WWF Basket

Halving the environmental impact of the UK Baskets: Targets and metrics technical background and rationale

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Background

Rationale

Human activities are propelling the climate crisis, disrupting global biochemical cycles, degrading or converting species-rich natural ecosystems, causing chemical and plastic pollution, and inducing a decline in global biodiversity. Land and ocean surface temperature is rising by between 0.1°C and 0.3°C) per decade[1], almost 75% of all ice-free land is significantly altered by human activities and vertebrate populations have declined an average 68% since 1970[2]. These impacts on the natural world – on which human society and wellbeing ultimately depend – are driven by overconsumption, unsustainable extraction rates, and by the methods we use to produce material goods, including foodstuffs.

The science is unambiguous: we need to reduce the impact that our production and consumption has on the natural environment if we are to conserve biodiversity for its own intrinsic value and ensure that future human generations have access to sufficient resources to thrive. Doing so will require urgent, sustained, and transformative action to address how we produce and consume materials[3]. WWF recognises three major changes that have to be brought about in order to 'bend the curve' of biodiversity: zero loss of natural habitats, zero human-induced extinction and halving the footprint of production and consumption[4].

Globally, the food system is the single largest driver of habitat and biodiversity loss on our planet. Increasing demand for food and fibres is responsible for around one third of all greenhouse gas emissions, pushing the global climate closer to dangerous limits. Recent research has shown that microplastic waste – some of it originating from food and beverage packaging – is now found 'absolutely everywhere' on earth. On more local scales, the over-abstraction and pollution of water, and degradation of soils threatens long term agricultural production: evidence suggests that with today's agricultural processes, and poorly managed soils in Wales and England alone cost the UK economy £1.2 billion a year[5].

The food system also fails to properly nourish billions of people. Almost one quarter of the world's population are food insecure[6], while 650 million people were classed as obese and nearly two billion overweight, with serious consequences for their health[7]. On top of this, more than two and a half billion tonnes of food is wasted every year, a third of the total produced[8].

As a major economy, the UK plays a significant role in the environmental impacts at home and abroad, including those associated with the food system. For this reason, WWF are committed to working with the UK food retail sector to at least halve the environmental impact of the average UK shopping basket by 2030. Ambitions, actions and metrics have been revised on the basis of trials within the WWF-Tesco

[1] Allen, M.R., O.P. Dube, W. Solecki, F. Aragón-Durand, W. Cramer, S. Humphreys, M. Kainuma, J. Kala, N. Mahowald, Y. Mulugetta, R. Perez, M.Wairiu, and K. Zickfeld (2018). Framing and Context. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)].

[2] WWF (2020). Living Planet Report 2020. https://livingplanet.panda.org/en-gb/

[3] Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review. London: HM Treasury

[4] WWF (2020). A New Deal for Nature and People. https://wwfint.awsassets.panda.org/downloads/newdeal_brochure_final.pdf

[5] Graves, A.R. Morris, J., Deeks, L.K., Rickson, R.J., Kibblewhite, M.G., Harris, J.A., Farewell, T.S. , Truckle, I. (2015). The total costs of soil degradation in England and Wales. Ecological Economics 119, 399-413. http://dx.doi.org/10.1016/j.ecolecon.2015.07.026

[6] FAO, IFAD, UNICEF, WFP and WHO (2020). In Brief to The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, FAO. https://doi.org/10.4060/ca9699en

[7] World Health Organisation (2021). Obesity and Overweight. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

[8] WWF-UK (2021) Driven to waste: The Global Impact of Food Loss and Waste on Farms. Woking, UK.

partnership and stakeholder consultation and are now intended to provide an overarching set of measurable goals for the UK food retail sector.

Pillars of the UK shopping basket targets

WWF have identified seven pillars where some of the major environmental impacts associated with UK food retail occur. These are:

- **Climate** – reducing GHG emissions in line with science-based targets;
- **Deforestation and conversion** – zero deforestation and conversion of natural ecosystems;
- **Agriculture** – reducing the impact of UK agriculture and global agriculture on biodiversity, water use, GHG emissions, fostering regenerative approaches;
- **Marine** – increasing the sustainable use of marine resources;
- **Food waste** – reducing loss and waste across the whole supply chain;
- **Packaging** – reducing packaging whilst increasing the rates of recycling and sustainable sourcing of materials.
- **Diets** – encouraging the uptake of healthier, more sustainable diets in the UK

Structure of the WWF Basket approach

A set of Outcomes & Measures and a Blueprint for Action by which retailers and others can measure progress have been developed for each of the above topic areas. The target areas and actions are articulated at a corporate level, though some do reference specific high impact supply chains. Where ambitious industry initiatives exist the WWF Basket aligns measures and actions to these.

WWF Basket Outcomes - If the outcomes are achieved WWF believes the ambition to halve the impact of the UK baskets and set the UK food system on the path to regenerative production will have been achieved. The outcomes have been set by WWF. While they provide a framework for those that have signed up to the WWF basket, the outcomes are intended to be met for the UK as a whole, rather than by any individual retailer. However, signatories will be expected to contribute to progress.

WWF Basket Blueprint for Action - the Blueprint for Action lays out the priority actions which WWF-UK believes UK Food Retailers should take to tackle the climate and nature crises. Retailers may take other actions to achieve the targets, but in signing up to the overall ambition it is expected that they will take action with the same level of anticipated impacts.

WWF Basket Measures – the measures are the means for tracking progress against the targets. Retailers will be asked to supply information for their performance so WWF can measure progress against the ambition to halve the environment impact of UK Baskets.

About this paper

This paper provides the evidence base and rationale for the ambitions, Blueprint for Action and Outcomes & Measures for reducing the environmental impact of UK baskets. It is intended as a reference resource for those developing solutions to reduce the impact of the food we buy.

Overarching assumptions

This section provides a brief overview of the assumptions that are universal to all topic areas.

Ambition

The overarching target for reducing the UK's footprint of production and consumption across the whole economy (i.e., including but not limited to the food sector) to within planetary means is a reduction of three quarters by 2030[9]. Underneath this primary target, varying reductions are required for different environmental impact areas, such as climate, deforestation and conversion, etc. These UK-wide targets and sub-targets are based on the best available scientific information, and those that are directly applicable to reducing the impact of the average UK shopping basket[10] are transposed here.

The WWF Basket outcomes & measures are framed as reducing the environmental *impact* of UK baskets, and therefore targets include a combination of both outright reductions in quantities as well as regenerative actions, which are in effect different routes to achieving a reduction in impact. For example, under the marine pillar, the targets include '*Reduce fishmeal and oil usage to FFDR<1 by using sustainable fishmeal and fish oil replacements and increasing the use of trimmings'* (a reduction) and '*All seafood sourced should be from a certification AND go beyond by adopting an area-based 'Seascape' Approach*' (a regenerative approach).

Ideally, the outcomes & measures and actions would sum to at least a halving of impact of the average UK shopping basket. However, in practice, it is not possible to make this calculation directly, because the targets are set and measured by different metrics which cannot be aggregated. Moreover, actions under different pillars interact with each other. For example, in addition to retaining habitat, elimination of deforestation and conversion would also lead to a reduction in GHG emissions associated with the UK's consumption. In this instance, this could potentially contribute to a reduction in GHG emissions that exceeded the minimum required by the climate change target alone. As a result, targets are aligned – where possible – with the reductions that are required by the whole UK economy[11].

Blueprint for Action

There are different ways of achieving a reduction in the impact of UK baskets, and the assumption is that individual retailers will choose approaches that best suit their individual contexts, innovate and take advantage of emerging opportunities. That being said, some structure is useful, and so a core set of actions is common to all blueprints for action that allows significant flexibility for different pillars:

1. Measure and report your impact
2. Set targets
3. Develop a roadmap
4. Implement within your company and with relevant suppliers to reduce your impact
5. Implement actions outside your supply base to support wider change
6. Support government advocacy for change

Metric framework principles

For the approach to measuring the impact of a shopping basket to be credible, metrics would:

[9] WWF and 3Keel (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. https://www.wwf.org.uk/what-we-do/uk-global-footprint

[10] The 'average UK shopping basket' is used to express two key ideas: firstly, that this applies to all retailers; and secondly that the intention of the targets, blueprints and metrics is broad rather than focusing solely on a small number of products or a limited range environmental impacts.

[11] WF and 3Keel (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. https://www.wwf.org.uk/what-we-do/uk-global-footprint

- **Be science-based**: methods would be underpinned by scientific theory, good data and applied in peer-reviewed research or other credible forums
- **Be quantitative**: numeric quantification of impact, rather than qualitative scores or indexes is preferred. Stakeholders will expect a 'halving' of impact to be quantified where possible
- **Address the most material impacts**: the approach to measurement should be focused on the major sources of environmental impact in value chains
- **Measure outcomes and/or impacts**: metrics need to be as closely linked to environmental impacts as possible (e.g., reductions in greenhouse gas emissions), rather than proxy indicators (e.g., proportion of suppliers with a carbon reduction target). However, some process/input metrics can be helpful and have been included
- **Be context-sensitive**: metrics need to be sensitive to local environmental constraints and thresholds. Many environmental impacts (e.g., water scarcity) are dependent on local conditions
- **Be based on current primary data**: the metrics need to relate to UK supply chains (domestic and international), and not be heavily reliant on out-of-date secondary sources of information or estimates
- **Be representative**: As far as possible, data collected for metrics should reflect all products within the agreed scope of the target, or at least be a representative subset. If not, metrics could introduce bias, and this could undermine credibility of the metrics.

Weighting

As discussed above, the different pillars are measured by different metrics which cannot always be aggregated. This means that there is no purely quantitative way of weighting the impact of the different pillars. For this reason, each pillar is given equal weighting.

However, five of the pillars have more than one target, and there is an opportunity to weight the impact of these. On a UK-wide basis, we are able to quantify the size of reduction in the production and consumption footprint that is required under a range of specific actions[12]. The weighting of each WWF basket target can then be quantified according to its estimated coherence with the relevant UK-wide target (as a percentage, Table 1).

The pillar weighting (which is always one) is then allocated between the targets according to the percentage coherence of that target with the UK-wide target. For example, if a pillar has two targets each providing 100% coherence with the relevant UK-wide targets, then the WWF basket targets are each weighted at 0.5. The weightings are provided in Table 1.

The following additional rules were applied:

- Where a shopping basket target is not present in the UK footprint targets or where the two targets are non-comparable, the basket metric is treated as providing full coverage of the UK-wide target.
- Where there is a range of potential coverage (e.g., because multiple UK targets relate to a single WWF basket target), the higher figure is taken.

