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TRANSFORMING UK FOOD SYSTEMS
Strategic Priorities Fund

Regulatory Tools for a Healthy and Sustainable Diet

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Executive Summary

Although written by three academic lawyers, this report is aimed at the wider agri-food, public health, environmental, climate policy, and social justice policy communities. We hope that its contents will be used by those in government responsible for all of these policy areas, by the agri-food industry (from farmers to supermarket companies) and the professionals advising them (whether in private practice or in trade associations), and by NGOs and the third sector.

The report aims to chart the regulatory tools that exist in the UK, and those that could be used from elsewhere, to transform the UK food system to one which is both healthy and sustainable. The role of law in this transformation is key. The transformation requires both individual behaviour change (on the demand side by consumers) and wider structural or systemic change (involving behaviour change on the production or supply side). Some transformation might take place voluntarily including through changing *social norms* and voluntary information provision; but, as the report discusses, there are significant barriers to voluntary social change on both the demand and supply sides. More likely then, is the need to rely on *incentivising* and *penalising* approaches to regulation rather than voluntary action (including informational *sermonising*) alone.[1]

Law plays a key part in both mandatory incentivising and penalising approaches, as well as in controlling the misleading excesses of voluntary sermonising. Although economics is at the core of incentivising approaches to regulation such as taxes and subsidies, these instruments invariably take legislative (i.e. legal) form. If the incentivising carrot does not work effectively or is not used, then law can also act as a penalising stick. In some ways that description mischaracterises law's role, which is fundamentally about setting *legal norms* that set out standards of behaviour or legal obligations, for food system actors here. These obligations are backed up by penalties (the 'penalising' part), but they are really again incentivising – compliance with the legal norm – and will not typically need to be imposed very often to produce the required deterrent effect.

The methodology adopted in the research for the report took the form of an 'integrative review'[2] of the existing academic and grey literature on the various food system 'problems' we identified and their causes, and then the tools or solutions that can be employed to tackle them. This type of review is particularly appropriate where the literature is multidisciplinary and extensive, as it is here, placing it beyond the scope of a 'systematic' review.[3] Much of the food system 'problems' literature is in the social sciences beyond law. The 'causes' literature, in contrast, tends to be in the positivist sciences or economics. As for the 'solutions' literature, this is a mix of law, economics, public policy, public administration, and regulation. An integrative review seeks to synthesise the knowledge from the literature into a conceptual framework that offers a new perspective on the area.[4] The report does that by providing a conceptual map of the various food system problems and a menu of legal and regulatory tools, across the supply and demand sides, setting out how each of those problems can be addressed. The academic literature was selected principally through Google Scholar, using search terms for relevant food system problems including 'problem', 'causes', 'tackling', 'law', 'policy', 'regulation', 'regulatory', 'tools', 'instruments', 'solutions', 'supply(-side)' and 'demand(-side)'. Much of the grey literature was accessed via Google searches using these terms, although some recent material was also discovered by following posts on LinkedIn over the last two years by the very active agri-food network on that platform, which includes agency staff, NGOs and academics.

As lawyers, our aim has been to centre law in the discussion. Thus, our research also involved examining the legislative basis for the various solution tools, including for example targets, emissions trading schemes, and environmental permitting. One added value of the report, we hope, is that it foregrounds these in the discussion more than other reports on the agri-food system. But, as the previous paragraphs have sought to emphasise, law is not just about being able to trace a policy back to an

Act of Parliament and implementing regulations in the form of a statutory instrument. It also involves thinking about what role law is playing, who and what it is directed at and why, how stringent its norm-setting is, and whether it is effective in meeting its goals.

In discussing methodology, it is also important to draw attention to the geographical scope of the report. We recognise that UK dietary choices may have important environmental and social sustainability impacts abroad. Nevertheless, our focus is on the transition of UK diets to a healthy and sustainable footing, which the project grant call defined in terms of the diets of UK consumers and sustainability *within* the UK.

In addition, although our project is about transforming the *UK* food system, the legal sources we drew on in our research are mostly from England. This was principally a matter of manageability. While we discuss other parts of the UK in a number of places – especially where they are acting as health or sustainability leaders (e.g. Scotland's targets for land under organic management) – it would have been impossible to cover each system in depth within the scope of a single report. But it was also about not wanting to lose sight of the illustrative wood by including too many trees. We hope that what we discuss remains of illustrative value to those working on healthy and sustainable food systems in Wales, Northern Ireland and Scotland, and indeed to others globally. If you use this report and it leads to changes in advice, practices, or policy, please get in touch to let us know. We hope that it plays a part in an ongoing conversation about the troubled UK and global food systems, but also that it might help to change them. That conversation of course includes the Labour Government's proposed new food strategy,[5] its 25-year farming roadmap,[6] the proposed Land Use Framework,[7] and the House of Commons Environment, Food and Rural Affairs Committee inquiry into the future of farming,[8] all due in 2025.

One of the report's key messages is that the regulatory policy tools or levers needed for securing the transition to a healthy diet are different in nature to those required for transitioning to a sustainable diet. The healthy diets transition principally requires levers centred around the food environment (including the informational environment) and the product.[9] In contrast, a transition to a healthy *and environmentally sustainable* diet requires another set of levers, mostly involving producer behaviour change to make process and production methods more sustainable. Adding to environmental sustainability the transition to a *socio-economically* sustainable diet complicates the picture because it involves both sets of levers.

The report also emphasises the importance of *context* in deciding on appropriate regulatory tools. The health and sustainability distinction above is an obvious part of that context. However, the report also breaks both down into the different *food system problems* associated with each of them. This problem-based approach provides much more granular context. Only by closely analysing the range of particular food system problems and their causes can we consider exactly what tool from the regulatory toolbox is most suitable.

For localised pollution from farms for example, 'command-and-control' tools in the form of e.g. land use rules and environmental permitting play a key role, but environmental land management subsidies (an economic instrument) and advice to farmers on pollution avoidance (an informational instrument) also feature strongly. For climate change as a food system problem caused by farms, in contrast, the regulatory levers needed are more likely to take the form of a carbon tax or agricultural emissions trading scheme.

Another important message is that some tools have been overplayed in regulating the agri-food system, while others have been underplayed. The basis for that conclusion lies in *effectiveness*. As observed above, context is important: you need the right tool to match the relevant problem. But any such assessment must include evidence on practical effectiveness: has the tool worked in practice so far to deliver healthy and sustainable diets (HSD)? That too is important context. Given the crisis condition of the UK's food-related health and its natural environment, it would be hard to avoid the conclusion that the tools used in the recent past have not been up to the job.

On this basis, informational and voluntary approaches look to have been overplayed, and economic instruments and command-and-control tools underplayed. Targets as a tool are a more recent phenomenon and it is perhaps too early to say whether they have been under- or overplayed. However, until recently, they have certainly been under-*explored* by those working on food systems. The current report therefore seeks to add to the existing literature by taking them seriously as a regulatory tool in their own right.

On command-and-control approaches, these have not often been deployed on the *healthy* food side: with sugar for example, rather than imposing mandatory product 'standards', reformulation was instead incentivised in the UK by an economic instrument in the form of a mandatory 'sugar tax' on drinks. On the *sustainable* food side where they *have* been used, given the state of the UK environment, one might be tempted to conclude that they have been ineffective and a source of 'regulatory failure'. But, again, granular context is important there. It is hard to blame command-and-control as an instrument if the environmental permitting system has only been loosely applied to farms, or if the public agency running the system has had its funding significantly reduced. Command-and-control *can* work and is the most appropriate approach for some key food system problems. One of the contributions which the report aims to make is to bring these often somewhat obscure and under-appreciated instruments out of the shadows and to show how they operate in practice in the agri-food sector. Appropriately designed, they can protect the UK's environment and public health, and help to ensure long-term food security and economic growth.

The remainder of this executive summary consists of the individual policy recommendations that can also be found at the end of the relevant sections of the report on each regulatory tool. We chose not to formulate these recommendations after the sections on each food system problem, because our aim was to bring out ideas centred around the regulatory tools. Those are the report's main focus, and not the food system problems themselves which the tools aim to address. Nevertheless, it should be relatively easy for readers of the report to map these recommendations onto those problems. The recommendations are based on our own assessment of where gaps currently exist in law and policy for transitioning to a more healthy and sustainable food system. In terms of prioritising these, our view is that while all of the HSD problems we raise matter, some are more important and urgent than others. Ones that should be prioritised are those necessary for achieving statutory targets, including those on climate change, and water quality.[10] Without more active intervention in the agri-food sector, targets in both of those areas are unlikely to be met. Public support for action on both climate and water quality is also strong, so if implemented carefully, there are political advantages in tackling these environmental sustainability issues.

Given the impact of poor diets on health and the downstream costs those have on the NHS, regulatory interventions to promote healthy diets are also important. With growth a government priority, there are also likely to be productivity and growth benefits from healthier employees being in work.

1. Policy recommendations on targets

- **The Government should set more concrete binding targets on health in relation to diets.** *Dietary guidelines and nutrient profiling models are not the same thing as targets, as the former do not have dates by which improvements in health outcomes – or in percentage increases or decreases in foods or ingredients designed to achieve those outcomes – can be expected. While the setting of such targets may have gone against the previous Government's wish to avoid being labelled as encouraging a 'nanny state', without clear ambitious targets on healthy diets, there is likely to be insufficient action and nothing in place to provide accountability for progress.*
- **The Government should update its sugar targets, making these applicable to adults too and placing them on a similar rolling basis to the existing salt reduction programme.** *Adult obesity is as much of a health problem as childhood obesity and although there is a Soft Drinks Industry Levy in place which has had some success – reducing the amount of sugar in within scope drinks by 44% – this is an indicator without an accompanying target (and applies only to soft drinks).*
- **There needs to be greater standardisation for the format of corporate health targets, preferably with a science-based underpinning for health targets equivalent to SBTN or SBTi.** *Without greater standardisation, there is a clear risk of 'health washing' and difficulty in making comparisons between health targets across different companies.*
- **In setting health targets, companies should distinguish more clearly between intensity-based and absolute targets.** *Unless attention is also given to absolute targets, there is a danger that health improvements in individual food and drink products will be overshadowed by an increase in overall volumes of now healthier, but still not very healthy products.*
- **The Government needs to set clear targets on the social sustainability of the agri-food sector.** *The food sector is one characterised by low wages, a reliance on migrant labour and some small farms which are struggling to make ends meet. Unless adequate attention is paid to improving the social conditions in the food sector, especially of food sector workers and small farms, then it will be difficult to ensure that other food system problems are addressed and there may also be backlash against necessary changes. Socio-economic sustainability is a key part of achieving a just transition in the food system.*
- **The Government should introduce binding farm to fork food waste targets, in a legislative form.** *Accountability will be better served by legally binding targets on food waste and they will provide an important backdrop for sector reporting on food waste.*
- **The UK Government should introduce binding pesticide reduction targets or, like in Scotland, set a target for the proportion of land under organic management.** *Merely focusing on means or tools like integrated pest management is inadequate. Only a target will provide a clear framework for measuring data on pesticide use over time and ensuring that a full range of tools are in place to reduce it. Alternatively, a land use target for organic production would serve a similar purpose.*
- **The Government should set reduction targets for meat and dairy that match its 2050 net zero commitments.** *To avoid backlash these targets could initially be non-binding, with a change to mandatory targets if progress against the voluntary targets is insufficient.*
- **The Government should set GHG reduction targets for the agriculture sector and for the livestock sector within this.** *While economy-wide climate targets are important, in order to ensure that all sectors are making their fair share, and for greater justification of carbon budget trajectories, there is a need to move increasingly towards sector-specific GHG reduction targets, like in Ireland.*

2. Recommendations on command-and-control instruments

- **The Government needs to ensure that the Environment Agency is appropriately funded.** *The Agency needs to be able to properly enforce the range of command-and-control regulation applicable to farming and the wider food sector, including using criminal prosecution where appropriate so as to provide a deterrent effect. The same applies to devolved agencies such as the Scottish Environment Protection Agency, Natural Resources Wales and the Northern Ireland Environment Agency.*
- **Closer attention needs to be paid to water abstraction licensing, including enforcement.** *Water quantity and flow is crucial for water quality. With pressure on water quantity from climate change in increasingly hot summers, water quality is likely to face further challenges unless abstraction levels are properly allocated and enforced.*
- **The environmental permitting regime should be extended to dairy and intensive beef farms.** *The previous Government observed that, since bringing pig and poultry farms within the environmental permitting system, emissions had reduced by around 30%. It was considering expanding environmental permitting to dairy and intensive beef farms. Given the pollution stresses on many rivers from manure, this should now be taken up.*
- **Attention also needs to be paid to the differences and overlaps between existing command-and-control land use rules (like the Farming Rules for Water) and the environmental permitting system.** *The advantages and disadvantages of each need to be analysed and consideration given to whether having a single system within environmental permitting for all farms, including arable farms, would bring benefits in terms of environmental effectiveness and ease of use.*
- **Rules on distances of diffuse pollution sources from watercourses need to be the subject of further research.** *With nutrient pollution at critical levels in many areas, there is a clear need to establish whether existing presumptive distances are sufficient.*
- **The Government should consider introducing statutory designated Phosphorous Vulnerable Zones in addition to Nitrate Vulnerable Zones.** *Given that phosphorous levels are now also a major agricultural pollution problem, it is important that legal controls reflect this.*
- **Quotas on UK sugar beet production should be considered in order to reduce soil loss and to address high dietary sugar levels.** *This needs to form part of a national land use strategy. As things stand, the UK devotes too much land to growing unhealthy food, including sugar, and too little on healthy horticultural products, notably fruit and non-starchy vegetables. However the design of any sugar beet land use quota will need to ensure that the policy is not undermined by substitute imports.*
- **The UK should introduce mandatory product design standards requiring tethered lids on all bottles sold on the UK market.** *Many UK manufacturers are already doing this because they are selling into the EU internal market where it is a requirement. However, given high litter levels and low recycling of plastic lids in the UK, this also needs to become law across the UK's own internal market.*
- **The UK should extend fertiliser product standards to lower-carbon organic fertiliser.** *This will enable these fertilisers to access the market and to provide lower-carbon competition.*

3. Recommendations on economic instruments

- **The UK Government should either bring agriculture within the UK ETS or else introduce an agricultural GHG emissions tax. As in Denmark, this could be combined with tax-breaks and subsidies to promote greater industry acceptance.** *Ensuring that UK agriculture, as an economic sector, takes its fair share of the responsibility for reducing emissions and pays for its externalities in accordance with the polluter pays principle is important. Voluntary approaches alone, without some form of legally binding regulatory incentive, are unlikely to work in a highly competitive sector: margins are tight and few farmers are likely to take carbon emissions-reducing action unilaterally. If carbon pricing is introduced for the sector then consideration also needs to be given to introducing a CBAM for agricultural imports so that UK farmers are not undercut by products from countries which do not face an equivalent agricultural carbon price. However, designing a CBAM for a sector with such a diffuse range of supply chains may prove challenging.*
- **Urgent action is needed to close any remaining protection gaps between the former cross-compliance system and the new environmental land management (ELM) scheme standards.** *The new post-Brexit farm support system should be an opportunity to increase the standards of environmental protection on farms, not to weaken them.*
- **Consideration could be given to subsidies to encourage farmers to reduce ruminant numbers or to exit ruminant livestock farming.** *While predominantly a climate measure to reduce GHG emissions, such subsidies could also be aimed at areas where pollution and biodiversity harms are high. Given the media attention and backlash this climate measure attracted in Ireland, care would need to be taken to ensure that a relevant scheme was both well designed and proactively communicated. Moving subsidies away from livestock production to encourage plant-based alternatives like in Denmark may be less controversial.*
- **The existing levy on sugar in soft drinks should be extended to all processed foods and there should also be a levy on salt in food.** *To avoid these levies being regressive, revenues should be spent on relevant subsidies to bring down the price and access to healthy foods for those in need. See too the voluntary instruments recommendations below.*
- **In the draft report we had recommended the rapid introduction of a UK-wide Deposit Return Scheme for drinks containers.** *We are pleased to note the Labour Government's move to bring a DRS into force in England and Northern Ireland from October 2027. Such schemes are an important tool for tackling the environmental sustainability problems of littering, GHG emissions, and low recycling rates.*

4. Recommendations on informational instruments

The Government should:

- **Recognise the limitations of labelling as a means of changing consumer diets.** *Careful assessment is needed of the ability of consumers to use the information provided to effect change in eating habits. Consumers are not a homogenous group and while labelling will work for some, there are others whom it will have difficulty reaching.*
- **Consider the efficacy of informational tools as part of a package of tools and not as a reflex 'go to'.** *Information is seldom effective on its own. However, on the producer level, it can often act as a crucial supplement to other regulatory instruments such as subsidies, emissions trading and environmental permitting. At the consumer level, information will be used by some, but helping others to avoid unhealthy food is likely to require changes to the product to make it healthier. That requires other policy levers such as levies or taxes.*
- **Favour mandatory front of pack, traffic light and warning message labelling.** *Thesehave, to date, proved to be the most effective at delivering messages to consumers about food that has particularly poor health outcomes.*
- **Consider banning mascot 'labels' on food products and packaging.** *Mascots are generally aimed at children and young people. They should be banned where they are used as a means of enticing people to purchase unhealthy food products.*
- **Carefully consider the interaction between sustainability and health labelling.** *Using labelling to communicate with consumers about both the health* and *sustainability qualities of food products brings its own challenges. Interaction between sustainability and health labelling needs careful attention so that consumers do not confuse the two.*
- **Introduce a mandatory, standardised but comprehensive methodology for food ecolabels.** *Food ecolabels are an important part of the messaging on sustainability and may help to drive consumer and producer behaviour change. While official product ecolabels have long featured in many sectors, food has largely been missing. An official scheme, or, failing that, a mandatory methodology, is a means to ensure that consumers are not confused by multiple manufacturer examples, each based on different life cycle assessments of sustainability.*
- **Complement labelling with education for consumers, not only on food but also on how to read labels effectively to maximise the benefits of labelling requirements.** *Food education and literacy are informational levers for behaviour change in their own right, including by helping to shape social norms. However, they are also important complements to food labelling as an informational instrument.*
- **Ensure that advertising and marketing does not overstate the positive health and environmental credentials of food products, thereby misleading consumers through health washing or greenwashing.**
- **Ensure advertising of harmful food products that have poor health and environmental outcomes is tightly controlled on TV, online and offline and consider extending restrictions where necessary. Ensure too that the marketing of such foods is controlled.** *There is no use creating good food environments if these are then undermined by bad ones. The Labour Government's implementation of laws banning advertising of unhealthy HFSS foods in family TV viewing time before 9pm is a positive step. However, controls on HFSS food advertising could be further extended.*

