 2019.

European Bioplastics (2016). [european-bioplastics.org, March. https://docs.european-bioplastics.org/2016/publications/EUBP_Guidelines_Seedling_logo.pdf](https://docs.european-bioplastics.org/2016/publications/EUBP_Guidelines_Seedling_logo.pdf)

European Bioplastics (2018). Biowaste collection and biodegradable plastics discussed at the Bio-waste Conference in Kassel, Germany, 26 April. <https://www.european-bioplastics.org/biowaste-collection-and-biodegradable-plastics-discussed-at-the-bio-waste-conference-in-kassel-germany/>. Accessed 11 December 2019.

European Bioplastics (2019). Bioplastics Market Development Update 2019. https://www.european-bioplastics.org/wp-content/uploads/2019/11/Report_Bioplastics-Market-Data_2019_short_version.pdf. Accessed 27 March 2020.

European Certification of Plastics Recycling (2019). Home. <https://www.eucertplast.eu/>. Accessed 9 January 2020.

European Commission on the Environment (2019). Ecolabel. <https://ec.europa.eu/environment/ecolabel/>. Accessed 9 January 2020.

European Organization for Packaging and the Environment (2005). ESSENTIAL REQUIREMENTS ON THE COMPOSITION AND THE REUSABLE AND RECOVERABLE, INCLUDING RECYCLABLE, NATURE OF PACKAGING, 19 December. <https://europen-packaging.eu/>: <https://europen-packaging.eu/component/publication/publication/10-press-releases/102-new-guide-to-cen-packaging-standards.html>. Accessed 17 December 2019.

European Organization for Packaging and the Environment (2019). Extended Producer Responsibility. <https://euopen-packaging.eu/policy/9-extended-producer-responsibility.html>. Accessed 6 January 2020.

Globescan (2019). Healthy and Sustainable Living: A Global Consumer Insights Project. Highlights Report. https://globescan.com/wp-content/uploads/2019/09/Healthy_Sustainable_Living_2019_GlobeScan_Highlights.pdf. Accessed 6 April 2020.

Good Environmental Choice Australia Ltd (2017). Home. <http://www.geca.eco/>. Accessed 8 December 2019.

Gray, A. (2017). Germany recycles more than any other country, 18 December. <https://www.weforum.org/agenda/2017/12/germany-recycles-more-than-any-other-country/>. Accessed 20 December 2019.

GreenCircle Certified (2019). RECYCLED CONTENT CERTIFICATION. <http://www.greencirclecertified.com/recycled-content-certification>. Accessed 23 December 2019.

Green Council (2019). Hong Kong Green Label Scheme. <https://www.greencouncil.org/hk-gls5>. Accessed 28 January 2020.

Green Dot North America (2016). Green Dot Trademark Use in North America. <https://www.greendot.ca/>. Accessed 28 November 2019.

Green Seal (2019). Green Seal Standards. <https://greenseal.org/green-seal-standards>. Accessed 20 December 2019.

GreenBlue (2019a). Store Drop-Off. <https://how2recycle.info/sdo>. Accessed 25 November 2019.

GreenBlue (2019b). How2Recycle. <https://how2recycle.info/>. Accessed 19 December 2019.

GreenBlue (2019c). How2Compost. <http://www.how2compost.info/>. Accessed 20 December 2019.

GreenCircle Certified, LLC. (2019). Home. <http://www.greencirclecertified.com/>. Accessed 9 January 2020.

GreenDot North America (2016). GreenDot North America. <https://www.greendot.ca/>. Accessed 25 November 2019.

Greenpeace International (2018). Over 1 Million People Demand Corporations Reduce Single-Use Plastics Ahead of Earth Day, 18 April. <https://www.greenpeace.org/international/press-release/15958/over-1-million-people-demand-corporations-reduce-single-use-plastics-ahead-of-earth-day/>. Accessed 19 February 2020.

Holy Grail Report (2019). HolyGrail: tagging packaging for accurate sorting and high-quality recycling, 19 December. NPE Pioneer Projects. <https://www.newplasticseconomy.org/assets/doc/Holy-Grail.pdf>. Accessed 8 January 2020.

ity recycling, 19 December. NPE Pioneer Projects. <https://www.newplasticseconomy.org/assets/doc/Holy-Grail.pdf>. Accessed 8 January 2020.