[12] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

Table 1: Weighting of individual targets within each of the pillars of the WWF basket. All reductions in the UK footprint are from a 2019 baseline and a 2030 target date apart from Deforestation and Conversion which has a 2023 target date

WWF basket pillar	WWF basket Outcomes	Progress Measures	Relevant UK footprint reduction target	Coherence of WWF basket target with UK-wide target	Pillar weighting	Target weighting within pillar	Additional notes
Climate change	Achieved GHG reduction across all scopes in line with 1.5-degree SBT	% reduction of GHG emissions across all scope 3 activities	33-39%	>100%	1	0.5	UK-wide footprint reduction is 33% for overseas emissions, 39% for UK emissions
		% reduction of GHG emissions across Scope 1 & 2 activities	33-39%	>100%		0.5	
Deforestation and conversion	100% deforestation- and conversion-free agricultural commodity supply chains by 2025 at latest, with a cut-off date* of 2020 at the latest (existing earlier cut-off dates should be upheld)	% of commodity that is verified deforestation and conversion free	100%	c.31-100%	1	0.5	Soy and palm oil (the commodities that will be measured by retailers) contribute c. 31% to the UK's deforestation footprint of agricultural commodities (Croft *et al*. (2021).. Attainment of the target across additional conversion-risk commodities (e.g., cocoa, coffee or beef) would make the WWF basket target fully coherent with the UK wide target
	Require first importers to have deforestation and conversion-free supply chains by 2025 at latest, with a cut-off date of 2020 at the latest* All definitions should follow the Accountability Framework Initiative	% of conversion-risk commodity sourced from importers that have robust commitments and action plans to handle only deforestation- and conversion-free material, across their entire operations, with a cut-off date no later than 2020.	100%	>=100%		0.5	As some UK suppliers also supply to other countries, this would exceed the UK footprint target if all deforestation-risk commodities are included
Agriculture	At least 50% of whole produce and grains certified or covered by a robust environmental scheme	% of produce & grains sourcing in a robust environmental scheme (tons LEAF, Countryside Stewardship, Global G.A.P. Organic or ELMs level tbc)	Not aligned	100%	1	0.16	The UK footprint distinguishes numerous impacts of agriculture, including nitrogen and phosphorus use, water availability and flows, water pollution, chemical pollution. These are 'wrapped up' into environmental schemes in the WWF basket metric, so there is no way of judging alignment.
	At least 50% of fresh food from areas with sustainable water management	% of sourcing from regions with sustainable water management	100%	50%		0.16	The UK-wide footprint requires sustainable use of all domestic surface waters. Due to the limited information available, the UK-wide ask target for overseas production is that water management is sustainable in all key overseas sourcing regions.
	Agricultural emissions lowered in line with 1.5 degree SBT	% of protein, produce & grain farms monitoring GHG footprint	33-39%	100%		0.16	
		% reduction in sourcing from lowland peat	70%	100%		0.16	

		% reduction in agricultural GHGs	33-39%	100%		0.16	
	100% meat, dairy and eggs, including as ingredients sourced to 'Better' standard	% meat, dairy and eggs sourced to 'Better' standards (tonnes including ingredients)	No target	100%		0.16	
Marine	100% of seafood from sustainable sources by 2030:	% Certified wild-caught & aquaculture material sourced (converted into whole fish/animal weight, tonnes)	100%	100%	1	0.40	
	All seafood sourced should be from a certification AND go beyond by adopting an area-based 'Seascape' Approach	% of wild-caught resources adhering to all aspects of the Seascape Approach, as outlined in the Blueprint for Action.	100%	100%		0.40	
	Reduce fishmeal and oil usage to FFDR<1 by using sustainable fishmeal and fish oil replacements and increasing the use of trimmings	% farmed seafood products with FFDR (FFDRm and FFDRo)<1 and with all feed ingredients certified by ASC Feed standards or equivalent	No target	~10%		0.20	The UK-wide footprint specifies a halving of the use of purpose-caught fish in aquaculture, which is not readily comparable with FFDR. In addition, the average FFDR of the Scottish salmon industry is already <1 (and salmon is 80% of UK aquaculture), so it is not clear that this target would guarantee a significant reduction in impact, hence estimated impact of ~10%
Food waste	Reducing food loss and waste in all aspects of supply chain by 50% (2015 baseline)	% reduction in retail & manufacturing food waste	50%	100%	1	0.33	
		% of products adhering to WRAPs best practice labelling guidance	No Target	100%		0.33	
		% reduction in pre-farm gate losses	50%	100%		0.33	
Packaging	100% Recyclable packaging	% packaging that is recyclable	No target	100%	1	0.20	
	40% reduction in material use	% reduction in packaging by weight and units	40-43%	93-100%		0.40	The UK-wide target of 40% refers to the material footprint in general, increasing to 43% for plastics
	All materials sustainably sourced and use of recycled content maximised	% packaging that is recycled content or sustainably sourced (where independently verified standards exist)	100% 75%	85% 100%		0.40	The UK-wide target relates to sustainable sourcing of virgin timber, pulp and paper for packaging. This UK-wide target relates to the recycled content Current recycling rates of packaging materials are at 64% overall, if the shopping basket metric was quantified at 75%, coherence with the UK-wide target would be 100%
Diets	50/50 plant/animal protein sales split (% tonnage)	% of protein sales from animal-based and plant-based sources (tonnes)	20%	>100%	1	1	

Pillar 1: Climate change

Introduction

Despite accounting for only 1% of the global population, the UK is historically the fifth largest contributor to GHG emissions in the world[13]. Although territorial emissions declined 44% between 1990 and 2019, this is partly due to increasing imports and the displacement of emissions overseas[14]. The UK's emissions reductions efforts must therefore be more ambitious than the global average to contribute its 'fair share' to the global effort in reducing emissions.

Signatories to the Paris Climate Agreement, including the UK, have committed to aim to limit global warming to 1.5°C above pre-industrial levels. The Intergovernmental Panel on Climate Change (IPCC) says that this requires global greenhouse gas (GHG) emissions to decline by 45% below 2010 levels by 2030 and to reach net zero by 2050. The UK's Climate Change Committee (CCC) has set out a pathway to net zero in '*The Sixth Carbon Budget - The UK's path to Net Zero*' which has been adopted by the UK government in a commitment to a 78% reduction in emissions by 2035 from 1990 levels[15].

Mirroring the Paris Climate Agreement, corporate climate action has increasingly been framed around delivering 'net zero' or 'science-based' emissions reductions: the reductions needed to limit global temperature increases to 1.5ºC. This has also resulted in the focus of organisational climate action on commitments that lead to absolute reductions in GHG emissions, as opposed to relative commitments to improve GHG efficiency but which may still lead to growth in tonnes of emissions.

Target

Achieved GHG reduction across all scopes in line with 1.5 degree Science Based Targets

Definitions

Definitions follow the Greenhouse Gas Protocol[16].

Scope 1	All Direct Emissions from the activities of an organisation or under their control, including fuel combustion on site such as diesel used in vehicles, gas boilers.
Scope 2	Indirect Emissions from electricity purchased and used by the organisation. Scopes 1 and 2 are the emissions that are within an organisation's direct control.
Scope 3	All Other Indirect Emissions from activities of the organisation, occurring from sources that they do not own or control, covering emissions associated with extraction and production of purchased materials; transportation of purchased fuels; and emissions associated with purchased services. For companies such as retailers at the top of supply chains, Scope 3 emissions can be the largest share of their overall emissions footprint. However, measuring and reducing Scope 3 emissions requires collaboration throughout the supply chain, which can be challenging.

Scope

The scope of this target includes all GHG emissions falling under Scopes 1,2 and 3.

[13] WWF UK. (2021) COP26: The UK's 2030 Climate Target to Cut Emissions. https://www.wwf.org.uk/updates/cop26-climate-target-cut-emissions
[14] Department for Business, Energy & Industrial Strategy (2021). Final UK greenhouse gas emissions national statistics: 1990 to 2019. https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019
[15] Climate Change Committee (2020). The Sixth Carbon Budget: The UK's path to Net Zero. https://www.theccc.org.uk/publication/sixth-carbon-budget/
[16] Greenhouse Gas Protocol: https://ghgprotocol.org/

How the target contributes to halving shopping basket and required UK reduction

The UK government has adopted a commitment to a 78% reduction in emissions by 2035 from 1990 levels. Adjusting the timeline to 2030, this equates to at least a 64% reduction in emissions compared by 1990. Science Based Targets should disaggregate the overall target by Scope, and may have a different, company-specific baseline, but overall would be broadly consistent with this target.

Metrics

% reduction of GHG emissions across all Scope 1& 2 activities % reduction of GHG emissions across all scope 3 activities

How metric relates to target

Due to the international research and policy focus on climate change, the emissions measure Global Warming Potential (GWP) has developed as the gold standard for quantifying an organisation's contribution to climate change. Global Warming Potential has also become the default measure for expressing emissions of different gases, such as carbon dioxide, methane and nitrous oxide, on a common scale: carbon dioxide equivalents (CO_2e). As the reference gas, carbon dioxide has a GWP of one[17]. By comparison, methane has a GWP of 28 (i.e., 1kg of methane is equivalent to 28kg of CO_2)[18].

While the Intergovernmental Panel on Climate Change (IPCC) define methods for accounting and reporting national-level emissions inventories under the UNFCCC, multiple global, regional, and national accounting and reporting standards and guidance materials have developed to support more consistent approaches to quantifying emissions from organisations, products and projects. These can be voluntary or as part of local climate regulation. The leading international approaches are published by the Greenhouse Gas (GHG) Protocol and by ISO (e.g., ISO14064). These frameworks typically reference IPCC concepts, methods and definitions.

While these standards typically require that GWP100 is used (i.e., the global warming potential of a gas over a 100 year period), they can be more or less prescriptive on the scope and boundaries of an inventory i.e., which processes and sources of emissions of a value chain to include. Generic corporate reporting frameworks, such as the GHG Protocol Corporate Standard, tend to focus on ensuring transparency of methods over highly prescriptive requirements on exactly which sources to include and how to estimate them (e.g., which secondary sources of emissions factors should be used for calculations). This means that most voluntary reporting standards do not deliver comparability.

[17] It is important to note that different versions of GWP exist that quantify the impact of emissions over different timescales e.g., 20 years, 100 years or 500 years. GWP100 (i.e., a one-hundred-year timescale) is generally used

[18] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

Pillar 2: Deforestation and conversion

Introduction

The growth in consumption of processed foods, animal protein and other products, has led to increasing demand for commodities like palm oil, soybeans and cocoa. These commodities are typically grown in regions where forests, grasslands, peatlands and other natural ecosystems are at risk of being converted so that increasing quantities of these commodities can be produced. Expanding commodity production is a major driver of loss of natural habitats and degradation of ecosystem services globally.

The impacts of deforestation and habitat conversion include loss of biodiversity and ecosystem services, increased greenhouse gas emissions which contribute to global climate change, and harm to local and indigenous communities. For example, 9-14% of global annual GHG emissions come from the gases emitted and sequestration potential lost when land is converted from natural ecosystems into food and fibre production[19]. Deforestation and habitat conversion can also trigger changes to regional climate patterns, leading to decreases in yields, reduced agricultural revenues, and disrupting local ecological processes[20].

It is not possible to limit catastrophic climate breakdown without protecting standing forests and other natural ecosystems. Uncoupling commodity production from further land conversion is one of our greatest challenges. We know it is possible to expand production instead onto areas of land which have already been cleared, degraded or abandoned[21], and that this could facilitate significant growth in production volumes whilst also protecting forests and other natural ecosystems.

UK policy

In 'A Green Future: our 25 Year Plan to Improve the Environment'[22] the UK Government articulates an ambitious set of goals and actions for the UK, including committing that '*our consumption and impact on natural capital are sustainable, at home and overseas*'. This statement of intent supports the UK's international commitments on climate, nature and people, including the Sustainable Development Goals, the Paris Agreement, the Aichi Biodiversity Targets, the New York Declaration on Forests, the Amsterdam Declaration and the Leaders' Pledge for Nature.