- **Put in place mandatory reporting requirements for the production and retailing of food that is unhealthy or damaging to the environment as well as food waste arisings.** *As the voluntary instrument recommendations below state, reporting on food waste should be made mandatory, as should corporate reporting on HFSS food sales.*
- **Ensure that the farm production side is also educated and alive to poor health and environmental outcomes as part of supporting farmers to make the transition towards an HSD food system.** *Farmer education is an important informational tool in aiding the transition. If farmers understand and are onside with the changes that need making, they are more likely to help make them. However, evidence suggests that this information needs to be specific to particular farms and their local contexts.*

5. Recommendations on voluntary instruments

- **Voluntary instruments are generally of limited effectiveness because companies are not willing to make significant changes to their unhealthy and less sustainable food products due to competitiveness concerns.** *Mandatory obligations across all companies remove such concerns and create a level playing field.*
- **Voluntary approaches to sugar and salt reduction have not been sufficiently effective and both should be made subject to mandatory levies (in the case of sugar beyond the existing Soft Drinks Industry Levy).** *The sugar levy has been effective but its scope is limited to drinks and only certain types of those. The levy should be extended to more drinks, especially those aimed at children like milkshakes, as well as to food including biscuits, yoghurts, cakes, breakfast cereals and sweets. Salt is also a health concern and would similarly benefit from the product reformulation incentivisation provided by a levy.*
- **Voluntary restrictions on multibuy or BOGOF offers on HFSS food need to be replaced by mandatory restrictions. These are already in place in the law – the relevant part of the regulations simply needs urgently implementing.** *See further the recommendations on informational instruments, above.*
- **Reporting on food waste should be made mandatory.** *Mandatory food waste reporting is advisable for all parts of the food system, including farms. However, it has been particularly widely called for in relation to supermarkets. The previous Conservative Government dropped plans for mandatory food waste reporting on cost grounds. This was despite it being supported by many large food companies and despite its importance in helping to assess the delivery of food waste targets.*
- **Reporting on HFSS food sales by large businesses should be made mandatory.** *Reporting on healthy versus unhealthy HFSS food sales by manufacturers, supermarkets, restaurants and food platforms is an important accompaniment to the setting of corporate targets to increase sales of healthy foods. Measuring and reporting enables companies and wider stakeholders to see how companies are progressing against those targets.*
- **Although food ecolabelling should probably remain voluntary, a mandatory *methodology* for those using eco-labels on food should be introduced.** *See further the recommendations on informational instruments, above.*

Contents

Executive Summary 3

1. Policy recommendations on targets 6

2. Recommendations on command-and-control instruments 7

3. Recommendations on economic instruments 8

4. Recommendations on informational instruments 9

5. Recommendations on voluntary instruments 10

1. Introduction 13

2. Sustainable diets/food systems 17

3. Healthy diets/food systems 19

4. A food systems-based approach 23

5. Food system problems and causes 24

5.1 Sustainability (environmental) 32

5.1.1 Food waste 32

5.1.2 Climate (greenhouse gas emissions) 33

5.1.3 Environmental pollution 35

5.1.4 Resource overuse 37

5.1.5 Packaging 38

5.1.6 Biodiversity loss 39

5.1.7 Soil health 40

5.1.8 Animal welfare 41

5.2 Sustainability (economic/social) 42

5.2.1 Economic access/affordability (of HSD foods) 42

5.2.2 Physical access (to HSD foods) 44

5.2.3 Farm profitability, food worker income, and EDI 44

5.3 Health 46

5.3.1 Over consumption of meat, and processed meat products 46

5.3.2 Over consumption of unhealthy HFSS foods (high in fat, sugar or salt) 48

5.3.3 Under-consumption of fruit and vegetables 51

5.3.4 Under-consumption of fish, including oily fish 52

6. Tools for transforming the UK food systems to HSD 54
6.1 Targets 54
6.2 Instruments to achieve these targets 61
6.2.1 Command-and-control instruments 61
6.2.2 Economic instruments 65
6.2.3 Informational instruments 70
6.2.3.1 Informational instruments as part of a toolkit, not as a main lever for change 71
6.2.3.2 Labelling 72
6.2.3.3 Dietary guidelines and other food literacy tools 78
6.2.3.4 Controls on advertising/marketing 80
6.2.3.5 Farmer education, training and advice 82
6.2.3.6 Corporate and farm reporting 82
6.2.4 Voluntary approaches 85

7. Conclusions 89

Endnotes 93

Figure 1: The report's approach to sustainability and health 13
Figure 2: Drivers of behavioural change 15
Figure 3: The EAT-Lancet planetary health plate 20
Figure 4: The Eatwell Guide 21
Figure 5: Australia and New Zealand Health Star Rating system 74
Figure 6: Nutri-Score 74
Figure 7: UK MTL system 74
Figure 8: Types of regulation involved in HSD transformation 90

Table 1: Food system problems, causes, and solutions 25

1. Introduction

This report forms part of the 'Realigning UK Food Production and Trade for Transition to Healthy and Sustainable Diets' project, commissioned under the UKRI Transforming UK Food Systems Programme (TUKFS). The project directly addresses the two overarching questions posed by the TUKFS programme that relate to: (1) the changes in dietary consumption, food production and trade patterns required for a transition to healthy and sustainable diets (HSD); and (2) the interventions needed to deliver this transformed food system. As part of the Law work package within the project, the report aims to set out the range of regulatory tools available to help the UK in this transformation.

The report starts from these two core dietary aims involving sustainability on the one hand and health on the other, while noting the connections between the two in the sense that health might be considered an aspect of social sustainability, and because environmental sustainability has human health implications. On the latter, and in a food context, the Intergovernmental Panel on Climate Change (IPCC) for example observes that healthy diets are potentially impacted by climate change, because "[f]ruit and vegetable production, a key component of healthy diets, is ... vulnerable to climate change."[11] However, for the most part we analyse health and sustainability separately, because this enables distinctive points about each one to be made. Nevertheless, we do examine specific areas of food policy where the issue of whether health and sustainability should be integrated or kept separate is a particularly live one. As will be seen later in the report, that arises, for example, in relation to dietary guidelines as an informational instrument, where some are health-based, and others have moved to an integrated health and sustainability approach.

Although the project title uses the term 'diets', this is principally a matter of shorthand convenience; the wider project outline makes it clear that we are adopting a 'food systems'-based perspective. That wider perspective is reflected in this report. It is important to focus on 'food systems' and not only individual diets, because the necessary transformations cannot simply be seen as the responsibility of individual consumers using their own agency to make dietary changes. There are key structural barriers to that across the agri-food industry, and a food systems perspective better reflects that fact. The report's focus is also on *human* diets (including animal feed that supports those). However, it is important to acknowledge that pet diets, especially those of cats and dogs, also have an impact as part of the UK food system – notably in their reliance on carbon-intensive meat.

Figure 1: The report's approach to sustainability and health

The approach we have taken in the report starts with an identification of various food system 'problems'. As illustrated in Figure 1, these are categorised into 'sustainability' problems and 'health' problems. Sustainability problems are then further divided into two sub-categories of sustainability – 'environmental' sustainability and 'economic/social' sustainability. Examples of environmental sustainability food system problems include food loss and waste, climate change and greenhouse gas emissions, and animal welfare. Examples of economic/social sustainability problems include access to, and the affordability of, healthy and sustainable foods, agri-food worker wage levels, and equality diversity and inclusion (EDI) issues in the agri-food sector. As for the second broad category – health problems – these include for example the over-consumption of red and processed meat (for cancer risk reasons here rather than greenhouse gas emissions), and the under-consumption of fruit and vegetables (again for human health reasons here as opposed to the climate co-benefits of a more plant-based diet).

Having set out problems, the report then seeks to identify some of the potential causes of these problems. We do not claim to be exhaustive there, because causation is typically a complex, multi-layered phenomenon. Instead, we attempt to identify *key* causes. With food waste for example, one might look at *who* it is predominantly caused by (whether by households with fridge waste, by wholesalers and retailers, via transport and logistics, or on-farm waste), or one might try to identify *what* within those has caused it (for example if fridge waste has been caused in part by strict 'use by' labelling).

The report's main focus is on the regulatory and legal tools or solutions for addressing the food system problems we have identified. In looking at these regulatory interventions to secure HSD in the UK, we divide them up into a broad regulatory taxonomy, with tools consisting of both targets and then instruments to achieve these, including command-and-control instruments (e.g. environmental permitting, minimum standards, land use controls, quotas), economic instruments (e.g. emissions trading systems for agri-food, taxes, subsidies), and informational instruments (e.g. labelling, dietary guidelines, education, and corporate and farm reporting). We further consider the legal status of both targets and instruments in terms of whether they are voluntary or mandatory.

One of the aims of this report is to produce a regulatory menu or toolkit, setting out the range of tools and instruments that policy makers can consider in helping the UK transition to HSD. This can be found in Table 1 later in the report. We are of course conscious that policy levers do not exist in a political vacuum. With 2024 a year that saw farmer protests across Europe, there are no easy answers to the necessary transition in our food system.[12] A transition to HSD is imperative on both health and sustainability grounds and will produce significant benefits. However, there are also inevitable transition costs, as well as the risk of backlash with some policy choices. These need to be borne in mind. Making sure that the transition leaves room for reasonable freedom of choice and that it is a just transition is important.[13] The former means not reaching too readily for bans as part of the toolkit, but considering what tools are a proportionate response to the problem at hand. The latter involves allocating transition costs fairly among all the relevant stakeholders in the food system, especially between farmers, farm workers, supermarkets, and consumers on lower incomes. If the era of unhealthy and unsustainable cheap food is to come to an end – as it must – then who pays for the increased cost of HSD is a key question that needs to be addressed. But the costs of not transitioning are much greater.[14]

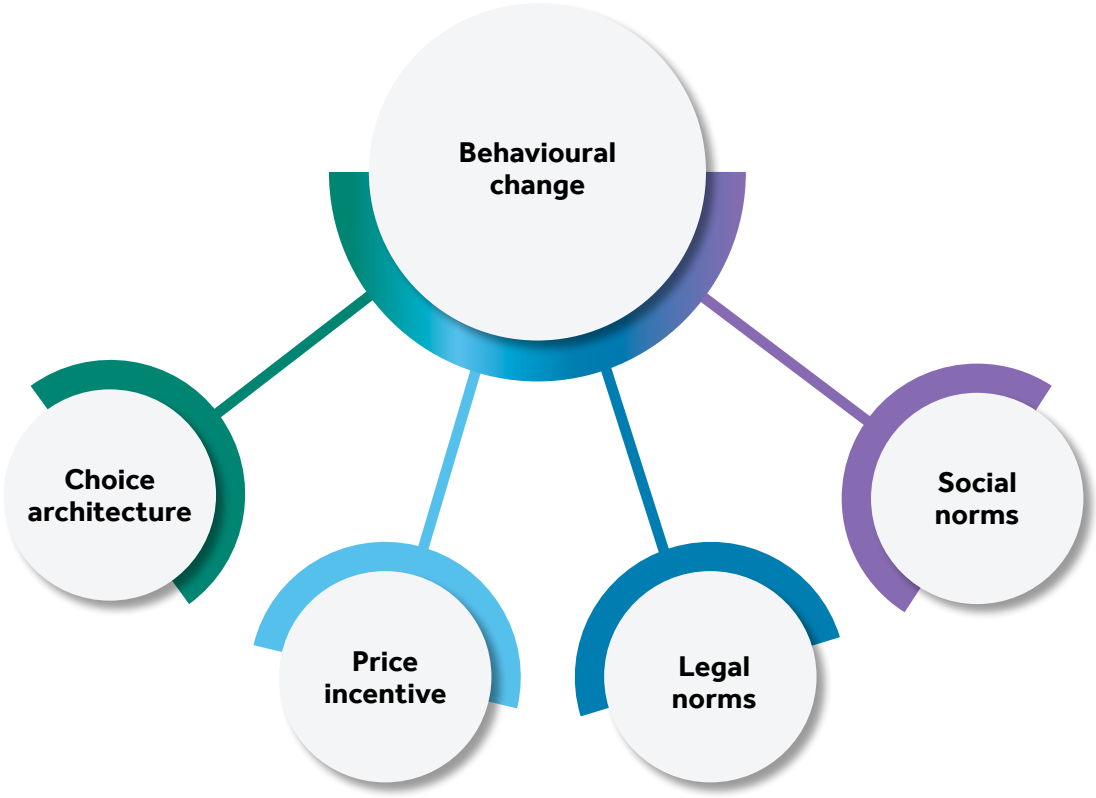

Figure 2: Drivers of behavioural change

In looking at tools and instruments, the report's focus is on policy levers that can be deployed by government – often legislative in form – which can help to transform the UK food system to HSD. Many of these levers or regulatory tools are aimed at securing *behaviour change* by consumers and producers. Figure 2, based on Lessig's four constraining forces on behaviour,[15] illustrates the various drivers of such behavioural change. In focusing on regulatory approaches, the report does not cover social norms, although changing social attitudes to meat eating, for example, might in time lead to behaviour change in the form of lower consumption levels. Legal norms include command-and-control tools such as environmental permitting requirements or mandatory ingredient limits or bans. Price signals to help drive or incentivise behaviour change come in the form of economic instruments such as taxes, subsidies, and emissions trading. 'Choice architecture' is about the external food environment which consumers face. The report covers some but not all aspects of this driver of behavioural change. In looking at the social and economic aspects of healthy and sustainable diets for example, we look at physical access to HSD foods, and we also examine information provision including health and sustainability labelling. These, respectively, involve the physical and informational environment which consumers face in making their choices. However, the report does not explore 'nudging' tools, such as default vegetarian options, in any depth.[16] A recognised policy tool or instrument, nudging is typically self-deployed at an organisational level by supermarkets, workplaces, and schools. It involves using knowledge of consumer psychology to encourage behaviour change through the creation of positive choice architectures. While we acknowledge the importance of nudging tools in behavioural strategies, these are addressed elsewhere within the TUKFS programme.[17]

Although we highlight the issues where notable, the report does not systematically analyse synergies (win-wins) or trade-offs across or between the various solutions discussed. Neither, except in passing, does this report examine international trade levers that could be used to achieve HSD (e.g. increasing

import duties on meat), nor the international trade law (WTO) compatibility of domestic HSD policy levers like labelling schemes. Nevertheless, many of the regulatory tools discussed in this report may be considered 'trade' measures in a UK, internal trade sense. Public procurement for example, is a key trade tool which can be used to encourage traders to supply healthy and sustainable food. Labelling of healthy and sustainable foods is a trade-related instrument, because labels are a form of intervention in the activity of buying and selling goods. Trade is also a matter of supply and demand. In considering potential regulatory tools to help the UK transition to HSD, where relevant, the report therefore also addresses whether these tools are addressed principally at the demand side or at supply. In the case of unhealthy amounts of dietary sugar for example, a demand-side measure might involve consumer labelling on sugar content, while an example of a supply-side tool would be to impose restrictive quotas on UK sugar beet production.

This report is organised around a 'problem-cause-solution' framework, and it adopts a standard approach to the regulatory taxonomy taken from the regulation literature. It is focused on HSD as the nature of the transformation being aimed for. However, other approaches can also be valuable and, in this respect, we note the existence of another TUKFS report, Kelly Parsons and David Barling, *Food Systems Transformation: What's in the Policy Toolbox?* (2021), which similarly considers tools for transforming food systems.[18] Their report can usefully be read alongside ours. The two reports are complementary, although they adopt a different emphasis. The Parsons and Barling report is organised principally around different elements of food system supply chains and takes a broad view of the tools involved. We aim to offer a more detailed and systematic study of regulatory instruments rather than being led by a supply chain approach. The report of the EU Strategic Dialogue on the Future of EU Agriculture,[19] which was published at around the same time as the draft version of this report, likewise provides a useful EU comparison, focusing as it does on many similar problem issues and suggested solutions for the EU agri-food system.

Finally, we are conscious that we are writing at a time when the use of GLP-1 weight loss drugs like Wegovy is increasing. While we list them briefly in Table 1 later, our focus is on tools that can help to transform the UK food system to HSD, not on technological interventions that address only the pathologies of the existing system. This chimes with the Government's proposed 10 Year Health Plan, which emphasises a shift from sickness to prevention.[20]

2. Sustainable diets/food systems

The aim of *sustainable* diets and food systems is to protect the environment, while also taking into account social and economic barriers and impacts. The social and economic aspects depend, for example, on healthy and environmentally sustainable food choices being affordable, available and culturally acceptable.[21] Food system employee wages and welfare are another important consideration as part of that broader sustainability picture, as are policies on equality, diversity and inclusion (EDI), and farm profitability.