How2Recycle (2019). How2Recycle. <https://how2recycle.info/>. Accessed 22 December 2019.

Intertek (2019). Recycled Content Verification. <https://www.intertek.com/sustainability/recycledcontent/>. Accessed 23 December 2019.

International Organization for Standardization (2018). ISO 14024:2018 - Environmental Labels and Declarations - Type 1 Environmental Labelling, 14 March. <https://www.iso.org/obp/ui/#iso:std:iso:14024:ed-2:v1:en>: <https://www.iso.org/obp/ui/#iso:std:iso:14024:ed-2:v1:en>. Accessed 4 December 2019.

International Organization for Standardization (2019). ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures. <https://www.iso.org/standard/38131.html>

IPEN and Arnika (2020). EU Withdraws its Toxic Recycling Exemption. <https://ipen.org/news/eu-withdraws-its-toxic-recycling-exemption>. Accessed 27 March 2020.

Jambeck, J.R., Andrady, A., Geyer, R., Narayan, R., Perryman, M., Siegler, T. et al. (2015). Plastic waste inputs from land into the ocean. *Science*, 347, 768-771.

Jambeck, J. R. (2015). Plastic waste inputs from land into the ocean, 13 February. *Science*, 347(6223), 768-771. <https://science.sciencemag.org/content/347/6223/768>

Japan BioPlastics Association (2019). What's GreenPla?. <http://www.jbpaweb.net/english/egp.htm>. Accessed 9 January 2020.

Keep Britain Tidy (2019). Home. <https://www.keepbritaintidy.org/>. Accessed 21 December 2019.

Keller and Heckman LLP (2019). Why Are 'chasing arrows' Still Used in RIC?, 2 May. *The National Law Review*. <https://www.natlawreview.com/article/why-are-chasing-arrows-still-used-ric>. Accessed 25 November 2019.

Lerner, S. (2019). Waste Only: How the Plastics Industry is Fighting to Keep Polluting the World. *Online: The Intercept*, 20 July. <https://theintercept.com/2019/07/20/plastics-industry-plastic-recycling/>. Accessed 19 December 2019.

Meeker, J. D. (2009). Phthalates and other additives in plastics: human exposure and associated health outcomes. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 364(1526), 2097–2133.

Mendez, G. (2018). Latin America is phasing out single-use plastics in search of more sustainable living. *Mintel Blog*. <https://www.mintel.com/blog/consumer-market-news/latin-america-is-phasing-out-single-use-plastics-in-search-of-more-sustainable-living>. Accessed 6 April 2020.

Ocean Conservancy (2019). The Beach and Beyond: International Coastal Clean-up Report. Ocean Conservancy.

Organisation for Economic Co-operation and Development (2011). Environmental Claims - Findings and Conclusions of the OECD Committee on Consumer Policy. Organisation for Economic Co-operation and Development.

One Planet Network (n.d.). About Consumer Information for SCP. <https://www.oneplanet-network.org/consumer-information-scp/about>. Accessed 19 February 2020.

Organisation, A. P. (2019). Australasian Recycling Label (ARL). <https://www.packaging-covenant.org.au/who-we-are/packaging-recycling-label-program>. Accessed 19 December 2019.

Packaging Gateway (2019). Ocean plastic: will more packaging companies take the plunge?, 16 April. <https://www.packaging-gateway.com/features/ocean-plastic/>. Accessed 20 December 2019.

Packaging News (2019). Study: 'eco-littering' could blight the UK due to confusion, 7 November. <https://www.packagingnews.co.uk/news/environment/biodegradable-compostable-study-eco-littering-blight-uk-due-confusion-07-11-2019>. Accessed 11 December 2019.

Packaging News South Africa (2013). New on-pack recycling label from Woolworths, 5 December. www.bizcommunity.com: <https://www.bizcommunity.com/Article/196/178/104351.html>. Accessed 4 December 2019.

Packaging Recovery Organisation Europe (2019a). PRO Europe. <https://www.pro-e.org/the-green-dot-trademark>. Accessed 11 December 2019.

Packaging Recovery Organisation Europe (2019b). THE GREEN DOT TRADEMARK. <https://www.pro-e.org/the-green-dot-trademark>. Accessed 11 December 2019.

Parker, L (2018). Fast Facts About Plastic Pollution, 20 December. <https://www.nationalgeographic.com/news/2018/05/plastics-facts-infographics-ocean-pollution/>. Accessed 19 February 2020.