The withdrawal of the UK from the European Union has necessitated the development of environmental regulations to replace the EU legal frameworks that previously applied to the UK. This has resulted in the drafting of the Environment Bill, which, at the time of writing (September 2021), is in the House of Lords at 3rd reading stage and is expected to pass into law by the end of 2021. Relevant secondary legislation will be developed over the coming year. Included within the Environment Bill is a draft deforestation due diligence regulation, which would place a mandatory requirement on companies above a certain size to conduct due diligence to ensure that the forest-risk commodities that are imported into the UK are not associated with illegal deforestation.

Whilst WWF and other civil society organisations work together with critical industry partners to ensure that the UK Environment Bill, mandatory due diligence obligation and supporting secondary measures are as robust as possible, it has never been clearer that preventing deforestation and habitat conversion for

[19] Harris, M., Hassall, I., Donovan, D., Way, L. & Wilkinson, S. 2020. Land Use Change Related GHG Emissions Embodied in Commodity Production and Trade. JNCC Report No. 658, JNCC, Peterborough, ISSN 0963-8091 Available at: https://hub.jncc.gov.uk/assets/e8829201-aeea-4346-bd1d-f7331441fa94

[20] Leite-Filho, A.T., Soares-Filho, B.S., Davis, J.L. et al. Deforestation reduces rainfall and agricultural revenues in the Brazilian Amazon. Nat Commun 12, 2591 (2021). https://doi.org/10.1038/s41467-021-22840-7

[21] Soterroni, A.C., Ramos, F.M., Mosnier, A., Fargione, J., Andrade, P.R., Baumgarten, L., Pirker, J., Obersteiner, M., Kraxner, F., Câmara, G., Carvalho, A. X. Y., & Polasky, S. (2019). Expanding the Soy Moratorium to Brazil's Cerrado. Science Advances, 5 (7), doi: 10.1126/sciadv.aav7336

[22] HM Government (2018). A Green Future: our 25 Year Plan to Improve the Environment. https://www.gov.uk/government/publications/25-year-environment-plan

overseas commodity production is amongst the top priorities for policy makers. Any UK legislation would build upon parallel moves in the European Union, and likely the United States, both of which are working on similar policies for the imports of forest- and conversion-risk commodities to those markets.

Corporate policy and action

Alongside significant public policy developments, there have been critical shifts in the understanding of what is required from companies to truly source responsible, deforestation-, conversion- and exploitation-free commodities. The Consumer Goods Forum (CGF) commitment to net zero deforestation and -conversion by 2020 contributed to a sweep of voluntary corporate commitments, many of which were oriented around certification standards as the means to deliver deforestation- and conversion-free supply chains. Over the past decade, there has been increasing recognition that approaches to responsible sourcing that rely on certification alone are unlikely to be able to halt deforestation and conversion, and instead a broader toolkit is required to address the challenge. Alongside increased focus on landscape and/or jurisdictional approaches and supporting smallholders to expand responsibly, there is a shift towards ensuring that commodity suppliers, importantly including exporters and importers, are 'clean' across their entire operations and supplying only deforestation- and conversion-free material to the global market. Various industry initiatives, including the CGF Forest Positive Coalition, are now developing commitments and roadmaps which are more inclusive of the various methods that can be used to verify a deforestation-, conversion- and exploitation-free production.

The development of the Accountability Framework Initiative (AFi) represents a major milestone, as it presents a civil society agreed expectation on what it means to have strong, wide-reaching commitments and policies to protect forests and other natural ecosystems and to respect human rights; to implement systems that drive measurable improvements within production landscapes and to ensure robust accountability that tracks progress, informs decision-making, and incentivised responsible procurement and investment. The AFi sets out the 'gold standard' for ethical commodity supply chains, operational guidance on how to become verified deforestation-, conversion- and exploitation-free, and a series of definitions on key terms used within civil society and the industry. The next frontier is working with companies to act on the guidance of the AFi, but its development and launch has been critical in broadening the approach to responsible sourcing from certification alone to a wider suite of complementary measures.

Target

100% deforestation- and conversion-free agricultural commodity supply chains by 2025 at latest, with a cut-off date* of 2020 at the latest (existing earlier cut-off dates should be upheld) Require suppliers to have deforestation and conversion-free supply chains as soon as possible and by 2025 at the latest, with a cut-off date of 2020 at the latest

Target date

The suggested target for the UK as a whole is that '*UK supply chains of deforestation/conversion-risk commodities are responsible for zero deforestation and conversion of ecosystems as soon as possible and no later than 2023 (with a cut-off date[23] of 2020 at the latest)*'[24]. This UK-wide target reflects a 100% reduction from the estimated deforestation footprint of 20,196 hectares in 2017[25]. This level of reduction is based on the recommendations of independent task forces and environmental NGOs[26]. For example,

[23] See definitions section, below

[24] WWF and 3Keel (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. https://www.wwf.org.uk/what-we-do/uk-global-footprint

[25] Croft, S., West, C., Harris, M., Otley, A. & Way, L. (2021). Towards indicators of the global environmental impacts of UK consumption: Embedded Deforestation. JNCC Report No. 681, JNCC, Peterborough, ISSN 0963-8091

[26] For example: WWF-UK and RSPB (2020). Riskier Business: The UK's Overseas Land Footprint. https://www.wwf.org.uk/riskybusiness

the Global Resource Initiative (GRI) Taskforce launched jointly by Ministers from DEFRA, BEIS, DFID and FCDO, and composed of a broad range of stakeholders proposed that '*The government urgently introduces a mandatory due diligence obligation on companies that place commodities and derived products that contribute to deforestation on the UK market and to take action to ensure similar principles are applied to the finance industry*'[27]. Although the GRI's recommendation did not include a specific target date, the urgency of eliminating deforestation from UK supply chains is clear. The move of target date from 2023 (UK-wide) to 2025 in the WWF shopping basket reflects the situation within retail supply chains, but all efforts should be made to achieve the target before the revised date. The cut-off date of 2020 remains the same.

Scope

Ecosystems covered: The target includes the conversion of all natural ecosystems – including but not limited to forests – recognising the pressure that consumption places on other vital non-forest ecosystems, such as grasslands, savannahs and peatlands[28].

Commodities included: The major sources of embedded deforestation in UK commodity supply chains include palm oil, soy, cocoa; beef; coffee; timber, pulp and paper products (including packaging) and we recommend that blueprints for action are developed for all of these commodities. We further recommend that all major uses of the commodity are included, whilst acknowledging that the feedstock of some highly derived ingredients may be unknown to retailers and their suppliers (e.g., glycerol).

Legality: The forthcoming UK regulation is likely to require due diligence on illegal deforestation only. This retail target pertains to all conversion, whether legal or illegal. As assessing presence of conversion is the necessary preliminary step in determining whether conversion is legal, this is likely to be less challenging to implement than a target based on legality, as establishing legality requires additional information and processes[29].

Definitions

All definitions follow the Accountability Framework Initiative.[30] Key ones include:

Conversion:	Change of a natural ecosystem to another land use or profound change in a natural ecosystem's species composition, structure, or function. • Deforestation is one form of conversion (conversion of natural forests). • Conversion includes severe degradation or the introduction of management practices that result in a substantial and sustained change in the ecosystem's former species composition, structure, or function. • Change to natural ecosystems that meets this definition is considered to be conversion regardless of whether or not it is legal.
Cut-off date (related to no-deforestation and no-conversion commitments):	The date after which deforestation or conversion renders a given area or production unit non-compliant with no-deforestation or no-conversion commitments, respectively.
Deforestation:	Loss of natural forest as a result of: i) conversion to agriculture or other non-forest land use; ii) conversion to a tree plantation; or iii) severe and sustained

[27] Global Resource Initiative (2020). Final Recommendations Report https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/881395/global-resource-initiative.pdf

[28] WWF (2021) Due negligence: Will a due diligence regulation on illegal deforestation delink UK supply chains from deforestation? and Béatrice Wedeux and Anke Schulmeister-Oldenhove (2021). Stepping Up? The Continuing Impact of EU Consumption on Nature Worldwide. WWF https://wwfeu.awsassets.panda.org/downloads/stepping_up___the_continuing_impact_of_eu_consumption_on_nature_worldwide_fullreport_low_res.pdf

[29] WWF UK (2021). Due Negligence: Will a due diligence regulation on illegal deforestation delink UK supply chains from deforestation? Available at: www.wwf.org.uk/what-we-do/due-negligence-report

[30] https://accountability-framework.org/the-framework/contents/definitions/

	degradation. This definition pertains to no-deforestation supply chain commitments, which generally focus on preventing the conversion of natural forests. • Severe degradation (scenario iii in the definition) constitutes deforestation even if the land is not subsequently used for a non-forest land use. • Loss of natural forest that meets this definition is considered to be deforestation regardless of whether or not it is legal. • The Accountability Framework's definition of deforestation signifies "gross deforestation" of natural forest where "gross" is used in the sense of "total; aggregate; without deduction for reforestation or other offset."
Natural ecosystem:	An ecosystem that substantially resembles—in terms of species composition, structure, and ecological function — one that is or would be found in a given area in the absence of major human impacts. This includes human-managed ecosystems where much of the natural species composition, structure, and ecological function are present. • Natural ecosystems include: a) Largely "pristine" natural ecosystems that have not been subject to major human impacts in recent history b) Regenerated natural ecosystems that were subject to major impacts in the past (for instance by agriculture, livestock raising, tree plantations, or intensive logging) but where the main causes of impact have ceased or greatly diminished and the ecosystem has attained species composition, structure, and ecological function similar to prior or other contemporary natural ecosystems c) Managed natural ecosystems (including many ecosystems that could be referred to as "semi-natural") where much of the ecosystem's composition, structure, and ecological function are present; this includes managed natural forests as well as native grasslands or rangelands that are, or have historically been, grazed by livestock d) Natural ecosystems that have been partially degraded by anthropogenic or natural causes (e.g., harvesting, fire, climate change, invasive species, or others) but where the land has not been converted to another use and where much of the ecosystem's composition, structure, and ecological function remain present or are expected to regenerate naturally or by management for ecological restoration
No-conversion (synonym: conversion-free):	Commodity production, sourcing, or financial investments that do not cause or contribute to the conversion of natural ecosystems (as defined by the Accountability Framework). • No-conversion refers to no gross conversion of natural ecosystems, which the Accountability Framework specifies as the appropriate policy and goal on this topic for companies and supply chains. • The terms "no-conversion" and "conversion-free" are used in favour of "zero-conversion" because "zero" can imply an absolutist approach that may be at odds with the need to sometimes accommodate minimal levels of conversion at the site level in the interest of facilitating optimal conservation and production outcomes (see definition for minimal level [of deforestation or conversion]).

Metrics

% of conversion-risk commodity in own supply chain that is verified deforestation- and conversion-free.

% of conversion-risk commodity sourced from importers that have robust commitments and action plans to handle only deforestation- and conversion-free material, across their entire operations, with a cut-off date no later than 2020.

How the metrics contribute to halving the impact of the average UK shopping basket

Including all of the deforestation- and ecosystem-risk commodities listed in the previous section within the metrics would be likely to capture over 50%[31]-[32] of the UK's overseas impact on deforestation and conversion. The metric is in line with the overall UK need to reduce the impact of deforestation and conversion to zero[33].