Policy discussions and the academic agri-food literature typically focus on health and the environment and ignore or underplay these other social and economic elements of sustainability.[22] However, a successful implementation of sustainable food systems and diets needs to conform with the parameters of sustainable development by embedding the three dimensions of sustainability, i.e., society, economics and the environment, which were first officially recognised in the 1987 United Nations (UN) Brundtland Report.[23] This approach was reinforced by the UN 2030 Agenda for Sustainable Development and the associated UN Sustainable Development Goals (SDGs), in its aim to ensure a balance between those three dimensions.[24] The most food-relevant SDG, with both environmental and social elements to it, is SDG 2 which has as its goal, "to end hunger, achieve food security and improved nutrition and promote sustainable agriculture."[25] If the UK is to abide by UN policy on sustainable development, including SDG 2, then it needs to have robust social and economic dimensions in its policies for sustainable diets and food systems.[26]

The UN Food and Agriculture Organization (FAO) has endorsed a definition of *sustainable diets* that includes health within sustainability:

> Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.[27]

The nature of a 'food systems'-based approach is explored in more detail in section 4 below. However, the FAO describes *food systems* as encompassing:

> the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded.[28]

The FAO further defines a *sustainable food system* as one:

> that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised. This means that: it is profitable throughout (economic sustainability); it has broad-based benefits for society (social sustainability); and it has a positive or neutral impact on the natural environment (environmental sustainability).[29]

In a more recent account, the UN High Level Panel of Experts on Food Security and Nutrition states that sustainable food systems possess the following qualities, which map onto the six dimensions of food security (listed in brackets after each quality). These dimensions are closely associated with the *right to food* under Article 11 of the International Covenant on Economic, Social and Cultural Rights.[30] Sustainable food systems should be:

> productive and prosperous (to ensure the *availability* of sufficient food); equitable and inclusive (to ensure *access* for all people to food and to livelihoods within that system); respectful and empowering (to ensure *agency* for all people and groups to make choices and exercise voice in shaping that system); resilient (to ensure *stability* in the face of shocks and crises); regenerative (to ensure *sustainability* in all its dimensions), and healthy and nutritious (to ensure nutrient uptake and *utilization*).[31]

As can be seen, many of the above definitions link sustainability in diets and food systems with the idea of *food security*.[32] The latter was described by the 1996 World Food Summit as existing "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life."[33] Economic and physical access are thus important elements both of social and economic sustainability and of food security. In the UK, economic access or the affordability of HSD diets is particularly important at a time when 7.2 million households in 2022/23 were 'food insecure'.[34] Government measures are needed to support healthy, diverse, and sustainable food systems and diets that are affordable to the wider public, in particular, for low income and vulnerable communities, who have been hit hardest by the economic (including inflationary) shockwaves of the pandemic and Ukraine war and the subsequent cost-of-living crisis.

The equation of healthy and sustainable food systems and diets that are both nutritious *and* affordable may at times be a source of tension and require some trade-offs between one or more of health, society, economics and the environment, so as to achieve overall sustainability. On the one hand, the need for healthy and sustainable food systems and diets calls for nutrient-rich foods; however, the nutritional value of such foods needs be weighed against effects such as cost and a potentially high carbon footprint or other environmental impacts. On the other hand, some lower-cost diets may be rich in calories but poor in nutrients. One, now commonly suggested, way of meeting this difficult balancing exercise, is for people to shift to eating less meat and dairy (due to their often high environmental impact and high price). However, this reduced consumption needs to come with appropriate support to ensure the social and economic sustainability of the farming communities producing them.

While the social and economic aspects of sustainability are important, the environment is rightly at the centre of the food sustainability picture because there is no food without nature. The environmental impacts of food systems are wide-ranging and include for example: the pollution of air, land and water; negative impacts on biodiversity; greenhouse gas emissions contributing to global climate change; the use of plastics which end up in the environment; packaging waste; and food waste, which itself causes emissions and which also exacerbates the other impacts. Animal welfare is also a key, but often missed, part of the environmental sustainability of food systems because, after all, domesticated farm animals, like humans, are also part of the environment.

The 2023 FAO report on the state of food and agriculture,[35] which looks into the true cost of food in sustainable food systems, sheds some light on the negative impacts from unsustainable activities and practices that worsen the effects on climate change, natural resource degradation and human health. The hidden costs of food systems are found in the environmental 'externalities' (or external costs) which farmers and companies in the food system place on wider society rather than paying and internalising themselves in accordance with the polluter pays principle. A key aim of many of the tools discussed in this report is to address these externalities (e.g. through taxes and levies, or emissions trading schemes) as well as other sources of market failure such as information asymmetries between producers and consumers (e.g. via labelling).

3. Healthy diets/food systems

There is, to date, no global consensus on what constitutes a healthy diet,[36] although there is converging evidence that predominantly plant-based diets offer the most tangible health as well as environmental benefits. The UN advice on what to do on SDG 2, for example, is to "Consume less meat and become vegetarian for one day a week."[37] However, because all individuals will have different needs as well as different food sources readily available, defining a healthy diet is a complex exercise. The focus is therefore generally on what amounts to a healthy diet at a population level.

Rather than offering a definition of a healthy diet, a useful starting point can be to look at the main characteristics/components such diet would have, as set out by various bodies, including: the UN World Health Organization (WHO); the EAT-*Lancet* Commission on Food, Planet, Health; the EU in its Farm to Fork Programme; and the UK government with its Eatwell guidelines.

The WHO healthy diet fact sheet[38] states that a healthy diet includes the following:

- Fruit, vegetables, legumes (e.g. lentils and beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat and brown rice).
- At least 400g (i.e. five portions) of fruit and vegetables per day, excluding potatoes, sweet potatoes, cassava and other starchy roots.
- Less than 10% of total energy intake from free sugars,[39] which is equivalent to 50g (or about 12 level teaspoons) for a person of healthy body weight consuming about 2000 calories per day, but ideally is less than 5% of total energy intake for additional health benefits.
- Less than 30% of total energy intake from fats. Unsaturated fats (found in fish, avocado and nuts, and in sunflower, soybean, canola and olive oils) are preferable to saturated fats (found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and lard) and trans-fats of all kinds, including both industrially-produced trans-fats (found in baked and fried foods, and pre-packaged snacks and foods, such as frozen pizza, pies, cookies, biscuits, wafers, and cooking oils and spreads) and ruminant trans-fats (found in meat and dairy foods from ruminant animals, such as cows, sheep, goats and camels). It is suggested that the intake of saturated fats be reduced to less than 10% of total energy intake and trans-fats to less than 1% of total energy intake. In particular, industrially-produced trans-fats are not part of a healthy diet and should be avoided.
- Less than 5g of salt (equivalent to about one teaspoon) per day. Salt should be iodized.

As one might expect given the WHO's health remit, the WHO guidance reflects a position which is motivated by achieving health goals and does not take into account wider sustainability issues including the environment.

The Eat-*Lancet* Commission[40] is a global, independent scientific body which, in 2019, produced an influential report (The Eat-*Lancet* Report)[41] on healthy diets and sustainable food production. While not legally binding,[42] the Report sets scientific targets for intakes of various food groups like fruit (100 to 300g/day) to ensure human health, and, separately, scientific targets for sustainable food production (e.g. on the global tonnage application of nitrogen) to ensure that this remains within planetary boundaries. The aim of this combined framework is to achieve 'planetary health' diets that are both healthy and environmentally sustainable.[43] This concept is similar to that of HSD used in the current report, except sustainability for our purposes goes beyond environmental sustainability to encompass social and economic elements.

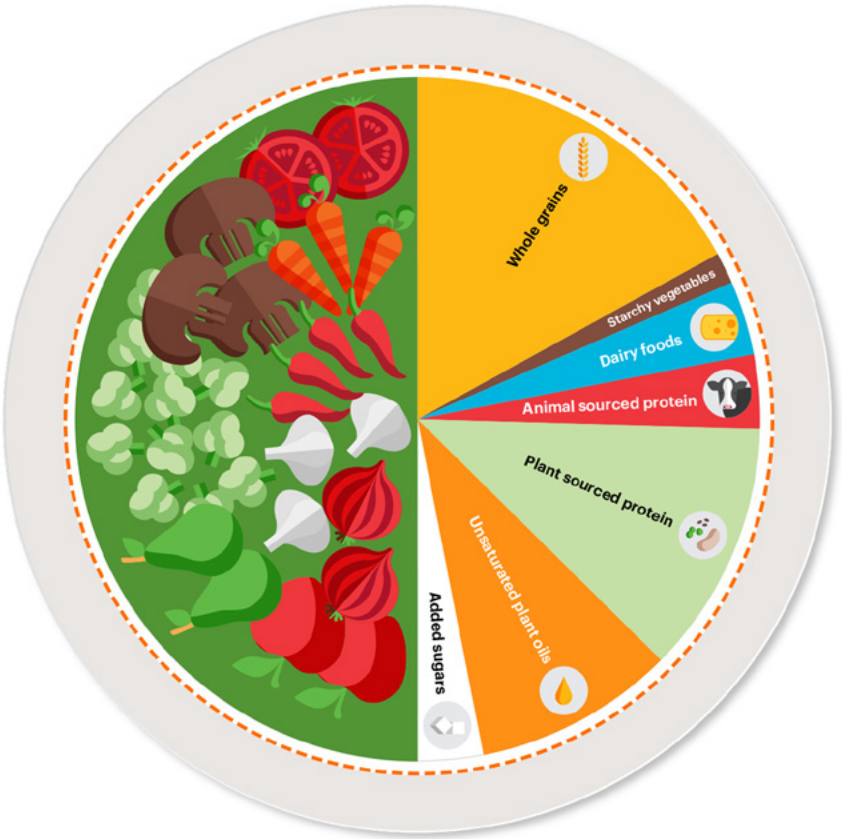

Figure 3: The EAT-*Lancet* planetary health plate. This graphic was prepared by EAT and is included in an adapted summary of the Commission Food in The Anthropocene: the EAT-*Lancet* Commission on Healthy Diets from Sustainable Food Systems. The entire Commission can be found online at **eatforum.org/eat-lancet-commission**. *Credit: EAT*

According to the EAT-*Lancet* Report,[44] a healthy diet should optimise health, broadly defined as being a state of complete physical, mental and social well-being and not merely the absence of disease.[45] In line with scientific evidence, a healthy diet can be described by looking at what food groups would need to be on a plate to offer the optimal caloric and macronutrient intake, although the Summary Report notes that this typical plate may need to be adapted to local conditions to reflect cultural and geographical realities of food production.[46] The Summary Report describes a planetary healthy plate (reproduced in Figure 3 above) as containing approximately half a plate of vegetables and fruits, with the other half being divided between the consumption of whole grains, plant protein sources (legumes[47] and nuts), unsaturated plant oils, alongside more modest amounts of starchy vegetables, dairy foods, added sugars and animal source protein (as an option) including beef, lamb, pork, poultry, eggs and fish.[48]

To arrive at this healthy diet – which the EAT-*Lancet* Summary Report labels 'flexitarian'[49] – requires some drastic changes to current consumption patterns in many parts of the world and notably involves reducing excessive consumption in wealthier countries.[50] These shifts in consumption will have to be accompanied by changes in production, and where production needs to decrease, one can expect pushback by industry lobbies, especially if there is a lack of adequate financial support for the transition.

At EU level, the Farm to Fork Strategy seeks to implement changes to make food systems fair, healthy and environmentally friendly as part of the European Green Deal. Within this remit, it aims to ensure "food security, nutrition and public health – making sure that everyone has access to sufficient, safe, nutritious, sustainable food".[51] The Strategy does not define what constitutes a healthy diet. However, noting high levels of obesity, cardiovascular disease and cancers, the EU recommends a shift in people's diets "to a more plant-based diet with less red and processed meat and with more fruits and vegetables", observing that this will be beneficial not only for health reasons but also to reduce the environmental impact of the food system.[52] The Farm to Fork Strategy further states that "Overall, European diets are not in line with national dietary recommendations, and the food environment does not ensure that the

healthy option is always the easiest one."[53] National dietary recommendations across EU Member States vary. Hence it is not possible to carve out a unified EU definition of what a healthy diet may be, although messaging around an increase of fruit and veg intake and a reduction of highly processed as well as meat products is common in many EU countries.[54] Consumers in Europe appear to still largely consume an omnivore diet (84%) with only 11% self-declared flexitarian, 2% vegetarian, 2% pescatarian and 1% vegan.[55] However, while 54% of consumers in Hungary eat meat every day, only a third do so in Sweden or Germany. Nevertheless, according to the European Commission, meat consumption as a whole is still often 2 to 4 times higher than the recommended intake.[56]

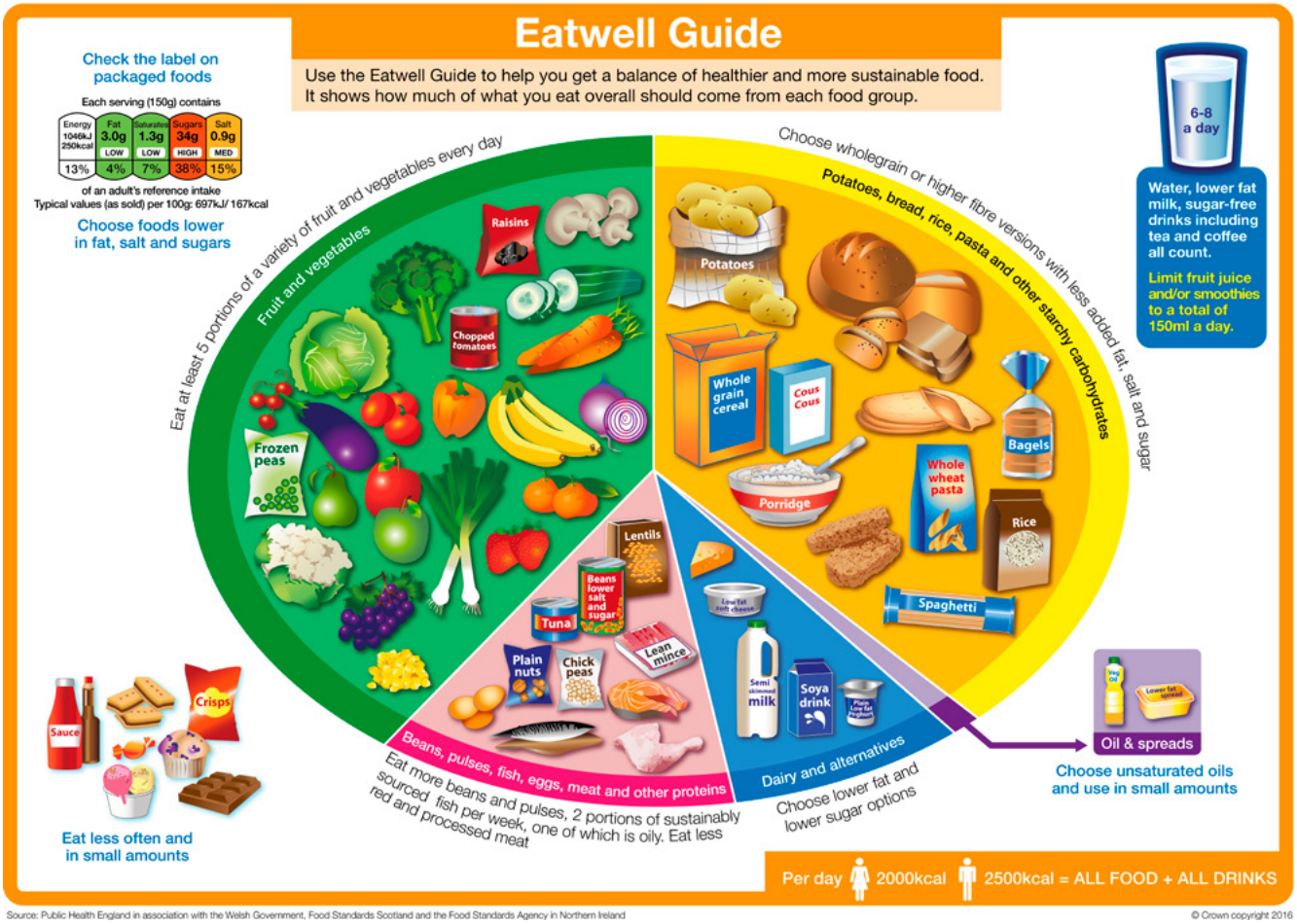

Figure 4: The Eatwell Guide

In the UK, which is the main focus of this report, a view on what a healthy diet looks likes exists in the form of the public-facing, pictorial plate-based, Eatwell Guide in Figure 4,[57] which also clearly indicates unhealthy food to limit or avoid. The Eatwell Guide is a government endorsed set of recommendations relating to the general population aged 1–18 and 19+. It was first published in 2016[58] by Public Health England (PHE)[59] and is based on recommendations from the Scientific Advisory Committee on Nutrition (SACN). PHE commissioned the Carbon Trust to carry out a sustainability assessment of the Guide's recommended healthy diet. Although this assessment did not affect the recommendations, it showed that such a diet has "an appreciably lower environmental impact than the current UK diet."[60]

The Eatwell Guide recommendations in the UK differ from those recommended by the EAT-*Lancet* Report. For example, the recommended intake of fruit and vegetables in the Guide is set at 40% and '5-a-day' rather than Eat-*Lancet's* 50%. Foods high in fat, sugar or salt (HFSS) also still feature, although they are no longer represented on the plate itself and are accompanied by the recommendation to eat them less often and in small amounts.[61] Even with the Guide's smaller recommended proportion of fruit and veg, only around 32% of adults in England are achieving 5-a-day.[62] This indicates that improvements are needed in the UK food system to enable a transition to HSD for all.

For the purposes of this report, we will take the UK Eatwell Guide as a reference point when discussing a healthy diet. This is in part because the Guide has already been tailored to local UK consumption. The EAT-*Lancet* study does, after all, explain that the healthy patterns it proposes allow for flexible application, with food and amounts tailored to preferences and cultures of different populations.[63] However, we emphasise that the EAT-*Lancet* plate – while reflecting worldwide estimations of desirable healthy food intake rather than local ones – is more ambitious in its composition. In considering regulatory interventions to achieve a move to HSD in the UK, it will also be important to consider the new version of EAT-*Lancet* due in 2025.[64]

Finally, while this section has largely focused on the 'health' aspect of HSD, with sustainability considered in the previous section, it is worth noting that some dietary guidelines, including for example the EAT-*Lancet* planetary health diet,[65] the Danish national guidelines,[66] and the German Society for Nutrition,[67] have in recent years moved towards integrating environmental sustainability considerations within the dietary health advice. Given that the aims of the two often coincide – moving to a more plant-based diet is for example generally[68] beneficial from both a human and planetary health point of view – that integration makes sense. However, while synergies between health and sustainability like this are common, they cannot be taken for granted, because there may also be trade-offs in places. With plant-based meat substitutes for example, if these are over-packaged using large amounts of plastic,[69] that has negative sustainability impacts. Although examples like these should not dilute the message about the general HSD desirability of more plant-based diets, policy makers nevertheless need to be aware of and address any such trade-offs where they can.