PET Bottle (2019). Section10 identification mark. <http://www.petbottle-rec.gr.jp/qanda/sec10.html>. Accessed 16 December 2019.

Pierce, L. M. (2014). Confused consumers toss out plastic packaging instead of recycling: poll. <https://www.packagingdigest.com/>

sustainable-packaging/confused-consumers-toss-out-plastic-packaging-instead-of-recycling-poll140731. Accessed 11 December 2019.

Poulter, S. (2019). M&S launches pioneering new recycling scheme by putting green bins in stores and schools across the country to stop plastic being sent to landfills, 29 January. <https://www.dailymail.co.uk/news/article-6645867/M-S-launches-pioneering-new-recycling-scheme-putting-green-bins-stores-schools.html>. Accessed 2 December 2019.

PPID (2017). KEMENTERIAN LHK LUNCURKAN SNI KATEGORI PRODUK TAS BELANJA PLASTIK DAN BIOPLASTIK MUDAH TERURAI, 13 February. http://ppid.menlhk.go.id/siaran_pers/browse/530. Accessed 21 November 2019.

Recycling Today (2016). Consumers look to packaging for recycling info, survey finds, 4 March. <https://www.recyclingtoday.com/article/carton-council-packaging-recycling-survey/>. Accessed 11 December 2019.

Resource Recycling (1999). Gary Anderson has been found!, May. https://logoblink.com/img/2008/03/recycling_symbol_garyanderson.pdf. Accessed 14 December 2019.

Roundtable on Sustainable Biomaterials (2019). ABOUT CERTIFICATION. <https://rsb.org/certification/about-certification/>. Accessed 2 December 2019.

SCS Global Services (2014). Recycled Content Standard, V7.0. https://www.scsglobalservices.com/files/standards/scs_stn_recycledcontent_v7-0_070814.pdf. Accessed 28 November 2019.

SCS Global Services (2019). RECYCLED CONTENT CERTIFICATION. <https://www.scsglobalservices.com/services/recycled-content-certification>. Accessed 29 November 2019.

So Delicious Dairy Free (2019). Packaging. <https://sodeliciousdairyfree.com/about-us/beyond-delicious/sustainable-packaging>. Accessed 19 December 2019.

Soo, Z. (2018). China issues rules to promote sustainable packaging in logistics amid Double 11 and Christmas shopping boom, 18 December. <https://www.scmp.com/tech/enterprises/article/2178473/china-issues-rules-promote-sustainable-packaging-logistics-amid>. Accessed 19 December 2019.

Sustainable Packaging Coalition (2017). 101: Resin Identification Codes, 20 July. <https://sustainablepackaging.org/101-resin-identification-codes/>. Accessed 14 November 2019.

Sustainable Packaging Coalition (2019b). Design For Recycled Content Guide. <https://sustainablepackaging.org/projects/design-for-recycled-content-guide/>. Accessed 23 December 2019.

Sustainable Packaging Coalition (2019c). The Essentials of Sustainable Packaging. <https://sustainablepackaging.org/projects/esp/>. Accessed 23 December 2019.

Taufik, D. R. (2019). The paradox between the environmental appeal of bio-based plastic packaging for consumers and their disposal behaviour. *Science of The Total Environment* 705 (6). <https://doi.org/10.1016/j.scitotenv.2019.135820>

TerraCycle (2019). Recycle everything with TerraCycle®. <https://www.terracycle.com/en-US>. Accessed 20 December 2019.

The On-Pack Recycling Label (2019). Home. <https://www.oprl.org.uk/>. Accessed 7 January 2020.

TÜV AUSTRIA (2019a). OK biobased. <http://www.tuv-at.be/>: <http://www.tuv-at.be/green-marks/certifications/ok-biobased/>. Accessed 16 December 2019.

TÜV AUSTRIA (2019b). OK biodegradable SOIL, OK biodegradable WATER & OK biodegradable MARINE. <http://www.tuv-at.be/green-marks/certifications/ok-biodegradable/>. Accessed 22 December 2019.

TÜV AUSTRIA (2019c). OK compost & Seedling. <http://www.tuv-at.be/green-marks/certifications/ok-compost-seedling/>. Accessed 22 December 2019.

TÜV RHEINLAND (2015). Certipedia - Certificate Database from TÜV Rheinland. <https://www.certipedia.com/?locale=en>. Accessed 4 December 2019.