Specific measurement issues

The metrics focus on eliminating deforestation and conversion associated with a company's supply chain and dealing with suppliers that have their own commitments and processes to exclude deforestation and conversion from their own supply chains. The key issues of these metrics are around the definitions of '*verified deforestation- and conversion-free*' and what constitutes '*robust commitments and action plans*' for commodity traders. It is recommended that in defining these, retailers follow the relevant sectoral initiatives such as the Palm Oil Transparency Coalition[34], the Soy Transparency Coalition, the CGF Forest Positive Coalition roadmaps and supplier asks, and the Retail Soy Group[35].

The outcomes associated with wider sectoral change is only partly within the mandate of an individual company, and so is a process measure rather than an outcome measure. Participation in initiatives to that end nonetheless remains essential.

[31] Croft, S., West, C., Harris, M., Otley, A. & Way, L. (2021). Towards indicators of the global environmental impacts of UK consumption: Embedded Deforestation. JNCC Report No. 681, JNCC, Peterborough, ISSN 0963-8091

[32] WWF-UK and RSPB (2020). Riskier Business: The UK's Overseas Land Footprint. https://www.wwf.org.uk/riskybusiness

[33] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

[34] https://www.palmoiltransparency.org/

[35] https://www.retailsoygroup.org/

Pillar 3: Agriculture

The term 'sustainable agriculture' is often used by stakeholders to describe many interrelated issues - from improving the livelihoods of millions of smallholder farmers to addressing many of the most pressing environmental issues of our day, such as climate change and water resource management[36]. The term and related concepts, such as food security, have many framings by business, governments, academics, and civil society organisations[37]. According to the Sustainable Agriculture Initiative Platform, sustainable agriculture is "*the efficient production of safe, high quality agricultural products, in a way that protects and improves the natural environment, the social and economic conditions of farmers, their employees and local communities, and safeguards the health and welfare of all farmed species*." Agricultural sustainability covers a wide variety of environmental issues, but ultimately concerns how human activities impact upon five key natural assets: biodiversity, soils, water, air and climate. As 'climate' has already been covered within the 'Climate Change' pillar we have focused on metrics that quantify the impact of the grocery sector on the remaining three environmental assets (see Figure 1 below). Other forms of air pollution caused by agricultural activities are not yet part of the shopping basket framework.

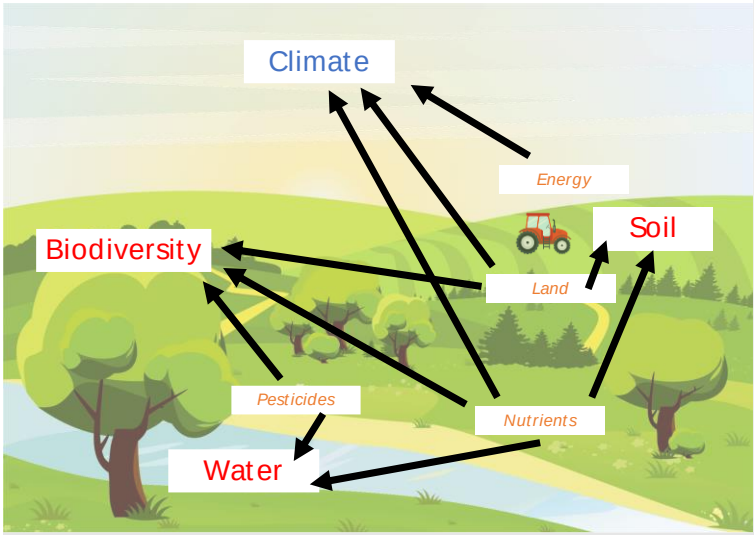

Figure 1: Environmental aspects of sustainable agriculture

Some fundamental principles are largely agreed in this e.g., the importance of considering the farming system as a whole (integrated farm management) and working with natural systems[38]. These need to be reflected in the choice of target and metric adopted (e.g., if certification is used then the scheme must put these principles at the core of its standard).

Target

Biodiversity and water:
At least 50% of whole produce and grains certified or covered by a robust environmental scheme

[36] Pretty, J. (2008) Agricultural sustainability: concepts, principles and evidence. Phil. Trans. R. Soc. B (2008) 363, 447–465
[37] WWF (2015) Food Security - A toolkit for exploring frames and links to biodiversity.
[38] Pretty, J. (2008) Agricultural sustainability: concepts, principles and evidence. Phil. Trans. R. Soc. B (2008) 363, 447–465

100% meat, dairy and eggs, including as ingredients sourced to 'Better' standard
At least 50% of fresh food from areas with sustainable water management

Agricultural Emissions & Land Use:
Agricultural emissions lowered in line with 1.5-degree SBT

Definitions

Unlike issues such as "climate change" and "deforestation" there is less consensus on some of the definitions used when defining environmental performance in areas such as biodiversity and water. The terms used in the targets above are defined as follows:

Water: Corporate reporting of water impacts is more developed than those relating to biodiversity. The concept of 'water risk' is now reasonably well-established (for example WWF's Water Risk Filter) and methodologies such as water footprinting have been used to understand the quantities of water consumed directly and indirectly by food and agriculture businesses. Best practice is to use 'context-based water targets' (CBWTs) that measure the degree to which water use by a company's sites and those of its suppliers is sustainable relative to local water resource constraints[39]. A purely volumetric measure of water efficiency (e.g., m^3/tonne) is not supported as reduced water use does not necessarily translate to reduced environmental impact in catchments – and can result in unintended consequences[40]. Instead, the focus should be on encouraging the sustainable management of water resources by local users and policymakers. We recommend alignment with the definitions used by WRAP and Courtauld 2030 partners under their water target[41] ("50% of fresh food (produce and protein) is sourced from areas with sustainable water management").

Climate: See dedicated section above on climate for general definitions. In addition, it is worth noting that it is recommended that any definitions follow emerging guidance developed by WWF, GHG Protocol and the SBTi on two key projects: WWF "FLAG" guidance on target setting in agriculture[42] and the GHG Protocol Land Sector and Carbon Removals guidance[43].

"Robust" environmental scheme: Over the past 10 years various researchers and initiatives have sought to compare and benchmark sustainability standards and schemes – for example, ITC's 'Standards Map'[44], The SAI Platform's 'Farm Sustainability Assessment'[45], Floriculture Sustainability Initiative's 'FSI Basket'[46] and the Consumer Goods Forum SSCI benchmarking[47]. It was not possible to define all the criteria for what constitutes a "Robust Environmental Scheme" within the scope of this project however we recommend applying ISEAL's Benchmarking Good Practice[48] to ensure the results are credible and transparently decided.

Better Meat and Dairy: As with broader land management standards, the definition of 'better' meat and dairy is not widely agreed. For practicalities sake, production standards will need to be used to implement this metric. The principles developed by Eating Better could serve as a basis for identifying appropriate

[39]Explanation of context based water targets is available via the CEO Water Mandate initiative https://www.ceowatermandate.org/files/context-based-targets.pdf
[40] Personal communications with Conor Linstead, WWF-UK Freshwater Specialist. Also see https://www.frontiersin.org/articles/10.3389/fenvs.2018.00048/full
[41] https://wrap.org.uk/taking-action/food-drink/actions/reducing-water-stress
[42] SBTi https://sciencebasedtargets.org/sectors/forest-land-and-agriculture
[43] GHG Protocol https://ghgprotocol.org/land-sector-and-removals-guidance
[44]ITC Standards Map: https://standardsmap.org/
[45] SAI Platform FSA https://saiplatform.org/fsa/
[46]FSI Basket of standards https://www.fsi2025.com/basket/
[47]The Sustainable Supply Chain Initiative (SSCI) https://www.theconsumergoodsforum.com/social-sustainability/sustainable-supply-chain-initiative/key-projects/benchmarking-recognition/
[48] http://www.isealalliance.org/about-iseal/our-work/benchmarking

standards[49].

Scope

The key decision-point is whether the target should cover all, or a subset, of raw materials used by business. Suggested scopes are:

- **Environmental scheme:** Covers fresh produce (fruit and vegetables) and cereals.
- **Water**: Covers fresh produce (fruit and vegetables) and protein (meat, dairy and eggs) categories. These categories are understood to be the primary source of water risk for UK retail businesses[50,51] and is also the focus of WRAP Courtauld action. From practical perspective, mechanisms for tracking and implementing water sustainability metrics are less developed
- **Climate**: Covers all ingredients.
- **Better Meat, Dairy and Eggs**: Covers all ingredient types (i.e., 'fresh' categories plus those used in prepared meals).

How target contributes to halving shopping basket and required UK reduction

The agricultural sector has a major contribution to make in reducing the UK's production footprint across many areas of impact: water pollution, water use and flows, chemical pollution, GHG emissions, nitrogen and phosphorous use. The suggested target wraps up many of these impacts into environmental schemes such as LEAF, Global G.A.P, etc.

Around 60% of the UK's water footprint is estimated to be overseas and embedded in imported goods consumed within the UK[52]. However, this overseas water use is relatively poorly quantified and reported. Water stress is particularly acute in regions including North Africa, Southern Europe, India and China. Animal products – meat, butter, eggs – have a particularly large, embedded water footprint, as do some nuts, fruits and pulses[53]. Irrigation and chemical use in farming has significant impacts on water resources in producer countries, leading to reduced river flows, depleted groundwater sources and deteriorating water quality.

Metrics

Agriculture - Biodiversity, water and regeneration:
% of sourcing in a robust environmental scheme (e.g. LEAF, Global G.A.P., Countrywide Stewardship, Glastir Advanced, or ELM scheme level tbd)
% meat, dairy and eggs sourced to 'Better' standards (tonnage, including ingredients)
% of sourcing from regions with sustainable water management
Agricultural Emissions & Land Use:
% reduction in agricultural GHGs
% of farms monitoring GHG footprint
% reduction in key product sourcing from lowland peat

How metric relates to target

Biodiversity & water: Given the complexity and technical difficulty in measuring the broad range of environmental impacts of farming (e.g., on biodiversity, soil health and water quality, etc.) the metrics in this pillar are predominantly output/practice-type indicators.

[49] Principles for eating meat and dairy more sustainably: the 'less and better' approach https://www.eating-better.org/uploads/Documents/2018/better_meat_report_FINAL.pdf

[50] Tim Hess & Chloe Sutcliffe (2018) The exposure of a fresh fruit and vegetable supply chain to global water-related risks, Water International, 43:6, 746-761, DOI: 10.1080/02508060.2018.1515569

[51] Zurek, M.; Garbutt, G.; Lieb, T.; Hess, T.; Ingram, J. Increasing Resilience of the UK Fresh Fruit and Vegetable System to Water-Related Risks. *Sustainability* **2020**, *12*, 7519. https://doi.org/10.3390/su12187519

[52] Ashok Chapagain & Stuart Orr (2008). UK Water Footprint: the impact of the UK's food and fibre consumption on global water resources. Volume one

[53] Our World in Data (n.d.). Water withdrawals per capita. https://ourworldindata.org/water-use-stress#water-withdrawals-per-capita

The first metric (% of sourcing in a robust environmental scheme) wraps up a wide range of environmental outcomes into sourcing from environmental schemes such as LEAF, Global G.A.P, etc. Given the number of farmers and growers, these market-based schemes are likely to be the most practical means of businesses scaling and tracking the adoption of better agricultural practices in a very dynamic sourcing environment. However, it is acknowledged that the reduction in impact that such schemes deliver is poorly quantified[54]. It is therefore critical that scheme owners continue to be pressed on providing evidence of their impacts (e.g., through use of best practices outlined by ISEAL). Furthermore, it is important to recognise that certification is often not the primary driver of the adoption of environmentally-friendly practices on farms. Generally, it is government-funded stewardship/support that is the reason why farmers adopt sustainable practices, and certification is a way of this being recognised for businesses. The premiums paid by farmers for certification (e.g., LEAF Marque) are not always enough to justify the economic cost of environmentally enhancing practices without government support. Consequently, further work must be done, including cross-sector government advocacy, to create a mechanism which recognises farmers who are involved in government-funded environmental schemes (e.g., ELM, Countryside Stewardship or the devolved equivalents), but which aren't certified by a voluntary certification standard initiative.