4. A food systems-based approach

As seen in section 2 above, the FAO has described food systems in the following terms:

> Food systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded. The food system is composed of sub-systems (e.g. farming system, waste management system, input supply system, etc.) and interacts with other key systems (e.g. energy system, trade system, health system, etc.).[70]

There are of course two words in the term food systems: food and systems. On the 'food' aspect, it makes more sense, from both a health and sustainability perspective, to talk of the food and drinks system, or at least to ensure that drinks are incorporated within the idea of food. Health-wise, sugar-sweetened drinks, for example, are linked with obesity[71] and an increased risk of cardiovascular disease.[72] As for sustainability, according to research by the consultancy firm Kearney, the drinks industry (including alcohol and dairy) emitted 1.5 billion tonnes of CO2 in 2021, accounting for 3.8% of global CO2e emissions.[73]

Thinking in terms of 'systems' has several important upsides. First, it encourages a move away from an otherwise common focus simply on the food production stage. Second, and relatedly, it involves examining all of the relevant activities between farm and fork (or even farm and flush) in an interconnected way rather than approaching each in siloed isolation. That is important, because actions in one part of the system are likely to have knock-on effects or implications for other parts. Those outcomes may be positive or negative. Where they are positive one can speak of win-win synergies across different food system goals; where they are negative, then one is in the territory of system trade-offs.

Third, a systems approach can be used to describe a 'circular economy' approach to food where agricultural production and consumption becomes as far as possible a closed loop, with inputs and outputs kept within the system and not wasted. That is contrasted with a linear model, involving a 'take, make, and waste' approach where there is no virtuous cycling of materials within the system. A concrete example of a circular approach is a regenerative mixed farm, where animal manure features in small quantities and is used as a soil conditioner, reducing or eliminating the need for mined or synthetic chemical inputs from another part of the food system (the agrochemical industry). In contrast, an intensive monoculture arable farm, or an intensive livestock farm, involves a linear approach where synthetic pesticide and fertiliser inputs, or excessive livestock manure, respectively, may run off as waste into watercourses rather than being kept within the system.

Fourth, a food systems approach usefully helps to cast light on the role of power. With major interdependencies between different parts of the food system, if parties like the seed and agrochemical industry, 'big meat' companies, or supermarkets, wield too much market power vis-à-vis farmers, then that has a range of implications for food system goals, including farmer livelihoods and fairness.[74] A 2024 WHO Report presents just such a link between large meat companies in an increasingly concentrated transnational market, and low prices for farmers. However, where an industry is unconcentrated and subject to healthy competition, consumers may not face higher prices as a result of market power in that industry.[75] Analysis of food price inflation by the UK Competition and Markets Authority (CMA) in 2023 found that supermarket power in relation to consumers had generally been kept in check by effective competition, especially from discounters like Aldi and Lidl.[76] However, power needs to be disaggregated.[77] Farmers may lack bargaining power in relation to supermarkets, while at the same time enjoying institutional lobbying and protest power in relation to governments. Indeed, as seen in farmer protests across Europe at the start of 2024, the former may be partly responsible for the latter. While

farmers may thus lack market power but enjoy political power, other food system actors have both. The WHO has drawn attention to the political lobbying power of the 'big' food industry, arguing that it has used the resources from its market power to exert political power to oppose public interest regulation, including many of the tools discussed in this report that would help the transition to HSD in the UK.[78]

Finally, a food systems-based approach helps to place food alongside other major human socio-economic systems that also require transformations or transitions in the light of the climate crisis – notably the energy system and the transport system. As the FAO quote above notes, the food system interacts with these other systems, and from a sustainability point of view, those interactions with legacy fossil fuel energy and transport systems (whether e.g. through fossil fuel energy used in fertiliser manufacture, or the use of ICE vehicles in farming and food distribution) are important.

In adopting our 'problem-cause-solution' approach in this report, we take a food systems approach. The problems identified are ones related to health and sustainability that arise in various parts of the food system, across production, distribution, consumption and food waste. In looking at the food system, we include drinks, with the soft drinks industry levy (or 'sugar tax') an important solution tool there. We also draw attention to the role of power, both in relation to food system problems around social sustainability, and in discussing industry lobbying for voluntary rather than mandatory instruments.

5. Food system problems and causes

Having explored the broad ideas of sustainability and health as part of HSD above, in this section we move on to break down those two broad categories into the particular food system 'problems' associated with each of them, and also the causes of those problems in terms of who and what has caused them. The problems and causes are set out in Table 1 below,[79] which also includes a column on regulatory tools or solutions that either are in place in the UK or that might be used to tackle the problem. Although Table 1 and the main text in this section touch briefly on them, the principal discussion of tools or solutions is left to the following section 6, which analyses them using a standard regulation taxonomy of targets, command-and-control, economic instruments, informational instruments, and voluntary instruments. Section 6 does not attempt a problem-by-problem discussion of each instrument. Instead, section 6 discusses tools or solutions more broadly, albeit drawing on concrete food system problems as part of the analysis.

Table 1: Food system problems, causes, and solutions

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Sustainability (enviro)		
Food waste	**Who?** Households, caterers, farmers (on-farm waste), food processors/ manufacturers, transport and logistics, wholesale and retail waste **What?** Range of factors including e.g. over-buying, and reactions to food safety and quality labels	Farm to fork food waste targets Voluntary agreements Farm and corporate food waste reporting Labelling (e.g. adjust 'use by' and 'best before' dates) Consumer education Marketing controls (e.g. restrictions on BOGOFs) Whole crop contracts
Climate (GHG emissions) **Domestic UK emissions** **Imported emissions**	**Who?** Farmers, agrochemical and ag-machinery companies, farmers, food processors/manufacturers, transport and logistics, wholesalers and retailers, local authority waste management operations, consumers of meat and dairy, lenders and investors **What?** Methane emissions from cattle/sheep, and from manure management Nitrous oxide emissions from inorganic and organic fertilisers and livestock manure CO2 emissions from industrial ag – high carbon-based fertilisers and pesticides, and ICE-based machinery Poor soil management (low soil carbon retention/sequestration Manufacturing/processing GHG emissions Storage and transport CO2 emissions Wholesale/retail CO2 emissions	Meat and dairy reduction targets Meat Taxes Reduce or eliminate subsidies for meat and livestock and subsidies for the marketing of meat Subsidies (grants) for technological innovation (e.g. reducing GHG emissions via cattle feed additives) Subsidies for farmers to make plant-based farming switch, and/or regenerative agriculture transition, and/or for carbon removals or climate friendly farming practices Marketing controls (limit or ban advertising of meat) Sustainable public procurement Carbon labelling and other forms of ecolabelling addressing GHGs Consumer education (e.g. on feed additives, and low carbon foods and labelling) Climate reporting, including whole supply and value chain (scope 3) emissions ETS, climate emissions levy or carbon tax for the agriculture sector CBAM climate border tax Controls on amount of food waste (methane-producing) being sent to landfill Fertiliser product standards

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Other forms of environmental pollution (water, local air, soil)	**Who?** Farmers, food processing/ manufacturing plants, food transport **What?** Pesticides Animal slurry and manure Fertiliser nutrient loss and overload (nitrogen and phosphorous) Factory and transport pollution Packaging litter/pollution	Pesticide use reduction targets Synthetic pesticide bans (organic certification and labelling) Land under organic management targets Sustainable public procurement Pesticide tax Land use controls ELM subsidy schemes Farmer education/training/advice Environmental permitting Product standards Deposit return schemes Subsidies to encourage precision agriculture techniques (e.g. fertiliser application)
Resource overuse (land and water)	**Who?** Farmers Food and drink manufacturers Lenders and investors Fishers **What?** Excessive abstraction levels of underground or surface waters Extensification of agriculture leading to biodiverse wild land loss Overfishing	Water abstraction licensing Limits on spray irrigation Drought orders limiting abstraction Subsidies to encourage precision agriculture techniques (irrigation) Certification and labelling, including land and water use Corporate targets on water reduction Corporate reporting on water use Land use planning and nature conservation (e.g. agricultural EIA) Quotas

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Packaging	**Who?** Packaging manufacturers, food service and hospitality sector, farm suppliers, wholesalers and retailers, waste management industry **What?** Poor product design Polluting materials used Food safety and product longevity (food waste prevention) concerns Single use infrastructure	Packaging targets pEPR waste fees Plastic packaging tax Single use packaging charges Product standards Labelling Deposit return schemes (DRS)
Biodiversity impacts	**Who?** Farmers, agrochemical companies, supermarkets, lenders and investors **What?** Land use conversion from wild/ semi-wild to agricultural Changes in farming practices Pesticide use Nutrient loads	Nature restoration targets Nutrient reduction targets Meat reduction targets Pesticide use reduction targets Synthetic pesticide bans (organic certification and labelling) Land under organic management targets Pesticide taxes Land use controls Sustainable public procurement ELM subsidy schemes Farming innovation funding Certification and labelling

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Soil health	**Who?** Farmers Agrochemical companies **What?** Tillage Monocropping Leaving soil fallow Soil erosion/loss Pesticide use	Soil health targets Certification and labelling (e.g. organic) Restrictions or bans on synthetic pesticide use Pesticide reduction targets Land under organic management targets Restrictions on excessive fertiliser use, including criminal offences Supply side controls (e.g. quotas) on acreage allowed for soil-removing crops Reporting on soil health Fertiliser product standards
Animal welfare	**Who?** Farmers, meat processors, retailers, consumers **What?** Intensive rearing practices Intensive rearing as a system Number of farmed animals	Meat and dairy reduction targets Reduce or eliminate subsidies on meat production and marketing Command-and-control standards (e.g. cage/pen sizes, pre-slaughter stunning) Labelling Marketing controls Sustainable public procurement

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Sustainability (econ/social)		
Economic access/ affordability of HSD foods	**Who?** Retailers, hospitality and food service sector, government **What?** Low incomes/income inequality Inflation Competition	Subsidies for greener choices Higher minimum wage Competition law
Physical access to HSD foods	**Who?** Supermarkets, local authorities (planning) **What?** Food 'deserts' and 'swamps' Shop locational profitability	Planning law and policy Sustainable public procurement Grants to support alternative food networks and social enterprise (e.g. community food markets)
Farmer profitability	**Who?** Supermarket supply chain pressure and other value chain actors **What?** Physical climate risks Time and costs involved in transition to e.g. regenerative and/ or organic systems Unequal bargaining power/ competition	Fair trading tools (Agriculture Act 2020) Sustainable public procurement Transparency and reporting Subsidies (for adaptation and transition)
Food worker income	**Who?** Value chain actors Government **What?** Labour markets Unequal bargaining power	Sustainable public procurement Labelling Reporting Minimum/living wage and welfare policy
EDI	**Who?** Large companies, lenders and investors **What?** Discrimination Unequal bargaining power	Reporting Sustainable public procurement

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Health		
Over consumption of red and processed meat (cancer causing)	**Who?** Consumers Large companies Government **What?** Cultural preferences Intensive production Low prices Absence of suitable alternatives	Health-driven meat reduction targets Food business reporting of proportion of plant-based v animal proteins sold annually and targets to reduce these Warning labelling Reduce or eliminate subsidies for meat production Marketing controls (limit or ban advertising of these meat products) Taxes on red and/or processed meat
Over consumption of unhealthy HFSS foods (high in fat, sugar or salt)	**Who?** Consumers Large companies Government **What?** Relative cheapness of this food group compared to healthier alternatives	Voluntary reformulation targets (e.g. amount of sugar in breakfast cereals) Marketing controls (e.g. HFSS BOGOFs) Taxes on salt and sugar Command-and-control reformulation mandates Reporting of proportion of HFSS foods sold and targets to reduce these Prescription of GLP-1 weight loss drugs
Under consumption of fruit and vegetables	**Who?** Consumers Large companies Government **What?** Affordability of fruit and vegetables Preparation Volumes needed to replace meat	School food standards Public procurement (e.g. GBSF standards for fruit) Subsidies Labelling (e.g. 5-a-day)
Under consumption of fish, including oily fish	**Who** Consumers Large companies Government **What** Relative expense of this food group Lack of consumer taste for fish Lack of fish cooking skills	Fish labelling Subsidies Public procurement Fishmonger rates reduction Fishing quota changes

HSD Food system problem	Cause of problem (who/what)	Regulatory solutions/tools (possible/existing)
Other health problems (not covered in the report) – some contested		
Under consumption of fibre and wholegrains		Labelling Bread formulation standards School food standards Public procurement Reporting of proportion of high fibre and wholegrain foods sold and targets to increase these Taxes on low fibre alternatives
Antimicrobialresistance (in humans)		Command-and-control restrictions on livestock antimicrobial overuse (Veterinary Medicines Regulations) Corporate targets on cutting antimicrobial use
Hormonal disruption		Ban on growth hormones in livestock farming
Pesticides and cancer		Product standards – maximum residue levels in foods Ban relevant pesticides (e.g. glyphosate) Certification and labelling (organic) Land under organic management targets
GMOs		GM traceability and labelling controls Ban or moratorium on GM crops

5.1 Sustainability (environmental)

Looking at the environmental sustainability of food systems involves a range of different but often interrelated food system problems, including food waste, greenhouse gas (GHG) emissions, pollution, resource overuse, packaging, biodiversity loss, soil health, and animal welfare. They are interrelated because, for example, food waste and packaging both contribute to other problems like GHG gas emissions, resource overuse and pollution.

5.1.1 Food waste

Policy documents may refer to just 'food waste' or to 'food loss and waste'. The distinction between food loss and food waste in the latter stems from the UN Sustainable Development Goal (SDG) 12.3, 2030 target to 'halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses'.[80] The UN measures food 'loss' from the production harvest stage onwards,[81] including storage and transport, up to but excluding the manufacturing and subsequent retail level. For food 'waste', it includes both inedible (but edible in some cultures or usable in other ways in human supply chains or for animal feed) and edible food that is not eaten and gets discarded at the retail, food service, and household consumption level.[82]

This report generally uses the term food waste. Although the distinction between loss and waste can be useful for highlighting *who* is causing the problem within the food system and where relevant regulatory tools or solutions therefore need to be addressed, care is also needed because responsibility for farm level food loss may well lie further up the supply chain with supermarkets and their contractual quality specifications for example.[83] The reverse can also be true: waste in the supply chain may also be 'driven by changeable factors at a farm level'.[84] Another key point to note is that food system waste goes well beyond just wasted food. While food waste is the focus of this section, on-farm waste for example, also includes plastic packaging like sacks and containers as well as plastic sheeting, tyres, machinery etc.

Preventing food waste is important in the context of achieving HSD because, for example, it means that there are GHG emissions associated with each stage of the food system involved with a particular food product, from production, through retail, to disposal, which have been emitted for no eventual benefit. Likewise, there may have been unnecessary water abstraction, as well as pesticides and fertilisers polluting land and waterways unnecessarily. Part of the problem is therefore one of wasting the original resources that went into producing it.[85] The other important environmental sustainability problem involves methane emissions from food waste when disposed of in landfill.

Food waste is also problematic from the perspective of social and economic sustainability in that farmers may be losing valuable products that they could otherwise have sold, and also in terms of national food security: the more food wasted, the more may need importing. Beyond the S part of HSD, there may also be H-related healthy diet implications of food waste, particularly if healthy foods like fruit and vegetables are the ones being wasted and not eaten by consumers. Nevertheless, there are potential trade-offs to consider between food waste and social and economic sustainability as well as win-win synergies like these. One reason some foods are wasted is their low cost: competition-driven social sustainability instruments to address unfair trading practices (UTPs) may lead to lower food prices for consumers and more food waste.[86]

The causes of food waste are numerous and range from labour shortages, poor harvesting and storage techniques and overproduction by farmers (which may be caused by those further up the supply chain),[87] through poor or damaged packaging, to marketing strategies that encourage consumers to buy more

food than they need, and poor meal planning.[88] The question of 'who' causes food waste is as important as the what causes it question though. This includes farmers, logistics operators, wholesalers and retailers, households, and also local authorities responsible for waste management options (working within policy set by central government) – with households by far the biggest contributor.[89] However, as adverted to above, policy makers need to be careful not to assume that the causes lie at the same level at which the waste arises: its indirect cause may be elsewhere in the supply chain.

In considering the causes of food waste, the distinction between food loss and waste is also worth mentioning. If the policy focus is on food 'waste' in the narrow UN SDG sense (likely to be a temptation given it is the one with a numerical target), then there is a risk that farm level food 'loss' and the factors that cause it get downplayed. Given that, contrary to common perceptions, per capita farm-stage waste levels are typically higher in developed countries like the UK than in developing countries,[90] any lesser emphasis on food loss and its causes needs to be avoided.

In thinking about solutions or tools for addressing food waste as a food system problem, these need to be carefully tailored to what causes them and who is responsible. Targets to reduce food waste set by national government and by farmers and food companies are a useful tool to encourage action and subsequent accountability. Instruments then used to meet those targets might then include informational instruments such as marketing restrictions on buy one get one free (BOGOF) type offers,[91] changes to 'use by' or 'best before' labelling laws,[92] and mandatory farm to fork corporate and farm food waste reporting duties (leading to the measuring of food waste and enabling subsequent progress on reduction targets to be assessed).[93] In order to avoid some of the supply chain causation issues discussed above, operators need to report on food waste across their supply chains, and not just in their own operations. Economic instruments like Pay-As-You-Throw (PAYT) weight-based waste charging for hospitality and food service are a further option,[94] as are voluntary instruments like whole crop contracts to avoid imperfection rejections. Command-and-control requirements like mandating separate food waste collection from households and businesses can also feature.[95] Some of these instruments may also be used in relation to non-food waste.[96]

5.1.2 Climate (greenhouse gas emissions)

Key GHG emissions from the agri-food sector, which are a problem because they contribute to climate change, include CO2, nitrous oxide, and methane.[97] The level of emissions of these gases is important in determining whether food can be considered environmentally sustainable as part of the transition to HSD.

In 2021, agriculture accounted for 71% of all UK nitrous oxide emissions and 49% of the UK's total methane emissions, but only around 1.9% of CO2 emissions.[98] The majority of nitrous oxide emissions in agriculture arise from the application of nitrogen fertiliser to soils and from manure. Agricultural methane emissions are associated with both ruminant livestock (principally cattle and sheep) and manure management.