UL (2019). Recycled Plastics Testing and Certification. <https://www.ul.com/offering/recycled-plastics-testing-and-certification>. Accessed 22 December 2019.

UN Environment and ITC (2017). Guidelines for Providing Product Sustainability Information. UN Environment, International Trade Centre, Consumers International, International Climate Initiative. United Nations Environment Programme. <https://www.oneplanetnetwork.org/resource/guidelines-providing-product-sustainability-information>.

United Nations Environment Programme (2015). Biodegradable Plastics and Marine Litter. Misconceptions, concerns and impacts on marine environments. Nairobi.

United Nations Environment Programme (2017). Exploring the potential for adopting alternative materials to reduce marine plastic litter. http://wedocs.unep.org/bitstream/handle/20.500.11822/25485/plastic_alternative.pdf?sequence=1&isAllowed=y

United Nations Environment Programme (2019a). Resolution adopted by the United Nations Environment Assembly on 15 March 2019: 4/6. Marine plastic litter and microplastics. UNEP/EA.4/Res.6. <https://>

web.unep.org/environmentassembly/proceedings-report-ministerial-declaration-resolutions-and-decisions. Accessed 18 February 2020.

United Nations Environment Programme (2019b). The Role of Packaging Regulations and Standards in Driving the Circular Economy. http://sos2019.sea-circular.org/wp-content/uploads/2019/11/FINAL_THE-ROLE-OF-PACKAGING-REGULATIONS-AND-STANDARDS-IN-DRIVING-THE-CIRCULAR-ECONOMY.pdf.

United States Federal Trade Commission (2012). FTC Issues Revised “Green Guides”, 1 October. <https://www.ftc.gov/news-events/press-releases/2012/10/ftc-issues-revised-green-guides>. Accessed 9 December 2019.

United States Department of Agriculture (2019). WHAT IS BIOPREFERRED?. <https://www.biopreferred.gov/BioPreferred/faces/pages/AboutBioPreferred.xhtml>. Accessed 20 December 2019.

Walmart, Inc. (2018). Sustainable Packaging Playbook. https://www.walmartsustainabilityhub.com/media-library/document/sustainable-packaging-playbook/_proxyDocument?id=0000015b-5ef9-d62c-abfb-fef-d3ea60001. Accessed 12 December 2019.

Walmart, Inc. (2019). The Recycling Playbook, November. https://www.walmartsustainabilityhub.com/media-library/document/recycling-playbook-november-2019/_proxy-

Document?id=0000016e-384f-d8af-a96e-beff25150000. Accessed 17 December 2019.

Whelan, T. and Kronthal-Sacco, R. (2019). Research: Actually, Consumers Do Buy Sustainable Products, 19 June. Harvard Business Review. <https://hbr.org/2019/06/research-actually-consumers-do-buy-sustainable-products>. Accessed 19 February 2020.

White, K., Hardisty, D.J., Habib, R. (2019). The Elusive Green Consumer, July-August Issue. Harvard Business Review. <https://hbr.org/2019/07/the-elusive-green-consumer>. Accessed 19 December 2019.

Woolworths (2018). HOW TO READ OUR RECYCLING LABELS. https://www.woolworths.co.za/content/howto/good-business-journey/how-to-read-our-recycling-labels/_/A-cmp201960. Accessed 11 December 2019.

Woolworths Group (2017). Woolworths first to commit to Australasian Recycling Label across Own Brand product range, 13 November. https://www.woolworthsgroup.com.au/page/media/Latest_News/woolworths-first-to-commit-to-australasian-recycling-label-across-own-brand-product-range. Accessed 1 December 2019.

XDS Solutions (2019). SASO postpone stage 2 & 3 of OXO-Biodegradable Mark for Degradable Plastic Products. <https://www.xds-solutions.com/saso-postpone-oxo-biodegradable-mark-plastic-products-stages/>. Accessed 20 December 2019.

United Nations Environment Programme

Economy Division

Resources and Markets Branch

Consumption and Production Unit

1 rue Miollis

Building VII

75015 Paris

France

Telephone: + 33 (0) 1 44 37 14 50

Email: ciscp@un.org

Consumers International

24 Highbury Crescent

N5 1RX London

United Kingdom

Telephone: +44 (0) 20 7226 6663

Email: consint@consint.org