The second metric (on sourcing fresh food from areas with sustainable water management) is defined by Water Framework Directive status (within the EU) and the WWF Water Risk Filter agricultural water risk scores (non-EU).

Better meat & dairy: this metric relates directly to the proposed target, so no further explanation is needed.

Agricultural Emissions & Land Use: The headline metric (% reduction in agricultural GHGs) is directly aligned to the target of lowering agricultural emissions in line with 1.5-degree emissions pathway. The additional metrics capture key indicators that demonstrate two things:

- Agricultural producers are monitoring agricultural emissions performance - important for identifying mitigation actions and understanding their effectiveness
- In addition to 'agricultural' emissions the significant source of biogenic CO2 losses from UK cropland use are being addressed. According to the UK national GHG inventory[55], although drained peatlands used as cropland and intensive grasslands occupy only a small fraction of the UK's peat area they have the highest greenhouse gas emissions per unit area of any land use, with high rates of CO2 because of deep drainage. It is important to note that tackling CO2 emissions from lowland peatland is sensitive as this is a significant crop production area for the United Kingdom. Care is needed to ensure land reversion does not cause increased emissions elsewhere in the UK or abroad. According to the Climate Change Committee, restoring at least 25% of lowland peat would contribute towards total peatland emissions reductions of 5 MtCO2e by 2050, while allowing food production to continue on the most productive land[56]. Addressing this conundrum: of lowland peat being an emissions source, but also a productive soil which produces a large proportion of our domestic vegetable crop will be an important piece of work that is currently missing. Progress must be made in trying to answer how we reduce land use

[54] Gillian Petrokofsky & Steve Jennings (2018). The effectiveness of standards in driving adoption of sustainability practices: A State of Knowledge Review. ISEAL Alliance. https://www.isealalliance.org/get-involved/resources/report-effectiveness-standards-driving-adoption-sustainability-practices

[55] UK Government 2019 UK Greenhouse Gas Emissions, Final Figures. Statistical release. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957887/2019_Final_greenhouse_gas_emissions_statistical_release.pdf

[56] Climate Change Committee (2020) Land use: Policies for a Net Zero UK. file:///C:/Users/RichardSheane/Downloads/Land-use-Policies-for-a-Net-Zero-UK.pdf

emissions, whilst increasing vegetable production and consumption and not offshoring the environmental impact of food production. The social impacts of land use change must also be considered.

Pillar 4: Marine

Introduction

Marine resources encompass wild caught fisheries products and aquaculture, including fish oil and fish meal used as feed in the aquaculture sector. Marine resources are consumed directly by people (e.g., eating of fish and seaweed) and are also embedded within other products, such as fish feed and fish oils used in feed for livestock production.

From an ecological perspective, key impacts of marine resource use include the depletion of animal and plant stocks. Overfishing occurs when harvesting populations beyond a sustainable level can diminish numbers to the point that marine organisms can no longer replenish themselves naturally, which can have devastating effects on individual species and cascading impacts on marine ecosystems. The intensity of fishing and associated activity and the impact of some of the methods used to harvest these resources, both domestically and overseas, mean marine resource use is also a major source of other environmental damages including accidental catches of unwanted species, habitat destruction and greenhouse gas emissions[57].

The use of fish for aquaculture feed is another key impact of marine resources on the environment. More than 20% of wild caught fish are diverted to create fish meal and fish oil, even though 90% of these fish are fit for direct human consumption[58]. Replacement of wild caught fish with alternative feed ingredients can also be problematic: much of the replacement in Norway was by soy from South America. The sector is currently striving to decouple its soy supplies from deforestation, and approximately three quarters of the soy used to produce salmon in UK supermarkets has verified deforestation-free claims. However, virtually none of the soy used to produce other seafood has similar sustainability attributes.

Up to a third of all landed fish globally is IUU (Illegal, Unreported and Unregulated) fish[59], which are highly likely to be associated with human rights abuses such as illegal working conditions. Marine resources carry a risk of being associated with these unless they are fully traceable and their supply chains fully transparent.

Around 60% of the UK's marine resource consumption is imported from outside the UK from almost 90 countries and the majority of UK domestic marine resource production is for export purposes, mainly destined for the EU[60]. This means that the UK has a significant overseas impact on marine resource use.

Target

<u>100% of seafood from sustainable sources by 2030:</u> All seafood sourced should be from a certification AND go beyond by adopting an area-based 'Seascape' Approach. Reduce fishmeal and fish oil usage to FFDR<1 by using sustainable fishmeal and fish oil replacements and increasing the use of trimmings

[57] Sala *et al.* (2021). Protecting the global ocean for biodiversity, food and climate. Nature. 592:397-402. https://www.nature.com/articles/s41586-021-03371-z

[58] Cashion *et al.* (2017). Most fish destined for fishmeal production are food-grade fish. Fish and Fisheries. 18(5): 837-844. https://onlinelibrary.wiley.com/doi/10.1111/faf.12209

[59] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

[60] Seafish (2021). 2019 UK Seafood Import and Export Summary Factsheet Finalised Data. https://www.seafish.org/insight-and-research/market-supply-data-and-insight/

Definitions

Certification: A number of seafood certification schemes have become prevalent in the last decade including those that are business facing and consumer facing. Different certification schemes have their own strengthens and shortcomings, making it challenging to determine which are credible. As a starting point, the following schemes would be considered: the Marine Stewardship Council, Aquaculture Stewardship Council, Responsible Fishing Vessel Standard (for fishing crews' welfare – where certification is feasible), Best Aquaculture Practices, Global GAP Aquaculture Standard, RSPCA farmed fish welfare standards, and/or Global Sustainable Seafood Initiative recognised certifications (with the caveat that the list of appropriate certification schemes will be determined by considering their criteria, ambition, governance and transparency). The most robust and relevant certification schemes should be prioritised along with third party verified equivalent.

Seascape Approach: According to the Seascapes Guidebook, seascape approaches are "*large, multiple-use marine areas, defined scientifically and strategically, in which government authorities, private organizations, and other stakeholders cooperate to conserve the diversity and abundance of marine life and to promote human well-being*"[61]. Similar to the Landscape Approach[62], the Seascape Approach aims to achieve effective ocean governance and management from local to regional levels. According to recent research by Murphy et al (2021)[63] there is a need for the Seascape approach to be supported and adopted by political and financial institutions if we are to meet SDG targets as well as the proposed post-2020 global biodiversity framework goal to conserve 30% of our oceans by the year 2030. The essential elements are summarised in the figure below (from the Seascape Guidebook). It is recommended that recognising the merits and shortcomings of certifications schemes, the Seascape (sourcing) Approach emphasises the importance of collective action in seafood sourcing and amplifies the importance of private sector engagement to go beyond certification in creating or advocating improvement to some, if not all, essential elements in the Seascape Approach.

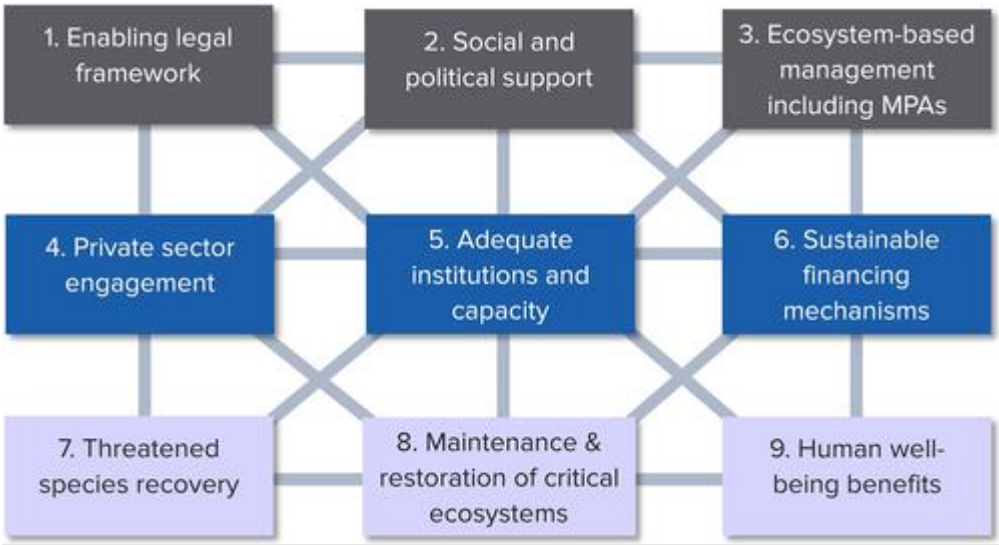

Figure 2: The nine essential elements of a Seascape adapted from the Seascape Guidebook

[61] Atkinson, S., Esters, N., Farmer, G., Lawrence, K., & McGilvray, F. (2011). The seascapes guidebook: How to select, develop and implement seascapes. Arlington, VA: Conservation International.
[62] https://globalcanopy.org/insights/publication/the-little-sustainable-landscapes-book/
[63] Murphy, SE, Farmer, G, Katz, L, *et al.* (2021). Fifteen years of lessons from the Seascape approach: A framework for improving ocean management at scale. Conservation Science and Practice. 3:e423. https://doi.org/10.1111/csp2.423

Forage Fish Dependency Ratio (FFDR): According to the Aquaculture Stewardship Council FFDR "*the quantity of wild fish used per quantity of cultured fish produced*".[64] The calculation approach is outlined in the 'metrics' section below.

Scope

Targets cover a broad definition of 'seafood' that includes fish, shellfish, crustaceans and even seaweed. This definition applies to freshwater and marine species and to farmed and wild-caught products. Fresh, frozen and canned seafood products are all within the scope, whether they are intended for human consumption, animal consumption or other purposes[65].

How the target contributes to halving shopping basket and required UK reduction

Seafood: The target addresses unsustainable production and harvesting systems both in the UK and related to imports from overseas. The target is consistent with reducing the UK's overall footprint of production and consumption[66]. Current levels of certified seafood within the UK are unknown. However, retailers reaching a 100% certification rate would be on the right path to reducing the marine footprint of the average shopping basket.

Certification is, however, a minimum requirement within the Basket Metrics. The Seascape Approach entails going beyond certification to address the seascape level impacts of seafood sourcing in a more ambitious, holistic way. Moving beyond certification and species/gear focussed seafood sourcing strategies would allow more consideration and advocacy for what healthy productive oceans would look like.