In thinking about what and who is causing relevant GHG emissions in the food system, farm-based emissions are therefore key, and solutions need to be focused, in particular, on nitrous oxide and methane from farms. However, the figures above only count UK-based emissions. Given that UK livestock farming imports animal feed worth nearly £3.5 billion,[99] and that upstream scope 3 emissions from feed form the bulk of GHG emissions for UK chicken and pork producers,[100] any consideration of the sustainability of UK diets also has to account for overseas GHG emissions used to grow feed. The emissions include not only those from growing feed like soy, but also any arising from prior land clearance and deforestation.[101]

On farms, CO2 emissions arise from e.g. lighting, heating, and machinery including ICE vehicles. Together, these represent around 9% of agricultural GHG emissions.[102] Soils are a further farm-based source of CO2 emissions, although they are also potentially a sink in terms of carbon sequestration or carbon farming (as are trees and hedges on farms). Food system CO2 sources beyond these include those from agrochemical and agricultural machinery companies, food processors/manufacturers, transport and logistics operators, wholesalers and retailers, and local authority waste management operations.

Solutions include targets like the NFU's voluntary one to reach net zero across the whole of agriculture in England and Wales by 2040.[103] Bringing agriculture into the UK Emissions Trading Scheme (ETS) could be among the instruments to help meet this target. *Who* an ETS is addressed to within the food system is raised as an important issue in a 2023 policy report prepared for the European Commission. Depending on the precise design of an ETS for the sector, it could be aimed at farmers, or at actors upstream (e.g. fertiliser producers) or downstream of them (e.g. meat processors) in the food system.[104] But solutions here are potentially complicated not just in terms of 'who', but also in relation to 'what'. As we have seen above, while farms and their soils may be a cause of climate change, they are also potentially a removals solution, and tools to encourage carbon sequestration may be tied in with an ETS aimed at sources (allowing credits for removals), or they may come in the form of 'public good' subsidies via agricultural payment schemes which reward climate friendly practices or outcomes. An alternative economic instrument to including farming in an ETS would be to impose a carbon tax on agricultural emissions. There are sustainability trade-offs to be considered though, such as whether carbon pricing in either form might lead to increased intensification of livestock production, at the cost of animal welfare.

An ETS and a carbon tax are principally producer or supply-focused solutions. An alternative would be to directly target consumers on the demand side instead with a combination of a meat reduction target – the *National Food Strategy* for example recommended a 30% reduction in meat consumption by 2032[105] – and then a range of tools to meet that target. These might include one or more of: the imposition of controls on meat marketing, meat taxes, the removal of meat subsidies, the carbon labelling of meat, and subsidies for meat alternatives. However, as discussed further in section 5.3.1, targeting meat directly may prove less politically palatable than a wider policy on agricultural emissions like a carbon tax.

Product standards can also be a useful tool. Producing conventional inorganic (mined or synthetic) fertilisers is CO2-intensive[106] and so it can make sense to adopt a more circular economy approach to fertiliser production instead by using a greater proportion of organic fertilisers sourced from 'waste'.[107] The latter are made from materials such as animal by-products or bio-waste. They not only have a lower production carbon footprint, but biowaste-based fertilisers can also improve soil carbon sequestration and soil biodiversity.[108] Historically, EU CE marking and associated product quality standards enabling goods to be placed onto the EU market only applied to high carbon conventional fertilisers. More recently, however, the EU has changed its rules to apply product standards to lower-carbon organic fertilisers.[109] Under the Windsor Framework, these EU rules apply in Northern Ireland. As a post-Brexit revision, they do not apply in the rest of the UK, although the UK Government was due to consult on making similar changes in late 2023.[110]

Planning permission as a possible climate instrument is considered below in section 5.1.3.

5.1.3 Environmental pollution

Taking a food systems approach is important in considering environmental pollution as a problem because there is otherwise a temptation to focus only on agricultural or farm pollution and to ignore other parts of the wider food system such as food transport, food processors, and food and drinks producers. In looking at who causes the problem, they also need to be kept in mind.

The nature of the pollution with farming is different, however. Pipe or outlet-based 'point source' water and air pollution are closely associated with food processing and manufacturing. Similarly, 'mobile' sources of pollution from transport (including exhaust, brake and tyre emissions, and dairy, oil and fuel spillages) are linked with the food transport and logistics sector. While these sources of pollution (point source and mobile) also exist on farms,[111] the greatest farm pollution impacts tend to come from 'diffuse' sources. Conventional agriculture typically involves the application of inorganic fertilisers, or animal slurry or manure, onto farmland, and synthetic pesticides onto crops, in order to increase yields. The application of these may, over time, cause soil pollution in situ on the relevant farmland; and both 'dry' atmospheric deposition and 'wet' run-off from rainfall may lead to the diffuse pollution of neighbouring land and local watercourses, including protected habitat sites. Wind is also likely to cause air pollution from both pesticides (pesticide 'drift') and from ammonia emissions from slurry and manure applied on fields. Farm slurry stores may themselves also leak or overflow, causing more immediate and direct water pollution and, if not properly covered, will be a further source of ammonia emissions to air.

In thinking about the problem of agricultural pollution, it is increasingly common to look at particular features of it such as the 'nutrient overload' of rivers, and to focus on particular chemicals such as nitrogen pollution in its various forms (including ammonia NH3, and nitrous oxide N2O). A proportion of the pollution of the River Wye,[112] for example, is associated with nutrient overload caused by an excessive number of chicken farms and application of chicken manure in its catchment. The chicken manure contains high levels of the two key nutrients phosphorous and nitrogen. While these are beneficial for crop growth, nutrient 'loss' to neighbouring land or waterways can lead to the over-dominance of certain plants or microorganisms at the expense of others. In watercourses like the Wye, this has caused problems such as algal blooms and eutrophication, resulting in poor ecological water quality status.[113] Nitrogen deposition can also lead to pollution of neighbouring land via acidification. This harms biodiversity by lowering calcium levels in the soil, leading to, for example, fewer snails, thinner birds eggs and weaker bird bones.[114] Although much of the environmental pollution from nitrogen is local, nitrous oxide from agricultural fertilisers is also a significant global greenhouse gas.

In looking at the causes of pollution, it is important to consider not only what goes into the water, such as nutrients and pesticides, but also how much receiving water is there to dilute them and reduce the harmful impact associated with greater concentrations. Abstraction of water by farmers and the wider food and drinks sector is also important therefore, because this can lower dilution capacity and exacerbate pollution harm. Abstraction and water use is discussed further in section 5.1.4 below.

Solutions to the relevant problems depend on the various ways above in which those problems are framed. Point source pollution for example, tends to be controlled via environmental permitting as a tool,[115] and abstraction via abstraction licensing.[116] In contrast, keeping diffuse pollution in check tends to rely more on land use controls such as nitrate vulnerable zones[117] and other land management rules.[118] Farmer education, training, and advice (e.g. on application times/methods for fertilisers and pesticides) are also an important linked tool in this regard. Data reporting by farmers on fertiliser use so that amounts of phosphorous and nitrogen can be better tracked has been called for in a number of EU Member States.[119] Subsidies too may play a role as a tool in addressing nutrient pollution. England's

Environmental Land Management (ELM) subsidy schemes include nutrient management standards that must be adopted as a condition for receiving such subsidies.[120]

As for command-and-control solutions, while most farms in England don't require environmental permits, they are used as a tool in relation to large intensive pig and poultry farms.[121] Regarding planning permission, agricultural operations themselves do not generally amount to 'development'[122] within the land use planning regime and thus do not require such permission.[123] However, if new construction is involved like livestock housing or slurry stores, then these are likely to require it.[124]

In relation to GHG emissions (section 5.1.2 above), the 2014 UK Supreme Court ruling in *Finch*[125] raises the possibility that, as part of the planning process, any environmental impact assessment (EIA) for intensive livestock development may need to cover scope 3 GHG emissions, including upstream overseas emissions from animal feed production.[126] While a negative EIA does not prevent a planning authority from granting planning permission, the *Finch* case at least makes lack of consent for new intensive livestock developments more likely.

If nutrient pollution from the increased livestock density associated with these new developments risks having a significant effect on protected 'European' sites, then a Habitats Regulations Assessment (HRA) is required.[127] If the competent authority is unable to rule out an adverse effect on the integrity of such a site, then it *must* refuse planning permission unless a derogation applies to the project.[128] These are the so-called 'nutrient neutrality' rules, where EU (and now UK) habitats law allows developments to be given planning permission only if any nutrients from them, notably nitrogen and phosphorous, have a neutral impact on the condition of protected sites.[129] While some farmers may potentially be caught by such rules in relation to their own developments, others may be in a position to sell mitigation credits to offset nutrient pollution from new housing or other developments. Where nutrients in wastewater from such sites threaten nutrient neutrality, a farm in the catchment area might, for example, agree to the long-term removal of pigs from their land as a mitigation measure.[130] Whole farms may also be bought by local authorities with a view to ceasing intensive agriculture and selling nitrogen and phosphorous nutrient credits as part of nutrient mitigation schemes.[131]

'Water neutrality' is also a planning law constraint which may affect development on farms and by the water-thirsty wider food sector. Where abstraction from surface or groundwaters by a proposed development risks having a significant effect on a protected biodiversity site, it can receive planning permission only if water neutrality is demonstrated (i.e. that use of water in the area is the same or lower after the development as it was before it).[132] While this is one tool or solution for addressing the pollution impacts of reduced water quantity, others are discussed in section 5.1.4 below, which addresses water overuse as a broader food system problem.

Pollution from pesticides may be prevented systemically via pesticide use reduction targets, pesticide taxes, or via bans on synthetic pesticides by organic certification. Take-up of the organic farming system can either be left to the market, with farmers and consumers in principle able to choose organic via labelling. Alternatively, it can be encouraged by the state via national targets for the proportion of land under organic management accompanied by supportive farm transition subsidies, or via public procurement percentage organic requirements.[133] Where pesticides are used, diffuse pollution drift is, again, typically controlled via land management rules governing how and when pesticides are applied.[134]

Although much of the pollution from food processors and food and drinks manufacturers is point source-based, controlled by environmental permitting, these non-farming parts of the food system can also give rise to diffuse pollution. While often framed in policy terms as 'litter', environmental groups

have sought to reframe waste food and drink packaging discarded into the environment as 'pollution', with major manufacturers such as Coca-Cola, McDonald's and PepsiCo identified as among the worst polluters.[135] The solutions to this problem include product standards requiring tethered lids on bottles[136] and, more systemically, the introduction of deposit return schemes. This issue is discussed further below in section 5.1.5 on packaging.

5.1.4 Resource overuse

Resource overuse as a food system environmental sustainability problem relates to the overuse of natural resources such as land, water, and fish stocks, leading to negative impacts on biodiversity and food supply. With increased droughts associated with climate change affecting water supply, and with the population density in the south of England leading to unbalanced demand, water as a resource is under pressure in the UK. This has environmental sustainability implications in terms of pollution and biodiversity because excessive abstraction of water leads, for example, to greater concentrations of pollutants in rivers. There are also economic and social sustainability issues around water security.

A food systems approach is, again, important here. With water for example, looking at a food company's water use in its operational facilities needs to be accompanied by an examination of water use in its supply chain, because water use in farming typically makes up a large proportion of the food and drink sector's water footprint.[137] Farms too need to consider water use in their supply chain and not just on-farm use.[138] While corporate water risk assessments, reduction targets and water use sustainability reporting are key tools for addressing the problem, these need to include supply chains and not just own operations. In 2023, only 6% of respondents in the global agri-food sector had supply chain targets for water.[139] Other tools for addressing water resource scarcity in the UK include abstraction licences,[140] spray irrigation limits,[141] drought orders,[142] subsidies to fund precision irrigation equipment,[143] and informational approaches including farmer advice, and consumer labelling.[144]

Biodiverse land is also a scarce natural resource. In the UK, enclosed farmland makes up 52% of land cover.[145] Intensively farmed agricultural land is typically poor in terms of its levels of biodiversity, with farmland birds in particular having suffered a marked decline in numbers since the 1970s.[146] But moving to greater extensification of agriculture, with lower yields per hectare than intensive systems, may mean that there is then greater pressure, either within the UK or abroad, to convert highly biodiverse wild land to agriculture.[147] The debate here is typically framed in terms of 'land sparing' versus 'land sharing', with the former preferring intensive production so as to allow existing wild land areas not to be encroached on, and the latter preferring to make agriculture more environmentally sustainable and existing agricultural land more biodiverse.[148] To avoid yield and encroachment issues, advocates of the latter, land sharing, approach argue for relevant side-policies including reductions in levels of meat consumption in the national diet, and reductions in food waste.[149]

A key tool to stop encroachment of agriculture onto biodiverse sites is environmental impact assessment under the EIA (Agriculture) Regulations.[150] These require a farmer wanting to cultivate previously uncultivated land or semi-natural areas to seek a prior screening opinion from Natural England; depending on the outcome of that, a full consent process may be required.[151] Informational instruments may also be directed at land use and water use – the IGD draft ecolabel methodology includes both of these.[152]

Fish stocks are also typically framed as a natural resource. In UK coastal waters, there is a long history of overfishing which has led to their depletion, with various species having been at risk in different time periods. On one level, the answer to the questions of what and who causes pressures on fish stocks

is straightforward – it is overfishing by fishers. However, in broader terms, the cause can be traced to fish being a limited common-pool resource, with a collective action problem where fishers each have an incentive to increase their catch rather than maintain a sustainable fishery. Regulatory tools are therefore needed to address this. Under the UK Fisheries Act 2020, these include licensing rules (required for foreign access),[153] catch quotas (setting maximum fish quantities),[154] and effort quotas (controlling the number of days at sea).[155]

5.1.5 Packaging

Food packaging plays an important role in relation to transport, as well as food product longevity and safety, which can help to prevent food waste.[156] However, the amount of packaging, the materials it is made from, and its effects on the environment also make it an environmental sustainability food system problem. Because of the large volumes involved, much of which does not get properly recycled or even properly disposed of, there is a major litter and pollution problem caused by packaging, on land and in the ocean and inland waters. Where the packaging is plastic, this can degrade and become microplastic pollution. When packaging is properly consigned to the waste management system, it may be recycled, or it may end up being incinerated or placed in landfill. Landfill is seen as a waste of the original resources used in packaging. Incineration in the form of energy from waste plants may recover some value, but at the cost of combustion emissions, including CO2. Recycling the materials keeps more of the value, but the recycling process often involves degradation of the material, making it suitable only for use in lesser products. Where the material can be used again in the same product, there are only so many times that this can be done before the recyclate eventually deteriorates and requires more virgin material.

Looking at who in the food system is responsible for the problem, the highest profile actors are the hospitality and food service sector (particularly in relation to packaging from take-aways) and supermarkets. However, there are also other food system actors involved in creating and solving packaging's environmental sustainability problem, including packaging manufacturers, farm suppliers, wholesalers and other non-supermarket food and drink retailers, and the waste management sector.

In considering what causes the packaging waste problem, part of this is about some of the aspects adverted to above such as the material packaging is made from and the need to make food transportable and long-lasting. Poor product design can also be a factor, with lids previously not tethered to bottles for example. But the environmental sustainability problems caused by packaging are as much, if not more, about the single use nature of much packaging and the infrastructure that has developed around this.

Packaging recycling targets are a key tool for tackling the problem. The EU Packaging and Packaging Waste Regulation (PPWR) 2025/40[157] contains a number of targets for packaging waste including e.g. for minimum recycled content in plastic packaging.[158] In the UK, targets to recycle a percentage of particular packaging materials (glass, paper, plastic etc) are set for producers as part of the 'extended producer responsibility' for packaging (pEPR) regime which, as the name suggests, involve producers taking full responsibility for the lifecycle of their product beyond just its sale. Under the UK regime, packaging producers have obligations to recycle a target percentage of packaging waste in a relevant year.[159] The pEPR regime includes, but is not limited to, the food sector. However, there are also sector-specific examples like the voluntary Courtauld 2012–2015 packaging targets for the hospitality and food service sector.[160]

Economic incentives on both producers and consumers can also be applied to packaging. In England, there is a packaging charge designed to deter consumers from using single use carrier bags.[161] On the producer side, a Plastic Packaging Tax was introduced to incentivise companies to use recycled plastic in plastic packaging rather than virgin materials.[162] The UK pEPR regime introduced a waste fee on

producers requiring them to pay the full costs of household packaging waste disposal, with modulated fees from 2026 to incentivise use of recyclable materials.[163] Consumers can also be aided by labelling, which may serve two purposes: labelling on the qualities of the packaging such as, for example, its recycled content, may attract consumers to purchase an item in the first place; labelling (such as 'recyclable' and 'biodegradable') may also spell out what can be done with the packaging after use.[164]

Solutions to the problem of systemic single use dominance come in the shape of deposit return schemes (DRS), where consumers pay a deposit for their packaging container which is then reimbursed when they return it. Such systems can be used as a form of economic incentive to encourage greater *recycling* (particularly with out of home drinks, where containers tend to end up not being recycled). When used for that purpose, they do not address the single use model. However, they can also be used as part of *reuse* systems where the relevant containers are washed and reused. The Conservative UK Government was aiming to launch a recycling- rather than reuse-based DRS by 2027, having relied on the UK Internal Market Act to prevent Scotland's own, earlier, scheme.[165] The Labour Government has announced its intention to bring such a scheme into force in England and Northern Ireland by October 2027.[166]

5.1.6 Biodiversity loss

There is, in practice, an overlap between pollution as a food system problem and biodiversity loss as a problem. That is because such loss often stems from pollution, although there are other causes beyond this including non-pollution-related habitat loss (past removal of farmland hedgerows for example).

The actors responsible for causing biodiversity loss include farmers, agrochemical companies, supermarkets, lenders and investors. One of the causes of the problem is land use conversion from high trophic wild or semi-wild areas to intensive agricultural land, and in twentieth century changes in agricultural practices to monocrops, larger field sizes, and a greater dependence on polluting synthetic pesticides and inorganic fertilisers.[167] Although tracing a direct causal link between pesticides and wide-scale biodiversity loss is not straightforward, pesticides increase the risk of such loss along with other drivers such as land use change, and climate change;[168] and there is recent research showing that pesticides have, for example, caused a reduction in bumble bee colonies.[169] Inorganic fertilisers, along with manure and slurry, have often caused nutrient overload on neighbouring land and in rivers, which has harmed the existing ecology.