Fishmeal: The fishmeal and fish oil used by the UK's aquaculture sector comes from a combination of trimmings from fish for human consumption – which would otherwise be waste – and purpose-caught fish. While the use of fishmeal use metrics on their own has been criticised by the aquaculture industry[67] there are a number of key reasons for including it:

- The use of purpose caught fish to produce feed creates a danger of increasing demand pushing up the price of fishmeal to levels that incentivises exploitation of small pelagic species (the main source of fishmeal) beyond their maximum sustainable yield, potentially leading to rapid depletion of resources
- The above reason will become more likely if aquaculture activity continues to increase at its current rate
- Exploitation of small pelagics would also have impacts on important seabird populations[68]
- There is an ethical reason surrounding the fact that most purpose-caught fish for fishmeal could be used for human nutrition and therefore should not be used to feed fish.

Furthermore, the FFDR metric can support the continued trend toward lower fishmeal/oil usage and increase the efficiency of marine resource use (fishmeal and fish oil are both finite resources that are shared across a range of users with increasing demands).

Although the high-level metric focuses on FFDR only, it is important to consider that any replacement for fishmeal and fish oil should be sustainable and not place pressure on other vulnerable ecosystems. The Blueprint for Action therefore includes two actions within the *Innovation and Investment* and *Advocate* sections that focus on the development of sustainable alternative ingredients that are nutritionally

[64] ASC Salmon Standard v1.2
[65] https://wwfint.awsassets.panda.org/downloads/wwf_global_seafood_charter_for_companies_june_2015_1.pd
[66] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint
[67] For example, in the IFFO Position Paper on FFDR as a measure of sustainability: https://www.iffo.com/forage-fish-dependency-ratio-ffdr
[68] Frederiksen et al. (2004). The role of industrial fisheries and oceanographic change in the decline of North Sea black-legged kittiwakes. 41(6):1129-1139 https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.0021-8901.2004.00966.x

equivalent to the fishmeal and fish oil they are replacing. The Deforestation section also contains metrics to ensure sustainable forest commodities.

Metrics

% Certified wild-caught & aquaculture material sourced, converted into whole animal weight, tonnes
% of wild-caught resources adhering to all aspects of WWF's Seascape Approach
% farmed seafood products with FFDR (FFDRm and FFDRo) <1 and with all feed ingredients certified by ASC Feed standards or equivalent

How metric relates to target

% Certified wild-caught & aquaculture material (tons) – this metric translates directly onto the targets and definitions outlined in the section at the start of this chapter.

% of wild-caught resources adhering to all aspects of the Seascape Approach – as above.

% farmed seafood products with FFDR<1 and with all feed ingredients certified by ASC Feed standards – We recommend adopting the FFDR methodology outlined in Annex IV of the latest version of the ASC Standards.[69] FFDR levels do vary by sector and sub-sector (e.g., within Salmon and Seabass species FFDR ranges from 1 to 9[70,71]). It is not recommended that sector-specific cut-offs are used in this instance, but rather an industry-wide ambition to reach low levels of inclusion across the board (i.e., <1).

[69]Version 1.2 of the ASC Salmon Standard https://www.asc-aqua.org/wp-content/uploads/2019/04/ASC-Salmon-Standard_v1.2.pdf
[70] ASC Seabass, Seabream and Meagre Standard v1.1 https://www.asc-aqua.org/wp-content/uploads/2019/03/ASC-Sea-Bass-Seabream-and-Meagre-Standard_v1.1_Final.pdf
[71] Version 1.2 of the ASC Salmon Standard https://www.asc-aqua.org/wp-content/uploads/2019/04/ASC-Salmon-Standard_v1.2.pdf

Pillar 5: Diets

Introduction

The food we eat and how we produce it has a major role in determining the health of people and the planet. But addressing and improving food production practices is not sufficient on its own. To meet 1.5 degree aligned climate targets and restore nature, dietary shift is also needed[72]. A contracting and rebalancing of protein consumption is also needed to improve the healthiness and sustainability of UK current diets[73]. UK citizens consume on average 75g of protein per day, which is 50% higher than Public Health England recommended levels of 50g per day on average[74]. Consumption of animal proteins is beyond our national 'fair share', with UK citizens consuming twice the global average of meat and three times the average of dairy. As producing animal proteins has a greater environmental impact than plant proteins in general[75], and overconsumption of meat (particularly processed red meats) has been linked to diet-related diseases[76], there is a significant opportunity to reduce the environmental and health impacts of current diets by facilitating a reduction in overall protein consumption levels and a shift away from animal and toward plant proteins.

Various quantifications of a healthy sustainable diet have concluded that a significant reduction in consumption of animal protein and increase in consumption of plant-based protein is required to reverse diet-related ill health and reduce the climate and nature impacts of the food system[77]. However, there is currently no official UK policy to determine the rate at which the transition to a healthy and sustainable diet should be made.

In terms of the contribution of dietary shift to emissions reduction in the UK, the Climate Change Committee's 6th Carbon budget[78] outlines exploratory scenarios including a 20% reduction in meat and dairy consumption by 2030 and a 50% reduction by 2050, accompanied by an increase in plant-based food consumption. Both scenarios involved maintaining current protein levels; and translated to a ~5-6 $MtCO2e\ yr^{-1}$ by 2030 and ~17-18 $MtCO2e\ yr^{-1}$ by 2050. This represents a 9-11% and 31-33% reduction in emissions from the UK agriculture sector compared to 2020 levels (~54 MtCO2e) respectively. Much of the emissions reduction in these scenarios comes from dietary shift, demonstrating the potential of changing diets in achieving Net Zero, especially if protein consumption is aligned with health recommendations. The Green Alliance[79] analysed the impact of faster dietary change between now and 2030, finding that accelerating the reduction in meat consumption could facilitate Net Zero to be reached by 2040. Reducing meat and dairy consumption by 50% by 2030 would lead to an emissions reduction of over 12 MtCO2e yr-1, which is significantly higher than in the 20% reduction by 2030 pathway suggested by the CCC.

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[72] Leclère, D., Obersteiner, M., Barrett, M. *et al.* (2020). Bending the curve of terrestrial biodiversity needs an integrated strategy. Nature 585, 551–556. https://doi.org/10.1038/s41586-020-2705-y

[73] Scarborough P, Kaur A, Cobiac L, *et al.* (2016). Eatwell Guide: modelling the dietary and cost implications of incorporating new sugar and fibre guidelines. *BMJ Open*; **6:** e013182. doi: 10.1136/bmjopen-2016-013182

[74] Public Health England (2016). Government Dietary Recommendations: Government recommendations for energy and nutrients for males and females aged 1–18 years and 19+ years

[75] Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. Science, 360(6392), 987-992.

[76] Bouvard V, Loomis D, Guyton KZ, Grosse Y, Ghissassi FE, Benbrahim-Tallaa L, Guha N, Mattock H, Straif K; International Agency for Research on Cancer Monograph Working Group. Carcinogenicity of consumption of red and processed meat. Lancet Oncol. 2015 Dec;16(16):1599-600. doi: 10.1016/S1470-2045(15)00444-1. Epub 2015 Oct 29. PMID: 26514947.

[77] For example, Springmann, M., Clark, M., Mason-D'Croz, D. *et al.* Options for keeping the food system within environmental limits. *Nature* **562,** 519–525 (2018). https://doi.org/10.1038/s41586-018-0594-0;

[78] Climate Change Committee (2020). The Sixth Carbon Budget: The UK's path to Net Zero. https://www.theccc.org.uk/publication/sixth-carbon-budget/

[79] Brandmayr, C., Kelsey, T., Petersen M., & Gordon, B. (2019). **Cutting the climate impact of land use**. The Green Alliance. ISBN:978-1-912393-29-9

Business and political efforts are currently focused on targeting foods high in fat, salt and sugar (HFSS), specifically improving products nutrient profiles by reducing nutrients of concern (unhealthy fats, salt and free sugars) and increasing macronutrients such as fibre. However, improving nutrient profile through product reformulation does not necessarily lead to a reduction in environmental impacts and positive impacts on nature. Studies have shown that discretionary foods are responsible for a large percentage of dietary emissions[80,81]. Reducing sales and consumption of discretionary foods therefore presents a promising strategy for reducing avoidable food system environmental impacts and ensuring that scarce natural resources are used to produce nutritious food.

Target

50/50 plant/animal protein sales split (% tonnage)

Target ambition

Research conducted through the WWF-Tesco partnership suggests a reduction in UK consumption of animal protein of 46% compared with 2018 figures by 2030, and corresponding increase in plant-based protein of nearly 500% over the same period is required. Some NGO groups provide higher estimates of reductions in animal-based protein needed by 2030 (e.g., Eating Better Alliance, 50%; Greenpeace, 71%), but these do not take into account changes in food production methods (e.g., shifts to agroecology/regenerative agriculture). While estimates of reductions differ, it is clear that ambitious dietary shift centred around the concept of 'less and better' meat and dairy would provide co-benefits for health, environment and animal welfare. Reducing meat consumption would make a substantial contribution to achieving 1.5 degree aligned targets and could support nature restoration by freeing up land to be used for conservation purposes.

Due to the nutritional role of meat and dairy in the diet, replacement with nutritionally comparable foods is necessary (i.e., high-protein content, with adequate micronutrients), hence the need to 'rebalance' protein sales, encouraging the direct replacement of animal protein products with high-protein plant-based foods such as meat alternatives, legumes and pulses.

There is no overall UK target for reduction in discretionary foods: the Scottish Government proposes a halving of consumption, the UK government has specific targets for salt and sugar but not for processed 'discretionary' food. The National Food Strategy has recommended a 25% reduction in consumption of foods high in fat, salt and sugar by 2032.

Definitions and scope

Plant proteins[82]	vegetables high in protein (e.g., legumes, pulses); wholegrains; nuts and oilseeds; soy-based products (e.g. tofu); meat replacers; dairy replacers; algal sources

[80] Hallström, E., Bajzelj, B., Håkansson, N., Sjons, J., Åkesson, A., Wolk, A., & Sonesson, U. (2021). Dietary climate impact: Contribution of foods and dietary patterns by gender and age in a Swedish population, Journal of Cleaner Production, 306, 127189, https://doi.org/10.1016/j.jclepro.2021.127189.

[81] Hadjikakou, M. (2017). Trimming the excess: environmental impacts of discretionary food consumption in Australia. Ecological Economics, 131, 119-128, https://doi.org/10.1016/j.ecolecon.2016.08.006.

[82] The Livewell Plate https://www.wwf.org.uk/what-we-do/livewell

Animal proteins[83]	beef & veal; pork; lamb; poultry; processed meat; fish and seafood; dairy and cheese; eggs and egg products
'Discretionary' foods and drinks[84]	confectionery, sweet biscuits, crisps, savoury snacks, cakes, sweet pastries, puddings and sugar-sweetened soft drinks

How target contributes to halving shopping basket and required UK reduction

The UK shopping basket target and the UK-wide target of a reduction in consumption of meat and dairy by at least 20% and increase the proportion of plant-based foods in the average diet by 2030[85] are linked but not directly equivalent. This is because although a 50:50 split will lead to a reduction in animal protein consumption, this may in practice be more or less than the 20% indicated for the UK as a whole (e.g., if overall protein consumption increases or decreases). There is no UK-wide target for a reduction in discretionary foods.

Moving toward a 50/50 protein sales split would require food businesses to reduce their sales of animal protein products and sell more plant-based products. For example, Tesco's have disclosed that 88% of their protein sales currently come from animal sources, while Sainsbury's report 90% of sales from animal protein. Based on these two examples, moving toward a 50/50 split would require a ~40% reduction in sales of animal proteins, and an approximately five-fold increase in sales of plant proteins. Given the heterogeneity of the UK retail sector there may be differences in this protein 'sales split' between companies. Some businesses may be more reliant on sales of animal protein products. An ambition of reaching a 50/50 split by 2030 allows businesses to approach protein diversification in ways that work for their individual portfolio.

However, changing the make-up of UK retailer protein sales cannot be directly linked to a UK-wide target to reduce the consumption of meat and dairy given the mismatch between sales and consumption (e.g., sales don't account for consumer food waste).

Metrics

% of protein sales from animal-based and plant-based sources (tonnes)

How metric relates to target

The metric is consistent with the target, so long as the full scope of proteins is included in measurements (see below).

Scope of measurement

There is potential ambiguity in the scope of protein measurements, as many foods that are not bought or consumed primarily as protein, nonetheless contain significant proportions of protein (e.g., green peas, wheat, mushrooms). The recommendation is to include these within the protein measurements and focus on the categories listed above (animal, plant, discretionary), but the precise scope of this metric will have to be defined at a later date.

Secondly, proteins are commonly used as ingredients (e.g., within ready meals or pizzas) as well as being sold separately. There needs to be a consistent approach to dealing with this amongst all retailers if their progress is to be compared. A cut off (e.g., if the protein is at or above a defined percentage of the product weight) would probably be the most manageable option. Another consideration related to

[83] The Livewell Plate https://www.wwf.org.uk/what-we-do/livewell
[84] Food Standards Scotland (2018). Briefing paper on discretionary foods. https://www.foodstandards.gov.scot/downloads/FSS_-_Discretionary_Foods_Paper_-_September_2018_final_for_publication.pdf
[85] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

proteins used as ingredients is the split between branded and own-brand products. Data availability of protein content in branded products is a challenge, meaning it may be more feasible to focus on own brand. However, this would not provide a full picture of all protein sold by a particular company.

Pillar 6: Food waste

Introduction

The waste of edible food can occur on the farm ('pre-farm gate') or at any subsequent stage of the supply chain, including after food has been sold to consumers ('post farm gate').

Data on pre-farmgate food losses are less robust than for post-farm gate food waste, but food waste and surplus on farms might be as much as 3.6 million tonnes per year in the UK[86,87] with more associated with imported goods. In the Resources and Waste Strategy 2018, the UK government acknowledges that much of the agency to implement solutions lies with food chain actors other than farmers i.e., those who set the conditions of contracts[88]. Potential measures to reduce pre-farm gate food waste include not making last-minute changes to orders and improved market intelligence to better match supply with demand.

Figures from 2018 show that an estimated 9.5 million tonnes of food and drink are wasted post-farm gate annually in the UK[89] around 70% of which is edible[90]. The UK is committed to Sustainable Development Goal 12.3 to halve food waste at the retail and consumer levels and reduce food losses along production and supply chains by 2030[91]. In addition, the Courtauld Commitment – a UK-wide commitment from the charity WRAP with over 160 signatories including food producers, manufacturers, retailers, NGOs, government and certification bodies – is to reduce post-farm gate food waste by 20% by 2025 (compared to 2015 baseline)[92], but a greater reduction is required by 2030. Achieving this will involve collaborative action by actors along the food value chain, including those based outside the UK.

Target

Reducing food loss and waste in all aspects of supply chain by 50% (2015 baseline)

[86] WRAP (2019). Food waste in primary production in the UK. https://wrap.org.uk/resources/report/food-waste-primary-production-uk and The Grocer (2017). From farm to food waste: the pre-farmgate fight. https://www.thegrocer.co.uk/food-waste/from-farm-to-food-waste-the-pre-farmgate-fight/559044.article

[87] One informant cited unpublished work that suggests that pre-farmgate food losses may be much higher than this.

[88] https://www.thegrocer.co.uk/food-waste/from-farm-to-food-waste-the-pre-farmgate-fight/559044.article

[89] WRAP (2020).Food Surplus and Waste in the UK – Key Facts.. https://wrap.org.uk/sites/default/files/2020-11/Food-surplus-and-waste-in-the-UK-key-facts-Jan-2020.pdf

[90] Parry, A., Harris, B., Fisher, K. & Forbes, H. (2020). UK progress against Courtauld 2025 targets and UN Sustainable Development Goal 12.3. WRAP, Banbury, UK https://wrap.org.uk/sites/default/files/2020-09/UK-progress-against-Courtauld-2025-targets-and-UN-SDG-123.pdf

[91] Food and Agriculture Organisation of the United Nations. Sustainable Development Goals http://www.fao.org/sustainable-development-goals/indicators/1231/en/

[92] Department for Environment, Food & Rural Affairs and Environment Agency (2020). Resources and Waste Strategy: Monitoring Progress. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907029/resources-and-waste-strategy-monitoring-progress.pdf

Definitions

Avoidable food waste/loss	Food and drink waste that was, at some point prior to disposal, edible (e.g., slice of bread, apples, meat).
Possibly avoidable food waste/loss	Food and drink that some people eat and others do not (e.g. bread crusts), or that can be eaten when a food is prepared in one way but not in another (e.g. potato skins).
Unavoidable food waste/loss	Waste arising from food or drink preparation that is not, and has not been, edible in normal circumstances (e.g. meat bones, egg shells, pineapple skin, tea bags).
Food loss	The term food loss is the decrease in quantity or quality of food occurring along the food supply chain from harvest/slaughter/catch up to, but not including, the retail level.
Food waste (as defined by WRAP)	The decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers and consumers. For the purposes of this UK guidance, the term 'Food Waste' describes any food and inedible parts sent to any of the Food Waste Destinations listed below: • Anaerobic digestion/codigestion • Composting/ aerobic processes • Incineration/ controlled combustion • Land application • Landfill • Sewer/wastewater treatment • Not harvested/ ploughed-in • Other (including unmanaged disposal) This definition excludes any material that is sent for redistribution to people, animal feed or, conversion into industrial products (collectively referred to as 'food surplus')
Food surplus	For the purposes of the UK guidance, the term 'food surplus' describes any food and inedible parts that are sent to the following: • Redistribution to people (e.g., through a charity or commercial redistributor) • Animal feed • Bio-based materials/biochemical processing (e.g., feedstock for other industrial products)
Inedible Parts	Components associated with a food that would never have been intended to be consumed by humans – such as shells, bones, pits/ stones. 'Inedible parts' do not include packaging, or food that could once have been eaten but has been spoiled or passed its 'use by' date

Scope

The scope of the target includes all aspects of the supply chain and applies to all edible food. This does not include food waste arising from households once it has left the supply chain. All waste values should be calculated according to the WRAP Food surplus and waste measurement and reporting guidelines for Food Retail operations[93], which are based on the Food Loss and Waste (FLW) Accounting and Reporting Standard[94].

[93] https://wrap.org.uk/sites/default/files/2021-04/Measuring-Food-Waste-Reduction-Roadmap-guidance-for-retailers.pdf
[94] https://flwprotocol.org/flw-standard/

How target contributes to halving shopping basket and required UK reduction

Approximately 9.5 million tonnes of food are wasted in the UK each year, post farm gate, 1.5 million of which stems from manufacturing and 300,000 tonnes from retail. When food is wasted it not only wastes the embedded carbon resources such as agricultural inputs, land use and water consumption but contributes further to the climate crisis through its disposal. One tonne of food waste when sent to landfill is responsible for approximately 1010 kg of CO_2 equivalent during the collection, transportation, treatment and disposal stages[95].

Whilst the exact scale of food loss on farms is unclear due to a lack of measurement and subsequent lack of baseline, WRAPs estimates suggests UK levels are in the region of 1.6 million tonnes post-harvest waste and 2 million tonnes surplus on farms. This exceeds the volumes lost in manufacturing, the hospitality and food service sector and retail, and would increase dramatically if it included harvest stage losses. In the Resources and Waste Strategy 2018, the UK government acknowledges that much of the agency to implement solutions lies with food chain actors other than farmers i.e., those who set the conditions of contracts[96]. Potential measures to reduce pre-farm gate food waste include not making last-minute specification changes and improved market intelligence to better match supply with demand. Globally, farm stage losses contribute 16% of all agricultural GHG emissions and 4% of total GHGs, consumes 4.4 km^2 of land and draws 760 km^3 of water, whilst also driving biodiversity loss, eutrophication and acidification[97]. Whilst the uncertainty over the levels of pre-farm gate food waste makes it difficult to set a numerical target, it is nonetheless an integral area of food loss and waste and of halving the impact of the average UK shopping basket. The UK-wide target for post-farm gate food waste is the same as the retail target here: a halving[98].

Metrics

% reduction in retail & manufacturing food waste
% of products adhering to WRAPs best practice waste reduction guidance
% reduction in pre-farm gate losses

How metric relates to target

It is important that in order to quantify food loss the metrics are a numeric quantification of impact, rather than qualitative scores or indexes. All of the metrics adhere to this principle with two of them recording direct quantification of the food waste in different facets of the supply chain.

% reduction in retail & manufacturing food waste – this metric has a direct correlation to the overall target. By utilising this metric it provides a specific view on the post farm waste and loss and where it occurs and potential drivers lie, enabling tracking of waste volumes, reductions achieved and empowering action to reduce food loss waste volumes.

% reduction in pre-farm gate losses – this metric again has a direct correlation to the overall target and creates the overall waste figure when combined with the retail and manufacturing waste metric. As already noted, this will be the more difficult metric to accurately assess and monitor. Data on pre-farm losses is much less readily available and often not recorded. This is a potential risk as agriculture is likely to be a significant source of waste.

[95] Kim, M. H., & Kim, J. W. (2010). Comparison through a LCA evaluation analysis of food waste disposal options from the perspective of global warming and resource recovery. *Science of the total environment*, *408*(19), 3998-4006.
[96] https://www.thegrocer.co.uk/food-waste/from-farm-to-food-waste-the-pre-farmgate-fight/559044.article
[97] WWF-UK (2021). Driven to waste: The Global Impact of Food Loss and Waste on Farms. Woking.
[98] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

% proportion of products adhering to WRAPs best practice labelling guidance – There are many initiatives and bodies of work that seek to address food waste and loss. WRAP is a key player in this field and has set out guidance that lays out best practice labelling guidelines for reducing food waste in citizen homes. This metric seeks to increase the proportion of products that adhere to this guidance. The target is aimed at ensuring products allow citizens every opportunity to minimise food waste at each stage of interaction from purchasing, through storage, use and eventual disposal, thereby reducing food loss and waste.

Additional considerations

The metrics defined for this pillar target specifically address reducing the volume of food waste rather than the environmental 'impact' of grocery products – as this has a specific meaning within the world of environmental accounting. Typically, 'impact assessment' quantifies the impacts on the environment associated with energy and raw material inputs and environmental releases. In this context, 'food waste' is technically inputs and outputs of the value chain that result in wasted resource use and unnecessary emissions, which in turn has environmental impacts e.g., climate change. Halving the quantity of food waste does not necessarily equate to halving the environmental impact as different foods and packaging materials have different environmental impacts per kg (e.g., 1kg of wasted beef has the same climate change impact as 20kg of wasted bread). It is likely that businesses would target high cost (and likely high carbon) waste first e.g., meats, fish, dairy, etc. Therefore, it is likely that this business focus will halve the environmental impact of food waste well before the tonnages are halved, and this approach would ideally be incorporated into a retailer's roadmap.