Tools for addressing biodiversity loss include nature restoration targets,[170] nutrient reduction targets,[171] pesticide use reduction targets[172] and national land under organic management targets. Meat reduction targets have also been argued for on biodiversity grounds. The *National Food Strategy* for example suggested a 30% meat reduction by 2032 as being necessary not only for carbon budget reasons, but also to meet the UK's '30x30 nature commitment'.[173]

To ensure that biodiversity targets are met, many of the relevant tools will be familiar from the earlier pollution section, including pesticide taxes, synthetic pesticide bans (under organic certification), land use controls (e.g. nitrate vulnerable zones and other land management rules), innovation funding to encourage better nutrient application, and ELM subsidy schemes. To receive payments under the English ELM schemes, farmers must, among other things, meet a hedgerows standard for example.[174] Sustainable public procurement can also be used as a tool here. Section 40 of the Natural Environment and Rural Communities Act 2006[175] imposes a duty on public authorities in England to consider what action it can take to further the conservation and enhancement of biodiversity in England, and government guidance on the duty mentions procurement of goods and services among the functions where the duty could be relevant.[176]

Informational instruments may also play a role in relation to biodiversity loss. The LEAF certification and labelling scheme, for example, requires farmers to be 'carefully managing their hedgerows to provide a variety of habitats and food sources for wildlife, implementing a plan to create and enhance habitats to increase biodiversity [and] leaving a strip of land between hedgerows and crops to act as habitat for wildlife.'[177] As with pollution, farmer education, training and advice on biodiversity are also important.

Tools that are more unique to biodiversity loss include conservation covenants and biodiversity net gain offsite unit payments. Conservation covenants, introduced by Part 7 of the Environment Act 2021, are agreements, with a conservation and a public good purpose, between landowners[178] and responsible bodies such as local authorities, and other public bodies, charities and private companies with at least some conservation remit. In the case of farmer landowners, this might include, for example, agreeing not to use certain pesticides on native flora, or to conserve habitat for rare species.[179] While voluntary to enter into, covenants are legally binding in nature and may also bind future landowners.

Biodiversity net gain (BNG) was introduced as an instrument of planning law by amendments made to Schedule 7A of the Town and Country Planning Act 1990.[180] The Act places a legal duty on relevant developers to ensure that the development leads to a net gain in biodiversity of 10% or more. There is a biodiversity gain hierarchy, and developers are expected to prioritise on-site improvements where possible. However, where this is not feasible, they can buy off-site units. In a similar way to nutrient mitigation credits discussed above in section 5.1.3 on pollution, farmers seeking diversification of income-streams may be among the landowners providing such off-site units for a fee.[181]

There is an overlap between BNG and conservation covenants in that offsite BNG land has to be subject to a long-term binding agreement, either in the form of a conservation covenant or under a section 106 planning agreement.[182] BNG as a regulatory instrument is, in effect, a form of planning law-mandated, private sector, biodiversity subsidy to farmers and other landowners. The extent to which BNG is an effective tool for addressing agricultural biodiversity loss is questionable. It is designed as a form of what one might call 'offsetting +' (10%) for biodiversity loss arising from the development of predominantly non-agricultural land. Although offsite BNG units offered to the BNG market by farmers will necessarily improve biodiversity of the relevant farmland unit, given the biodiversity losses caused by the original development, the farmland units will typically only help to improve biodiversity nationally by 10%.

The comparative incentives provided by ELMs, BNG, and voluntary 'credit' markets[183] will need careful attention from policymakers to ensure that biodiversity targets are being achieved.

5.1.7 Soil health

Poor soil health as a food system problem is included separately here because it is, in many ways, a combination of a pollution problem and a problem of biodiversity loss. There are areas where soils have been polluted by excessive and repeated pesticide applications and/or nutrient overload. Because the soil is itself an important ecological system, this soil pollution, in degrading soil health, can also be seen as having caused biodiversity loss. In that respect, asking the question of who has caused the problem leads to the same answer as for biodiversity loss above – farmers and agrochemical companies and those supporting them.

What causes poor soil health? The answer here is similar to that for biodiversity. Soil quality can be impacted negatively by farm practices such as tillage (as opposed to low or no-till),[184] monocropping (as opposed to crop rotation),[185] and leaving fields bare or fallow (as opposed to using cover crops).[186] Soil health can also be harmed by pesticides,[187] and fertilisers.[188] Soil erosion, including via run-off from

rainfall,[189] and soil loss due to crop harvesting,[190] can also affect soil health. These individual pressures may, together, produce a greater cumulative harm.[191]

Tools to tackle the food system problem of poor soil health include targets on soil. The UK 25 Year Environment Plan, for example, contains a rather ill-defined target for "all of England's soils to be managed sustainably" by 2030, with a plan to use "natural capital thinking to develop appropriate soil metrics and management approaches."[192] The EU Soil Monitoring Law (SML)[193] contains a target to achieve healthy soils by 2050, with healthy soils defined in terms of good chemical, biological and physical condition.[194] However, there is no legal duty imposed on Member States to substantively achieve such a target – the SML is, instead, procedurally oriented, requiring them to report on measures taken to improve soil health.[195] Given the diversity of soil types and uses, that probably makes sense,[196] and also helps to explain the ill-defined nature of the UK soils target.

There is a range of tools and instruments to help achieve healthy soil targets including subsidies and certification and labelling. Under the Sustainable Farming Incentive (SFI) ELM scheme, farmers can receive subsidy payments to complete a soil assessment, produce a soil management plan, and test soil organic matter.[197] Organic and regenerative agriculture and their associated certification and labelling systems are also centred around soil health. Regenerative practices, for example, typically involve no or low tillage, cover crops, and herbal leys, which are considered beneficial for soils.[198] Although organic standards ban inorganic fertilisers and almost all synthetic pesticides, regenerative standards vary. While there are some that are both regenerative and organic,[199] others allow the use of conventional pesticides and fertilisers.[200] Alternative forms of sustainable farming certification and labelling such as the LEAF marque also specify good farming practices to promote soil health, notably "(u)sing crop rotations to keep the soil in good health" and the rather undefined "(u)sing plant protection products and fertilisers only when absolutely necessary".[201] Reporting on soil health is also important as a tool, not only at a state level, but also at farm level.

Other tools include pesticide reduction targets, national land under organic management targets, and fertiliser product standards. Where the latter product standards are inclusive of organic fertilisers, as seen in the climate section earlier, these can help to build the competitive position of such fertilisers, which are often beneficial to soil health.[202] Finally, tools for tackling soil loss due to crop harvesting could include supply side controls such as quotas on the amount of acreage allowed for notable soil harming/removing crops like sugar beet,[203] although without accompanying attention to import tariffs, there is a risk that this would simply lead to substitution by imports and offshoring environmental impacts.[204]

5.1.8 Animal welfare

In considering who is the cause of animal welfare as a food system problem, the actors most directly involved are farmers and meat processors, but others in the value chain including supermarkets, butchers and consumers also have a role.

The question of what causes animal welfare problems is a complex one. Diagnostically framing[205] the problem in isolation as one of 'animal welfare' may lead to a focus on a narrow set of prognostic solutions like command-and-control standards on cage/pen size and pre-slaughter stunning. However, higher animal welfare is likely to come through adopting extensive rather than intensive animal farming systems, with animals on the land rather than indoors. That *wider* prognostic solution may nevertheless lead to trade-offs with other environmental sustainability food system problems like water pollution and greenhouse gas emissions. The *widest* prognostic solution is thus to combine extensification with a reduction in the numbers of farmed animals. That reduction avoids those trade-offs while, it is claimed, achieving the highest animal welfare.

On a narrower welfare framing, beyond the command-and-control ones mentioned above directed to farmers and meat processors on the supply side, labelling can also be used as a demand-side informational instrument to signal to consumers that food has been produced in accordance with high animal welfare standards. The UK Red Tractor, free-range, and RSPCA Assured labels all have that aim.[206] Also on the demand side, there is sustainable public procurement as a tool, where the government sets contractual conditions for public authorities buying food products and catering services. The relevant Government Buying Standards for Food and Catering Services (GBSF) set a rather low bar, requiring only that "(a)ll food served must be produced in a way that meets UK legislative standards for animal welfare, or equivalent standards", and for eggs, that they must be sourced from systems using enriched cages as a minimum.[207] These are mandatory standards; the guidelines set no specific, higher 'best practice' standards for animal welfare.

Tools to achieve the widest transition (with synergies for other food system problems like climate change, biodiversity, and human health) include economy-wide meat and dairy reduction targets, accompanied by policies like reducing or eliminating subsidies on meat production and the marketing of meat, and imposing marketing controls to limit or ban meat advertising.

5.2 Sustainability (economic/social)

Section 5.1 above focused on the environmental sustainability of food systems. However, given the wider definition of sustainability discussed earlier, it is now necessary to turn to the social and economic aspects of food system sustainability.

This section examines a range of food system problems associated with social and economic sustainability, including affordability of and access to healthy and sustainable diets, wage levels, farm profitability, and equality, diversity and inclusion (EDI). Together, they could also be framed as issues of distributional justice within the food system.

As the Eat-*Lancet* Commission has observed, there are two 'end-points' of the global food system which impact human health and *environmental* sustainability: production (sustainable food production) and final consumption (healthy diets).[208] Layering *social and economic* sustainability onto this makes matters more complicated. As seen earlier, the end point of a healthy diet might itself be considered a matter of social sustainability. But looking at HSD through a diet lens would lead to a focus only on the social and economic sustainability issues confronting the final consumer, notably the affordability of and access to HSD food. However, a food systems approach is concerned with the social and economic sustainability of the whole food system, including the production stage – hence the relevance of further issues such as food sector wages, farm profitability and EDI. Looking at one in isolation is not advisable because policy makers might, for example, aim to make HSD food cheap for the final consumer, but that could come at the cost of a fair economic deal for farmers and food sector workers.

Finally, in examining social sustainability issues of economic and physical access to HSD, it is important to bear in mind disabilities as part of this, because those with mental or physical health problems, including digestive disorders, may face unique access issues.

5.2.1 Economic access/affordability (of HSD foods)

An ideal food system, from a social sustainability perspective, would ensure that everybody can afford healthy food produced in an environmentally and climate friendly way. This can also be seen through the lens of environmental food justice: it should not be the case that only the well-off can afford to buy food that is both nutritious and environmentally sustainable.

Affordability is a key determinant of food choices, especially for consumers on low incomes.[209] There is research suggesting that, in the UK, eating a healthy and sustainable diet is at least *as* affordable,[210] and can be *more* affordable than typical current diets.[211] Red meat for example – which, in quantity, is unhealthy and is also associated with high GHG emissions – is also expensive relative to alternative, healthier and more sustainable protein sources. However, the affordability picture depends considerably on the data used in making comparisons.[212] Thus, for *healthy* diets, if one looks at the relative costs, not between current diets and healthy diets, but between rock-bottom calorific survival diets and healthy diets, the picture becomes starker. Recent research estimates that, globally, a healthy diet is five times more expensive than a 'conventional' unhealthy diet that just meets basic calorie/energy requirements.[213] Next, if, data-wise, one looks instead at the percentage of disposable income that purchasing a healthy diet uses, then the picture may also look very different, because healthy food choices represent a greater proportion of expenditure in low-income households.[214] If one sticks to the relative costs of foods, neither are all *environmentally* sustainable food choices more affordable within the current system. While lower GHG emission food may often be cheaper, lower polluting organic food, or high animal welfare food, is typically more expensive because producers are meeting voluntary standards which carry costs not faced by their competitors (who continue to externalise pollution and animal welfare costs onto others).

Agrochemical companies, farmers, distribution and transport, retailers, the hospitality and food service sector are all actors in the food system who bear the costs that affect the affordability of healthy and sustainable foods. However, government also has a role to play in affordability because there are two sides to the affordability coin: there is the cost of HSD food, but there is also the ability to pay for it. Government has a role to play on the latter in helping to create an economy with high levels of employment in well-paying jobs, and in ensuring, for example, that welfare payments and minimum/living wage rates keep up with the cost of an HSD basket of foods. These are all important causal factors on the ability to pay side.

What causes the affordability problem on the cost side depends on a number of factors. There has been considerable food price inflation in recent years. Farmers and manufacturers have seen cost increases due to higher input costs (e.g. seeds, fertiliser, energy prices, ingredients, packaging) driven by the post-pandemic demand surge and the war in Ukraine. Physical climate risks in the form of heatwaves, drought, floods and extended wet periods are also adding to price rises by disrupting supply.

While inflation has affected all food, unhealthy and healthy – with prices from late 2021 to 2023 increasing by 22% – the relative increases were highest for less healthy food (26%) and lower for fruit and vegetables (which increased in price by 16%).[215] However, as Hoenink and others go on to point out, although healthier food like fruit and veg experienced lower relative price increases in this way, healthy foods "had a greater absolute price increase and remained more expensive, potentially exacerbating dietary inequalities."[216]

In terms of tools or solutions to affordability as a food system problem, existing research suggests that policy levers need to take not only a population level view, but also one that also looks at existing food types consumed by different income groups. What amounts to a HSD is likely to differ between such groups based on where they are starting from.[217] With that initial caveat in mind, regulatory tools include, on the cost side, subsidies for farmers producing HSD foods such as regeneratively grown fruit and veg and, on the ability to pay side, welfare subsidies targeted at healthier and greener food choices or more general measures such as increases in the minimum/living wage.

5.2.2 Physical access (to HSD foods)

For effective access to HSD foods to exist, there has to be both economic accessibility, considered in the previous section, and physical accessibility. In other words, both the affordability of and the proximity to HSD foods are important.[218] Although this section focuses on physical spaces, online food environments also increasingly need to be considered for the opportunities and challenges these bring in terms of HSD access.[219]

Particularly severe physical access problems are often framed in the language of 'food deserts' and 'food swamps'.[220] Food deserts designate geographic areas, especially in disadvantaged neighbourhoods, with limited physical access to healthy food. People in such areas are typically economically unable to travel to alternative localities with better, healthy food provision and therefore end up dependent on local convenience stores or fast-food restaurants offering less healthy options.[221] Food swamps refer to areas which enjoy reasonable healthy food provision in local food shops, but where those options are drowned out by an over-abundance of low quality outlets.[222] While food deserts and swamps are normally defined in terms of *healthy* community food environments,[223] one could also add in the *environmentally* sustainable food choices as part of the relevant definitions because people living in disadvantaged neighbourhoods ought to be able to access HSD, and not only HD food.

Retailers, including supermarkets and local authorities (especially regarding land use planning), are key actors in determining local access to HSD foods, as are alternative food networks, social enterprises such as community food markets, and other types of community food projects. What causes physical access problems is complex, and while it may include planning barriers, there may also be an issue of store profitability given the economically disadvantaged nature of the relevant areas.

There is a separate causal question of whether solving physical access and availability problems leads to better dietary outcomes, with existing research evidence inconclusive on this.[224] In any event, policy tools to improve physical access include targeted HSD demand-side subsidies for consumers in relevant stores or supply-side subsidies aimed at stores themselves to lower establishment costs.[225] Similar supply-side subsidies or grants can also be directed at stimulating alternative food providers such as community food projects.[226] While those policy levers are addressed to economic barriers to better physical HSD provision, planning law can also play a role in relation to spatial access. This not only includes using planning law to encourage more HSD shops into an area, but also – more targeted at the swamps problem – using it to exclude an over-supply of non-HSD outlets, particularly near schools.[227] Planning policy can, in addition, make better provision for community gardens and allotments so that residents can grow their own or access community-grown HSD produce.[228] Education on HSD provision addressed to the local community, local government, retailers and restaurants in relevant areas may also be a useful tool in helping to alleviate both desert and swamp problems.[229] Finally, it is worth noting that food access problems are not all solvable via the food system and may require changes to other systems such as transport.

5.2.3 Farm profitability, food worker income, and EDI

Farm profitability is a perennial worry for many farmers, compounded both by the increasing physical risks of climate change to profitability from prolonged wet weather, floods and droughts, and the costs they face in transitioning to more environmentally sustainable farming practices designed to help mitigate those risks. *Perceptions* of profitability are also important in shaping conservation action on farms.[230]

The very wet first half of 2024 in the UK provides a good illustration of the effects of physical climate risk on farm profitability, with increased rainfall a feature of rising global temperatures as a result of anthropogenic GHG emissions. In 2024, this extended period of wet weather was forecast to lead to a decrease in the net margin of an average arable farm to £80/ha, which was £119/ha lower than in 2023 (also a difficult year) and 82% lower than in 2021.[231] Regulatory tools to address these threats to profitability from climate risks include adaptation funding for farmers, which is provided for in the UK principally through the new ELM schemes,[232] and also innovation grants for those involved in providing agriculture with more resilient inputs and technology.[233]

As for sustainable agriculture transition risk and opportunity, US research shows that farmers can expect a 15–25% return on investment by transitioning from conventional agriculture to a regenerative approach.[234] However, although there is a positive medium- to long-term business case, with profitability well above conventional farming practices, there are short-term risks associated with the three-to-five-year transition period, including initial decreased crop yields and capital expenditure on equipment.[235] These risks call for financial and technical regulatory solutions, including cost share and lending programmes, subsidies, ecosystem service markets, favourable insurance terms, price premiums, sustainable leases, and regenerative crop warranties.[236]

Profitability also depends on farmers paying fair prices for their inputs and equipment and being paid fair prices by those they are selling their produce to. Working out what amounts to a fair share across the food system value chain – including farmers, their suppliers, food workers, wholesalers, supermarkets and final consumers – is complex. Nevertheless, research shows that UK farmers typically receive less than one percent of the profits when supplying supermarkets.[237]

Because this is in large part due to unequal bargaining power, relevant policy levers involve those used to combat unfair trading practices (UTP).[238] These include the provisions on transparency and fairness in Part 3 of the Agriculture Act 2020.[239] Informational instruments here in the form of transparent reporting of data – both by large businesses across the whole food system and by the government in its annual reporting[240] – are key, so that it becomes apparent who is making an excessive profit and who is making an unsustainably small one. Other tools include grants and subsidies to help increase public investment in local agri-food infrastructure and to encourage values-led supply chains in the form of, for example, not-for-profit wholesalers.[241]

The pandemic helped to underline how employees in the food industry suffer from low pay, with the Institute for Fiscal Studies (IFS) identifying that 71% of key workers in the food sector were earning £10 an hour or less in 2020.[242] In 2023, low pay was around three times higher in the food sector than in the wider economy, and a quarter of workers in the sector experienced food insecurity.[243] This is, again, in part due to unequal bargaining power, and also wider labour market supply and demand factors. Policy solutions to address low pay as a food system problem include raising the level of the national minimum wage or, for those over 21, living wage. The transparency measures mentioned above can also be used for food sector pay, which might include, for example, the reporting of wage differentials within food companies.[244]

On the demand side, public procurement is a "mechanism by which governments can leverage corporate responsibility for labour standards",[245] aiding farmers and food workers with alternative, fairly paid prices,[246] and helping to eradicate modern slavery from supply chains.[247] Labelling is another instrument, with Fairtrade labels helping to ensure that farmers and workers receive fair payment for their produce.