The metrics and targets are very much in line with other initiatives looking to reduce food waste in the supply chain, for example the commitments under WRAP's Food Waste Reduction Roadmap[99] by UK retailers, food producers, manufacturers, and hospitality and food service companies to reduce food waste in their own operations and work collaboratively on whole chain food waste reduction plan projects[100] to tackle food surplus and waste.

Relationship between food waste and packaging

There is a distinct relationship between pillars 6 and 7 (Food Waste and Packaging respectively) in that one can impact directly on the other. It is important to consider food waste in the context of competing environmental impacts such as plastic use, and other climate impacts such as increased refrigerant use or higher transport footprints.

[99] https://wrap.org.uk/resources/guide/food-retail-operations
[100] https://wrap.org.uk/resources/tool/whole-chain-food-waste-reduction-plan-toolkit

Pillar 7: Packaging

Introduction

Food packaging plays a key role in minimising food waste through supply chains, extending the shelf life of products and maintaining food safety. However, the materials used in food packaging can have negative environmental impacts through sourcing, processing and production stages (e.g., deforestation resulting from the demand for paper) and disposal (e.g., plastics leaking into the environment becoming pollutants near in perpetuity). It is therefore important to reduce the environmental footprint of packaging through reducing the volume of virgin materials required, ensuring that those materials are sourced and produced sustainably where possible, reducing valuable material losses by recycling, and disposal of any waste that cannot be recycled by means which are least impactful on the environment and society. The main packaging materials used in the UK food sector are paper/cardboard, plastic, aluminium, steel and glass.

The volume of packaging materials placed on the market in the UK has been increasing whilst rates of recycling have stagnated. Recycling rates were around 64% in 2017[101], with the latest figures from Defra indicating a modest increase to 67.2% in 2019[102]. The Resource and Waste strategy includes targets for 85% recycling rates for paper and cardboard and 30% for wood by 2030. The recycling target for plastics is 41% by 2024, increasing to 56% by 2030.

While there is a strong case for reducing overall packaging consumption, it is important to recognise the role that packaging plays in reducing waste both through its protective properties for collation and its barrier properties for perishable goods. Packaging contributes 3% of emissions to the UK food system and helps avoid additional sector-wide emissions by reducing food waste. For a few products such as drinks, packaging can represent over 20% of emissions.

Target

100% recyclable packaging 40% reduction in material use All materials sustainably sourced and use of recycled content maximised

Definitions

Reusable / returnable packaging	This is any form of packaging that can be cleaned and re-used. An example most people would be aware of is glass milk bottles that are simply cleaned and reused. There is a clear distinction between packaging that has been designed specifically for reuse/return and packaging which is intended for single use but is repurposed for the same or a different use.
Recyclable packaging	This is packaging made of materials that can be effectively recovered and reprocessed for use in the same or a different application. Recyclable materials include glass, metal, card, paper and – increasingly – certain plastics. However, by far the most common form of recycled / recyclable packaging is corrugated cardboard. Using the Ellen MacArthur Foundation definition - a packaging or a packaging component is recyclable if post-consumer collection, sorting, and recycling is proven to work in practice and at scale… A package can be considered recyclable if its main packaging components, together representing more than 95% of the entire packaging weight, are recyclable according to the above definition, and if the remaining minor components are compatible with the recycling process and do not hinder the recyclability of the main components[103]
Compostable packaging	This covers any packaging material that will break down in the soil, in the open environment or in controlled industrial composting facilities. Whilst materials such as glass and metals will eventually break down over time, the only form of naturally compostable packaging are paper-based materials such as card and corrugated cardboard. Some plant-based plastics are also considered compostable, some via home-composting and others through industrial composting facilities.

[101] Department for Environment, Food & Rural Affairs and Environment Agency (2020). Resources and Waste Strategy: Monitoring Progress. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907029/resources-and-waste-strategy-monitoring-progress.pdf

[102] Department for Environment, Food & Rural Affairs and Environment Agency (2021). UK Statistics on waste. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002246/UK_stats_on_waste_statistical_notice_July2021_accessible_FINAL.pdf

[103] Ellen McArthur Foundation, new plastics economy global commitment. https://www.newplasticseconomy.org/assets/doc/13319-Global-Commitment-Definitions.pdf

Bio / biomass based packaging	Bio or biomass-based packaging is produced from renewable natural resources such as plants. This would include products like bio-based polymers derived from sugar cane, where the sugar juice is taken from the first and second extraction to make sugar and the plastics are derived from the residues. Bio-based materials are renewable, which means they can be grown again
Non-bio / non-biomass based packaging	Non-bio or non-biomass based packaging is any type of packaging that does not derive from natural sources and are typically made from depletable fossil resources, or the products of mining.
Single-use plastics	Single-use plastics, often also referred to as disposable plastics, are commonly used for plastic packaging and include items intended to be used only once before they are recycled or disposed of through other means
Thermoplastics & Thermosets	Thermoplastics are a family of plastics that can be melted when heated and hardened when cooled. These characteristics, which lend the material its name, are reversible. That is, it can be reheated, reshaped and frozen repeatedly. Conversely, thermosets are a family of plastics that undergo a chemical change when heated, creating a three-dimensional network. After they are heated and formed, these plastics cannot be re-melted and reformed.
Closed & Open loop recycling	Closed loop recycling means a product is recycled into another, almost identical product. A simple example of this is recycling a PET drink bottle into a new PET drink bottle. Open loop recycling means a product is turned into a new type of product. For example, recycled plastic packaging could end up in a plastic water pipe, a park bench or even a pair of trainers
Post-consumer material[104]	Material— (a) that is generated by households or by commercial, industrial or institutional facilities in their role as end-users of the product, and (b) that can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

Scope

The scope of the target is for all packaging of products within the supply chain, not limited to own brand products as this would not drive the required reduction.

How target contributes to halving shopping basket and required UK reduction

40% reduction in material use: this is consistent with the overall UK target of reducing material consumption by 40% by 2030[105]. All avoidable plastic waste should be eliminated[106], totalling to a reduction of over 40%[107].

100% recyclable packaging: The target relates to packaging being recyclable, a necessary but insufficient precursor to recycling. This target is in line with other initiatives such as the WRAP Plastics Pact, who target 100% of plastics packaging to be reusable, recyclable or compostable by 2025. Plastic packaging provides the greatest challenge to driving high recyclability rates. According to the 2019-20 annual report from WRAP, 64% of plastic packaging placed on the market by Pact members is recyclable[108]. Figures for recyclability of all packaging types are not readily available.

[104] Definition from the draft UK Plastic Packaging Tax https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/934332/Plastic_packaging_tax_-_Draft_FB20_legislation.pdf

[105] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

[106] Department for Environment, Food & Rural Affairs and Environment Agency (18 December 2018). Resources and waste strategy for England. https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england

[107] Jennings, S., McCormack, C. & Stoll, G. (2021). Thriving within our planetary means: reducing the UK's footprint of production and consumption by 2030. WWF-UK and 3Keel. https://www.wwf.org.uk/what-we-do/uk-global-footprint

[108] Blazing a trail on plastics – The UK plastics pact annual report 2019/20 – WRAP https://wrap.org.uk/sites/default/files/2020-12/The-UK-Plastics-Pact-Annual-Report-19-20.pdf#page=10

All materials sustainably sourced and use of recycled content maximised: the first part of this target relates to the sourcing of virgin materials in line with independent certification schemes. For example, virgin wood fibre used in packaging (paper, card, etc). The proportion of virgin wood fibre used in packaging that is FSC or PEFC certified is currently unknown, hence the impact of achieving the target is uncertain. Sustainable aluminium sourcing is supported by the Aluminium Stewardship Initiative (ASI). With targets to increase the recycling rates for packaging, it is important to stimulate the market for the resulting recycled materials. The second part of the target - to maximise the use of recycled content - is therefore an important complementary target to the first target in this pillar and will drive down demand for virgin materials. This applies to all packaging materials, not just plastics.

Metrics

% packaging that is recyclable % packaging that is recycled or sustainably sourced % reduction in packaging by weight and units

How metric relates to target

As with the Food Waste pillar it is important that packaging reductions are measured using quantitative metrics, rather than qualitative scores or indexes. All of the metrics adhere to this principle, enabling specific improvements in certain aspects of packaging to be appropriately quantified.

% packaging that is recyclable – this is the key metric that relates to pursuing a target of 100% recyclable packaging. The ability to recycle specific packaging types is not only dependent on the material and format used, but also on the available collection routes e.g., kerbside collection, retailer front of store collection, etc. In the UK, the collection of different materials for recycling is varied and as such, guidance provided by On Pack Recycling Label (OPRL)[109] should be used wherever possible to determine actual recyclability. This metric will need to be ascertained through a packaging audit.

% packaging that is recycled or sustainably sourced – this metric has a direct link to the relevant target. Data for quantifying this metric will need to be obtained via supplier engagement activities to acquire provenance information. Where recycled content is specified, this should only come from post-consumer material. The proportion of packaging that is recycled or sustainably sourced should be independently verified where appropriate standards exist.

% reduction in packaging by weight and units – This metric is directly linked to the target of reducing material use by 40%. By focusing on both packaging weight and number of units used, there will be an additive reduction that leads to accelerated progress towards the target. This is due to both the individual item weights and the total number of packaging items reducing. Data for this metric can be obtained partially through packaging compliance submissions, however this should be audited for accuracy and supplemented with a detailed packaging audit.

Additional considerations

Packaging contributes 3% of emissions from the UK food system. It also helps avoid additional sector-wide emissions by reducing food waste. It is important to recognise the relationship between packaging and food waste. Despite this, consumers are concerned about excess packaging, especially litter and plastic pollution, and this is a key driver for reducing packaging and its related emissions, but this must be done in such a way that food waste and losses targets are not impacted.

[109] https://www.oprl.org.uk/

It should also be noted that waste management contributes 4% to overall UK emissions primarily due to landfill and incineration activities. This has reduced significantly since between 1990 and 2019 (71%) but further waste prevention measures will enable even further improvements.

There are several voluntary initiatives in this area to aid progress. For example, WRAP provides technical support on resource efficiency, packaging recyclability, alternative materials, and food waste prevention. As part of its leadership of the UK Plastics Pact, WRAP has several free guides on plastic packaging:

- Design tips for more recyclable rigid plastic packaging[110]
- Compostable plastic packaging guidance[111]
- Guidance on defining what's recyclable and polymer choices[112]
- Eliminating Problematic Plastics[113]

[110] https://wrap.org.uk/resources/guide/design-tips-making-rigid-plastic-packaging-more-recyclable
[111] https://wrap.org.uk/resources/guide/compostable-plastic-packaging-guidance
[112] https://wrap.org.uk/sites/default/files/2021-03/WRAP-polymer-choice-and-recyclability-guidance.pdf.pdf#page=4
[113] https://wrap.org.uk/sites/default/files/2020-08/WRAP-eliminating-problem-plastics-v2.pdf