The issue of fair worker pay intersects closely with Equality, Diversity and Inclusion (EDI) as a food system problem, which also looks at broader questions such as discrimination and the diverse representativeness of the workplace across protected characteristics including race, sex, disability, age, and sexual orientation as well as the ways in which the work environment helps to make people feel supported and included. EDI is often discussed in the context of corporate environmental social and governance (ESG) as a policy field, with EDI coming under S for social. There are therefore clear parallels between ESG and sustainability in its broad form, which similarly includes social sustainability issues like EDI.

The food industry has acknowledged that the level of diversity in the food and grocery sector is below the UK's wider industry average, including for example "female representation at board and executive committee level and LGBTQ+ representation."[248] Solutions include voluntary industry approaches such as GroceryAid's Diversity and Inclusion in Grocery (DIG) programme, as well as, again, informational instruments like transparency and reporting discussed above for low pay.[249] In some cases – e.g. on the gender pay gap and the recruitment and employment of people with disabilities – reporting is mandatory for large businesses.[250] In other instances (e.g. ethnicity pay reporting), it is currently voluntary.[251] Public procurement can also help to foster good EDI practice. The Government Buying Standards for Food and Catering Services (GBSF), for example, require catering contractors or food suppliers to have a written equality and diversity policy.[252]

5.3 Health

Both over-consumption and under-consumption of certain foods can lead to complex health issues and require intervention. Recommended changes in food consumption habits to healthy and sustainable diets are likely to yield a range of health benefits, including reducing the incidence of diseases associated with obesity such as type 2 diabetes. Many of the foods that are not healthy are also not environmentally sustainable. Over-consumption of red meat, for example, not only increases the risk of cancer, but is also a cause of methane emissions due to the ruminant digestive systems of cows and sheep. Thus, a holistic approach that tackles food production and consumption patterns that promote poor dietary health can also lead to positive environmental outcomes.

In addition, increasing the supply of healthier foods that are under-consumed may lead to a reduction in prices, which is an important part of making them accessible and appealing to consumers. Affordability of healthy food often remains a major roadblock in changing diets, especially because unhealthy food has, since the latter part of the 20th century, been relatively cheap.

5.3.1 Over consumption of meat, and processed meat products

Over-consumption of meat and notably red meat has been linked to numerous health and environmental problems. From a health perspective, over-consumption of some types of red meats as well as processed meats can increase the risk of cardiovascular diseases.[253] Another negative health outcome is cancer. Studies have shown a correlation between consumption of processed meat and colorectal cancer.[254] Over-consumption of red meat may also lead to other health issues including type 2 diabetes, and kidney disease.[255]

The over-consumption of red and processed meat is the result of a complex web of causes, which includes consumer demand and preferences, but also food production patterns. Richer countries tend to have increased consumption of meat, milk and eggs, consuming more calories and proteins from these sources. But emerging economies have also grown their demand for meat.[256] In the last 50 years,

meat production (from poultry, pigs, cattle and other livestock) has increased significantly.[257] The global meat market was estimated to be worth $44.3 billion in 2023 and is forecast to reach $68.9 billion by 2028.[258] Historically, since the Industrial Revolution, meat consumption has accelerated because of changes to meat production, with mass production enabled by the development of refrigeration[259] and transport over long distances, as well as the development of meat packing centres.[260] The production of meat was further accelerated by moving to an intensive production model, powered in large part by globalisation and leading to lower prices, hence further driving up demand. Large corporations have played an important role in increasing the production of meat, but supply has also benefited greatly from government subsidies. In the EU for example, cattle producers are highly dependent on direct payments for at least 50% of their income.[261] These payments are deemed to have "incentivized farmers to maintain herd size, keep pasture in production, or increase the level of supported activity, potentially hindering climate-mitigation efforts".[262]

However, the above are not the only causes of an increase in meat consumption. It is also linked to changing lifestyles. Meat distribution is for example, facilitated by urbanisation, where fast food chains mean easy access to meat products. This is coupled with lifestyle changes in urbanized areas that give less time for meal preparation and hence reinforce the need for access to quick and convenient calorie intake. Meat is often the most prominent protein option in supermarkets and on restaurant (including fast food) menus.[263] The meat industry has also contributed to pushing meat products to consumers. It has spent vast sums on marketing meat as well as lobbying to preserve the status quo.[264] Meat consumption is also culturally underpinned by many holidays and religious festivals that revolve around eating it. Meat can be a status symbol in certain cultures, differentiating between richer and poorer populations, or may act as a symbol of masculinity.[265] As countries move out of economic poverty and become more developed, meat is often a proxy for wealth. Income is therefore an important determinant of meat consumption. However, more recent trends signal a shift. Research indicates that meat consumption can decrease with education, income and social class,[266] with gender also a factor.

A drop in UK meat consumption in 2022 may have been due more to price increases at the early stages of the cost of living crisis than to a change in consumer preferences.[267] Red meat was most affected, with consumers switching to cheaper meat products such as poultry, but avoiding meat substitutes that can sometimes be more expensive than meat products.[268] Consumers switching away from meat are driven in large part by cost and perceived health benefits,[269] although some worry that a plant-based diet may have negative health consequences.[270]

Solutions to reducing over-consumption of meat will need to focus on a range of tools to be effective, with action taken on both demand and supply side.[271] On the *demand* side, changes to dietary guidelines[272] to more explicitly direct consumers to reduce meat consumption may assist in reducing over-consumption. Currently the Eatwell Guide[273] places meat in the pink segment with beans, pulses, fish, egg, and other proteins. The guidance reads: "eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat." While recommended portions are indicated for fish, they are not for meat. To make good dietary choices, consumers need an understanding of the health risks associated with red and processed meat. Beyond dietary guidelines, there could therefore be mandatory warning labels on these meat products.[274] In experimental research, labelling that combined both health and environmental messaging performed better than separate health warnings.[275] Limitations on advertising of relevant meat products might also be used as a lever to try to reduce consumption. No such warnings or limitations exist in UK law at present.

Moving forward, there may also need to be changes on the production or *supply* side, as a shift in consumer demand alone is unlikely to change the trajectory of meat consumption. Supply side measures

might include meat reduction targets, which could then be coupled with taxation of meat products that reflect their health (or climate) cost, and subsidies for alternative proteins – both for R&D, and to provide support for transitioning to growing crops for plant-based meat substitutes.

Tools such as target setting by government and corporate targets and reporting can help re-orient meat production and consumption. For example, in the Netherlands supermarkets Albert Heijn, Aldi, Dirk, Ekoplaza, Jumbo and Lidl now report on their share of animal versus plant-based proteins and the main Dutch retailers have all set targets to reduce the sales of animal protein. These targets all meet or in some cases exceed the Ministry of Agriculture, Nature and Food Quality's target of 50/50 animal and plant-based protein sales by 2030.[276] In the UK, the Dimbleby *National Food Strategy* recommended a target of a 30% reduction in meat consumption, for climate and biodiversity rather than health reasons,[277] but the recommendation was not taken forward, leading to reports that Ministers had 'run scared' of targeting meat consumption.[278] The Strategy also floated the idea of a mandatory requirement imposed on large food businesses to report on their sale of protein by type and origin (meat, dairy, fish, alternative, etc), allowing investors, government and others to track if businesses were heading in the right direction.[279] While most UK supermarkets now report on protein food sales using the 'WWF Basket' methodology, only Aldi-GB has set a target – for plant-based proteins to account for 25% of its protein sales by 2030.[280]

Meat taxation can be a demand or supply-side measure. Taxation of red or processed meat products at the consumption level has been controversial and attracted push-back by the meat industry, which has a powerful lobby.[281] Yet, by raising prices, such a tax could help re-orient demand. Among the objections is the regressive financial impact given that low-income households eat proportionately more red and processed meat.[282] However, health risks are also unfairly distributed and low-income households would be able to switch to cheaper and healthier meat choices. While a tax on meat consumption may not be a good optic for politicians,[283] a more indirect supply-side tax on GHG emissions from livestock could be better received,[284] although this may not produce the same net effect in reducing red meat consumption levels.[285] Policy packaging could also help improve public opinion by presenting consumption-based meat taxes as a means to increase animal welfare, or to tackle farming practices that are harmful to the environment.[286]

Higher prices for meat compared to healthier alternative proteins can be a strong incentive to re-orient consumer choice. Supply-side innovation funding for protein alternatives to conventional meat sources, including for plant-based meat substitutes, and cultivated meat,[287] may help to bring their relative cost down. So too can support for farmers transitioning to growing plant-based protein crops. Currently, most funding, in the form of subsidies, is concentrated on incumbent meat systems (in part because of their active lobbying).[288] A reduction or elimination of subsidies to meat and dairy producers[289] may also be a viable tool therefore, whether in isolation, or alongside subsidies to producers of healthier alternatives, and subsidies for consumers to be able to access healthier products.

Other tools can be used to target the marketing and advertising of meat products to help curb their consumption. For example, banning meat advertising in public spaces has been rolled out in some towns in the Netherlands – a measure billed as contributing to reducing CO2 emissions,[290] although one that should also help drive health outcomes.

5.3.2 Over consumption of unhealthy HFSS foods (high in fat, sugar or salt)

Over consumption of unhealthy HFSS food is also a complex problem with multiple causes and routes to solutions. From a health perspective, HFSS foods are linked to many conditions, both separately

and together. It is an important problem in the UK – the largest consumer of processed food in Europe – with around half the calories consumed per person per day coming from ultra-processed food (UPF) which is often high in HFSS.[291] Over-consumption of food high in sugar is linked to obesity, type 2 diabetes, heart disease, liver disease and tooth decay.[292] In the UK, a majority of adults and children consume significantly over recommended maximum daily sugar consumption levels.[293] Similarly, high fat content (notably saturated fats) can raise cholesterol and increase the risk of heart disease.[294] Diets that are high in salt can trigger high blood pressure, increasing the risk of heart attacks and strokes,[295] and salted foods are also linked to stomach cancer,[296] kidney disease[297] and osteoporosis.[298] When the food consumed combines high sugar, fat and salt contents, the risks are exacerbated. HFSS foods can lead to health complications due to the high calorie intake that results from their consumption (leading to weight gain, obesity and heart problems). Their poor nutritional value can also lead to deficiencies impacting overall health, including malnutrition.[299]

Production is an important factor behind the over-consumption of HFSS food. For example, the production of sugar in the UK is roughly equivalent in hectares to vegetable production.[300] Alongside costs to health, it also has a major environmental cost because of the rapid erosion of UK soil associated with harvesting.[301] Yet production of sugar is forecast to increase, with British Sugar, the monopoly controlling production in the UK, reported in 2019 as planning to increase its current annual production output by 50%.[302] Where production is increased, there is an incentive to promote products made with sugar, which is also likely to make them more affordable, thereby further encouraging their consumption. Indeed, the Dimbleby *National Food Strategy* noted that food companies were reluctant to stop investing in HFSS food for fear of losing their competitive edge, feeding a junk food cycle fuelled by demand from consumers who respond positively to calorie-dense food.[303]

These high levels of demand may be explained in part by another factor in the high consumption of HFSS foods, which is that there is some, albeit limited, evidence that they have addictive qualities,[304] making a switch to healthier options more difficult. Sugary foods are also culturally often associated with reward (especially but not only for children) and hence create eating patterns that are hard to break. But 'addiction' has also been driven by product formulation. The food industry has actively sought to develop highly attractive products and has spent large amounts on research and development to optimise HFSS food sales. Manufacturers have, for example, studied how people's perception of the crunch of HFSS food impacts consumption.[305]

Over-consumption is also driven by the way products are marketed and advertised by manufacturers, with large budgets devoted to promoting unhealthy food in media outlets, sports competitions, and other big events. According to the Food Foundation, 1/3rd of advertising spend goes on the promotion of confectionary, snacks, desserts, and soft drinks, compared to just 1% on fruit and veg. And 1/3rd of multibuy deals are on HFSS food and drink (compared to only 4.5% on fruit and veg).[306] The way unhealthy food is marketed in retail likewise plays a part.[307] In 2019, food and drinks that contribute to high child sugar and calorie intake occupied 70% of the prominent areas of supermarkets; and 89.5% of products on display at children's eye level in UK supermarket were classed as unhealthy based on Food Standards Agency criteria.[308]

There are many potential tools that can be used to address the over-consumption of HFSS food. The Dimbleby *National Food Strategy* made three key recommendations concerning HFSS food: the introduction of sugar and salt reformulation taxes with redistribution of revenue to help low-income families to buy fresh fruits and vegetables; education in schools; and the introduction of mandatory reporting on HFSS for large food companies.[309]

Information tools are often the go-to, outsourcing to consumers the duty to be informed and understand labels to make the right food choices. However, information is an imperfect instrument. It often has little effect on consumption patterns where consumers are not able to find viable alternatives or change ingrained behaviour patterns. It is also very difficult for consumers to be able to read information on product formulation and to be able to compare ingredients lists and items on them like additives without adequate knowledge and understanding of food. In that respect, some of the traffic light labelling on products has been of some use, but even that on its own cannot change demand-side consumption.

The growth of convenience food – that tends to be higher in calories, saturated fats, salt, and sugar – over meals prepared from scratch is also a causal factor behind the high HFSS intakes. Interventions focussed around children's food education are needed to enable the next generation to make better food choices.[310] The *National Food Strategy* also recommended trialling a 'Community Eatwell' programme modelled on a US programme, where GPs can prescribe food vouchers for fruit and vegetables along with food-related education and social support (including cooking lessons) to assist those with poor diets or suffering from food insecurity.[311]

Other measures that could be used to tackle HFSS as a food system problem include targets for reductions in HFSS food, and changes in governance arrangements.[312] The *National Food Strategy* proposed creating a statutory target to improve diet-related health through a Good Food Bill and to expand the role of the Food Standards Agency to cover health and sustainable food as well as food safety.[313] Although the Strategy does not supply details on what targets might be included, they could for example build on those at international level, such as the agreement by WHO Member States to reduce global population salt intake by 30% by 2025.[314]

Restrictions targeting production[315] may also prove effective. For example, to reduce sugar consumption, it is possible to exercise some control over the supply side (e.g. via quotas) on how much sugar beet can be grown nationally,[316] which, if combined with import controls, may impact the price of sugar and hence contribute to raising the cost of sugary products. It is also possible to prescribe standards on what food can contain to protect health. This can include regulation around food formulation, such as banning or limiting ingredients used to make food more appealing.[317] A lighter form of intervention would include the introduction of mandatory reporting by large businesses (producers, manufacturers, wholesalers, etc) to track the sales of HFSS food and drink.[318]

However, the *National Food Strategy* makes clear that a rebalancing of the financial incentives within the food system is also necessary[319] and taxes can play a key role there. Taxation can be effective, not only as a revenue generating exercise where money can then be re-invested in prevention or cure,[320] but also to additionally raise the price of unhealthy food, hence re-directing consumer choice. Taxation can also be effective as a supply-side incentive to change the formulation of products to avoid the tax, hence driving health improvements. This was notably the case concerning the 'sugar tax' in the UK. The UK soft drinks industry levy[321] (although limited to the drinks sector and not covering juices or milk within it)[322] has led to "over 50% of manufacturers reducing the sugar content of drinks since it was announced in March 2016 – the equivalent of 45 million kg of sugar every year".[323] Research has found that the amount of sugar consumed by children from soft drinks in the UK reduced by around 25% after the introduction of the sugar tax in 2016.[324] Its impact on dental hygiene has also been linked to a 12% reduction in hospital admissions for tooth extractions in children,[325] which has led to calls to extend the levy to biscuits, cereals, cakes, yoghurts, milkshakes and sweets.[326]

Measures on marketing are also a necessary intervention, as the marketing and retail of HFSS food is intertwined with the reasons why consumers find it difficult to move away from those products. Supermarkets use several techniques to maximise sales. In the UK, rules that help in making HFSS food less prominent or attractive have been in place since 2021 via The Food (Promotion and Placement) (England) Regulations 2021.[327] However, while the restrictions on product location contained in the Regulations came into effect in 2022, its rules on volume pricing (including buy one get one free or BOGOF promotions) were delayed by the previous government until 2025.[328] Advertising of HFSS food is also an issue. There, the Labour Government has legislated to restrict advertising of HFSS food to children.[329]

5.3.3 Under-consumption of fruit and vegetables

Under-consumption of a particular food group can also be damaging to health. Fruit and vegetable consumption is highly beneficial to health. While the UK's 5-a-day campaign is well-known, only a third of adults meet that target. Despite that, OECD data shows the UK and Ireland apparently lead other countries in daily fruit and veg consumption.[330]

Increasing the amount of fruit and veg eaten has many health advantages. A diet high in them can reduce the risk of heart disease and stroke, reduce blood pressure, prevent some types of cancers, and reduce digestion problems.[331] Dietary patterns with high intakes of fruit and veg may also support weight loss.[332] And the Food Foundation claims that increasing consumption to target could add 8 months to life expectancy and decrease GHG emissions by around 8%.[333]

It is thus important to continue efforts in the promotion of fruit and veg-heavy diets alongside other measures to encourage increased consumption focused on improving access to and availability of this food group.

On the demand side, some initiatives already exist, notably in the form of the 5-a-day logo, which has several criteria to satisfy for a licence to use it.[334] Educational campaigns are also important for change. The Food Foundation, for example, has worked to increase veg consumption, rolling out a number of initiatives such as 'Peas Please' and the creation of the 'Veg Advocates'.[335] The *National Food Strategy*'s 'Eat and Learn'[336] proposal for schools – while broader than a focus on just increasing fruit and veg – would also likely contribute to this goal.

Increasing fruit and veg consumption is linked with acting on food inequality. Children living in the poorest areas are four times more likely to be severely obese when they arrive at primary school.[337] On this front, the *National Food Strategy* contains some recommendations for intervention which include extending eligibility for free school meals.[338] This, coupled with ensuring school meals feature a high level of fruit and vegetables, could help improve fruit and veg consumption. The existing School Food Standards currently recommend one or more portions of fruit and one or more portions of vegetables per day.[339] This could be increased, but perhaps as important is enforcement of the existing standards. In addition, acting on procurement standards such as the Government Buying Standards for Food and Catering Services (GBSF) would help bolster efforts to increase fruit and veg consumption. Currently the GBSF sets minimum mandatory standards and best practice voluntary standards including, regarding fruit, that e.g. half of desserts available should contain at least 50% of their weight as fruit.[340]

To improve access, it is possible to look into instruments such as subsidies and incentives on the demand side. A key driver in encouraging a switch would be to impose e.g. taxes on the consumption of unhealthy food and use the revenues to help low income families access fruit and veg.[341] The *National Food Strategy* also features the recommendation of a Community Eatwell programme which includes enabling GPs to prescribe fruit and veg vouchers to patients.[342] It further recommends expanding the Healthy Start Scheme which helps with access to healthy foods.[343]

To be effective, the increase in uptake of fruit and veg requires a holistic approach, with action on the supply side across a range of issues (including labour supply and wages) as part of a national horticultural strategy. In this regard, the Fruit and Vegetable Alliance (FVA) has emphasised the need for government to support the growth of a productive and sustainable horticulture sector to help increase UK fruit and veg production and thus consumption. According to the FVA:

> the UK produces 3.1 million tonnes of fruit and vegetables. To meet the potential demand if everyone were to follow public health advice and eat 7 portions per day, we would need 15.2 million tonnes, representing an almost fivefold increase in current production.[344]

The UK imports large amounts of fruit and veg, but there is a need to improve local production. The Sunak Government published the 'Blueprint to Grow the UK Fruit and Vegetable Sector' in May 2024,[345] which notes that:

> if we want to build our food security, we must go further in fruit, in which we only produce 17% of what we consume, and fresh vegetables at only 55%. This is significantly behind other products. Through this blueprint, we want to boost the domestic production of fruit and vegetables, increasing horticultural output to become more self-sufficient and bolster our food security.[346]

However, the brief blueprint is widely regarded as falling short of the necessary comprehensive horticultural strategy,[347] which the Government had promised but dropped.[348]

5.3.4 Under-consumption of fish, including oily fish

In 2004, the Scientific Advisory Committee on Nutrition (SACN) advised that the population should be encouraged to eat more fish, especially oily fish, recommending 2 portions of fish a week, of which one should be oily.[349] An increase in the consumption of oily fish to one portion a week (from levels of about a third of a portion) would confer significant public health benefits without appreciable risk from contaminants in fish.[350] Yet, a 2018 survey found that consumers' fish eating habits were still falling short of the recommended 2 portions. Despite the UK's persistent problem with low fish consumption, there has been little policy action to address this.[351]

Fish is an important source of nutrients such as zinc, vitamin D and long-chain omega-3 fatty acids.[352] Although levels of omega-3 in farmed salmon have been declining, the farmed version still contains more omega-3 than wild salmon.[353] Nevertheless, due to the decline, there may now be a need for more than one weekly portion to achieve the same intake.[354]

Eating fish has many health benefits, not least because it can replace less healthy food in the diet. Oily fish is particularly beneficial in terms of the cardio-vascular system, lowering the risk of heart disease.[355] As adverted to above, there is nevertheless a potential health risk-benefit trade-off: fish and shellfish can contain traces of pollutants including mercury and other heavy metals,[356] and thus to reduce long-term exposure, over-consumption is not advisable.

However, fish is often not a very sustainable food source,[357] which explains why the Eatwell Guide recommendations refer to 'sustainable' fish portions. Indeed, according to the FAO, only 62.3% of fishery stocks globally were operating at sustainable levels in 2021[358] – a decrease of 2.3% compared to 2019. Urgent action is needed to reverse declining sustainability trends, especially in light of increased demand and with aquatic animal production set to increase by 10% by 2032.[359] Fish farming (aquaculture) is set to overtake fisheries, with 111 million tonnes produced from aquaculture in 2032 versus 94 million tonnes from fisheries.[360]

To improve health outcomes while ensuring sustainable levels of fish are consumed requires policy action in line with the Blue Transformation vision launched by the FAO in 2021, aimed at maximising opportunities to enhance food security, improve nutrition and support delivery of the UN SDGs.[361] A range of demand- and supply-side interventions are needed.

On the demand side, education is a tool that can be used to help increase healthy fish consumption as part of a UK HSD transformation. The Marine Stewardship Council (MSC), for example, makes fish recipes available on its website, because knowing how to cook fish and seafood is important in helping consumers to eat more of it.[362] Another demand-side factor which may be contributing to the under-consumption of fish is its relatively low advertising share: according to the *National Food Strategy*, fish advertising amounts to only 2% of overall industry marketing spend, compared to 31% on HFSS, 6% on carbohydrates, and 5% on meat.[363] Tools to address this potential cause of under-consumption might include subsidies aimed at increasing that 2% figure.

Consumers may also be more tempted by fish if price and availability make it a feasible choice. Reports on the cost of living crisis suggest that a number of consumers switched away from fish on cost grounds.[364] Consumers' willingness to pay more for fish than meat is limited but depends on a range of factors including age, gender and health beliefs.[365] Reducing cost is likely to have a positive impact on consumption and could be achieved via, for example, subsidies to the fishing industry[366] or at the retail fishmonger level. Public procurement standards can also help to encourage availability via exposure to fish as a menu choice. The GBSF currently requires that, if catering is for lunch and dinner, then fish "is provided twice per week (2X 140g portion), one of which is oily." If only one meal is being served, then an oily fish (140g portion) must be "available at least once every three weeks."[367]

Another necessary factor for fish consumption is to have acquired a taste for it. One way of achieving that is to ensure that children are eating fish from an early age. Fulfilling that goal may, for example, be achieved by school meals having a regular fish option. However, the School Food Standards currently require only that oily fish is served "once or more every 3 weeks."[368] For adults to acquire a taste for fish later in life might involve imaginative government campaigns encouraging them to try it.[369]

On the supply side, health benefits need to be considered alongside sustainability because, unlike meat for example, where supplies have continued to grow (albeit unsustainably), fishery stocks have routinely been depleted via overfishing. Therefore, to ensure consumers can continue to enjoy the health benefits of fish, its exploitation as a resource needs to be sustainably managed to avoid supplies drying up.

Ending overfishing is thus crucial for securing those health benefits over the long term. The level of overfishing has increased in recent decades and is 3 times higher than it was in the 1970s.[370] Among the reasons for overfishing include increased consumption, climate change, illegal fishing and fishing subsidies. The latter have at times encouraged unsustainable fishing practices.[371] In addition to ensuring that subsidies are aligned with sustainability goals, the use of quotas can also play a role in preventing overfishing,[372] as can fishery certification standards. The Marine Stewardship Council (MSC) standard is a globally recognised benchmark for seafood sustainability that reflects the most up to date fisheries science and management information. MSC certification underpins the ecolabelling of fish – a demand-side tool designed to encourage consumers to choose more sustainable supplies.[373] While directed principally at environmental sustainability in terms of preservation of fish stocks, and also social sustainability via associated labour standards, MSC fish ecolabelling can also be considered a health measure, given that the health benefits of fish only arise if there are fish available to eat. Avoiding aquatic food loss and waste is also important in this regard as that also helps to preserve existing stocks.[374] Another tool is R&D funding for alternative proteins to fish, like algae substitutes that are similarly high in omega-3.

6. Tools for transforming the UK food systems to HSD

The sections above have considered a wide range of HSD-related food system problems as well as some of the key regulatory tools that can be used to address them. In this next section, the report turns to consider these tools in more detail, dividing them into a standard regulatory taxonomy of targets, command-and-control instruments, economic instruments, informational instruments, and voluntary instruments.

6.1 Targets

Targets as a tool can play an important role in the regulatory drive for delivering HSD. They are a key part of regulatory governance architecture across a range of policy areas including climate,[375] environment,[376] and food. Targets sit on a continuum alongside other future-directed planning tools like goals, aims and objectives.[377] While they all set out a desired end result, targets "are the most tightly drawn and concrete" of these.[378] A target will often be expressed as a numeric figure (whether an increase or a reduction) to be achieved by a certain date, relative to a baseline year.

Food targets can be found across a wide range of food system problems and may be directed at broader health aims or social and environmental sustainability aims. Insofar as they involve environmental sustainability, food system targets can be expected to intersect and help with the delivery of broader state climate[379] and environmental[380] targets.

The nature of relevant targets is important.[381] They may be non-binding policy targets or binding targets set out in law.[382] They may be absolute, or intensity-based. They may be urgent, with a short timeframe set for them to be achieved. They may be long term, but have interim targets along the way. And they may be more or less ambitious in terms of the level of improvement sought within the relevant timeframe. For policymakers, how targets are structured and the precise form they take will involve consideration of a number of values, including accountability, legal certainty, and flexibility.[383] A binding target, for example, may come with clear benefits in relation to the first two of these but perform less well on the third, flexibility. One might not want to set a binding target on the use of a particular carbon-reducing additive in cattle feed, for example, if other technologies are in the picture and may yet emerge as a more effective and less costly alternative.

As will be seen in section 6.2.4 below, there may be lobbying by industry to persuade governments to adopt only voluntary measures. That includes state targets as a regulatory or governance tool, just as much as the regulatory instruments (e.g. labelling, or food reformulation standards) designed to meet those targets.

Food waste targets are a good example of a target aimed at addressing a particular food system problem (food waste). The UN SDG 12.3 contains a numeric target of reducing food waste by 50% by 2030,[384] but a much looser one for food loss to merely 'reduce' it "along production and supply chains, including post-harvest losses" by that date. To meet the food waste target, the EU has proposed a legally binding target to reduce the generation of food waste in processing and manufacturing by 10% (from 2020 levels) and in restaurants, food services and households by 30% per capita.[385] This falls short of the SDG figure. UK government policy targets on food waste can be found, first, in the 2018 policy document, *Our Waste, Our Resources: A Strategy For England*.[386] There, the Conservative Government set out its policy commitment to UN SDG 12.3's target to halve global food waste at consumer and retail levels by 2030.[387] This is a non-binding policy commitment. A further policy target on food waste was introduced in the Government's *Environmental Improvement Plan 2023*.[388] This sets an *interim* policy target to reduce

residual *municipal* food waste produced per person by 50% (from 2019 levels) by the end of January 2028. Besides general food waste targets, there are also more specific targets on diverting food waste away from landfill, principally aimed at reducing greenhouse gas (GHG) emissions from landfill sites. The 2018 Strategy sets a loose target[389] of "*work[ing] towards* eliminating food waste to landfill by 2030."[390] The 2021 *UK Net Zero Strategy* subsequently brought this forward by two years for municipal food waste, speaking of 'work[ing] towards the near elimination of biodegradable municipal waste to landfill by 2028.[391]

Not all collective food waste targets are ones that government sets to measure itself by. Some targets are set by bodies funded by it, like WRAP, which then sets targets for the food sector as part of voluntary agreements. The Courtauld Commitment involves a series of voluntary agreements signed up to by various actors in the food sector, funded by government and run by the NGO WRAP.[392] The 2025 Commitment contained a target to reduce food waste by 20% by 2025 compared to 2015 levels. The 2030 Commitment aligns itself with the UK government and international SDG 12.3 target, based on the UK 2007 baseline.[393] An earlier 201–2015 agreement under the Courtauld Commitment umbrella – the Hospitality and Food Service Agreement – contained targets to reduce food and associated packaging waste by 5% and to increase the rate of food and packaging waste recycled, composted or sent for anaerobic digestion to 70% or more by the end of 2015.[394]

The existing government food waste targets for England are not legally binding. While the Conservative Government had intended to introduce binding food waste targets alongside corporate food waste reporting (addressed in sections 6.2.3.5 and 6.2.4 below), this was delayed.[395] However, binding targets in legislative form do exist in relation to a limited number of food system problems such as agricultural nutrient water pollution from diffuse, run-off sources. In England, section 1 of the Environment Act 2021 provides a power to the Secretary of State to introduce regulations setting binding long term environmental targets, and *mandates* the setting of these in respect of 'priority' policy areas – those being air quality, water, biodiversity, and resource efficiency and waste reduction. Those powers were used to create The Environment Targets (Water) (England) Regulations 2023.[396] These set a legally *binding* target, for the reduction of nitrogen, phosphorous and sediment loads entering waters via agricultural diffuse pollution, of at least 40% by the end of 2038.[397] The Conservative Government's *Environmental Improvement Plan 2023* also contains a *non-binding* interim target of a 10% reduction by the end of January 2028, and by 15% in catchments with protected sites suffering from nutrient pollution.[398]

Other agri-food sector-specific environmental sustainability targets exist in relation to, for example, biodiversity and GHG emissions. Biodiversity targets have become a significant focus since the adoption in 2022 of the international Kunming-Montreal Global Biodiversity Framework (GBF) at COP 15 of the Convention on Biological Diversity. The GBF itself contains four goals for 2050, and 23 targets to be met by 2030. The targets include e.g. ensuring that at least 30% of areas with degraded ecosystems are restored by 2030.[399] There are also targets to "reduce pollution to levels that are not harmful to biodiversity", with sub-targets to reduce "excess nutrients lost to the environment" by at least 50%, and to "reduce the overall risk from pesticides and highly hazardous chemicals" by at least 50%, including through integrated pest management.[400] Food waste also has a target – to be halved by 2030.[401]

The EU, under its Farm to Fork and Biodiversity Strategies, proposed a target to reduce the use and risk of chemical pesticides in the EU by 50% by 2030.[402] Although the original proposal fell in early 2024, in part as a result of intensive agrochemical industry lobbying,[403] a revised less ambitious target may yet still emerge.

In 2020, as part of its international GBF commitment, the Government set a target to protect 30% of the UK's land (and ocean) by 2030 ('30by30').[404] This was described as "a collaborative, voluntary effort" with contributions to the 30by30 target made by landowners on a voluntary basis, with no obligation to participate.[405] In 2023, 8.5% of England was mapped as already counting towards the 30by30 target, mainly consisting of existing protected areas like SSSIs and Special Areas of Conservation.[406] Additional potential area categories, covering a further 26.8% of England were also mentioned, with farmland under appropriate biodiversity management arrangements among them.[407] The UK 25 Year Environment Plan emphasises a need to reduce pollution and biodiversity impacts from pesticides,[408] but beyond an emphasis on integrated pest management as a means for reducing their use, sets no clear quantitative target.[409] The 25 Year Plan does, however, contain a non-binding biodiversity target for "all of England's soils to be managed sustainably' by 2030".[410] The previous Government's *Environmental Improvement Plan 2023* – the first update of the 25 Year Plan – relaxed this target to bringing at least 40% of England's *agricultural* soil into "sustainable management" by 2028, and 60% by 2030, making it clear that sustainable management is via soil standards in the SFI ELM scheme.[411]

The *Environmental Improvement Plan 2023* contains further biodiversity targets relevant to the farming sector. These include halting the decline in species abundance by 2030, and then increasing abundance by at least 10% to exceed 2022 levels by 2042, and restoring or creating more than 500,000 hectares of wildlife-rich habitat by 2042.[412] Meeting these targets would involve farmers and land managers being paid to take care of the natural environment while producing food, so that collectively they would then meet sub-targets of: to contribute "at least 50% of the target of bringing protected sites into favourable condition by 2042" and with 65–80% of landowners and farmers "to adopt nature friendly farming on at least 10–15% of their land by 2030."[413]

Biodiversity targets also exist under the proposed Welsh *Sustainable Farming Scheme*, which sets out the new basis on which farming will be funded to replace the previous EU CAP-based system. In its 2023 consultation, the Welsh Government proposed a mandatory target of a "minimum of 10% tree cover on each farm as a scheme requirement to be met by 2030."[414] This and other mandatory 'universal actions' or minimum requirements under the Scheme, such as the rule[415] that at least 10% of a farm should be actively managed as wildlife habitat alongside food production, have attracted particular attention. Widespread farmer protest power was used to lobby against the proposals in early 2024, resulting in a delay in their introduction.[416]

Corporates in the agri-food sector can set their own internal sustainability targets independently of industry voluntary agreements or government imposed regulation. Although not that common, corporate biodiversity targets have been attracting increasing attention since the 2022 adoption of the GBF, with many company targets aligned with the Framework's 2030 date.[417] Where companies in the food sector have set nature-based targets, deforestation targets are well represented.[418] Unilever, for example, set a target to have a 'deforestation-free supply chain in palm oil, paper and board, tea, soy and cocoa by 2023'.[419] In terms of driving UK HSD, it is worth noting that deforestation targets are more relevant for biodiversity and sustainability abroad than in the UK itself. To ensure the credibility of targets, a number of large agri-food companies have signed up to the Science-Based Targets Network (SBTN),[420] which involves setting targets for nature and climate (and helping to resolve trade-offs between the two).[421] The EU has also produced guidance on biodiversity for SMEs in the agri-food sector, including target setting.[422]

Climate targets are among the highest profile HSD-relevant targets. Again, there are international law targets here, in the shape of article 4 of the Paris Agreement, which contains a target of achieving

"a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century". Article 2(1)(a) sets out an aim to limit global temperature increase to 1.5°C above pre-industrial levels, which is more of a goal than a target. Responding to Paris, countries globally have set their own state-level climate targets as part of their nationally determined contributions (NDCs). The UK has a legally binding economy-wide target, in the Climate Change Act 2008, to reach net zero by 2050. We have already seen above how this binding economy-wide target has then been supplemented by agri-food sector-specific climate-driven state policy targets – like the one on diverting food waste from landfill for example. Research has shown extensive expert support for more such sector-specific state targets, notably GHG reduction targets for the livestock sector.[423] The UK currently lacks these, in contrast with Ireland and New Zealand for example. There is, however, a voluntary NFU target to reach net zero across the whole of agriculture in England and Wales by 2040.[424]

In Ireland, under section 3 of the Climate Action and Low Carbon Development Act 2015,[425] the Government agreed ceilings or targets in 2022 for emissions from each sector of the economy in order to meet its overall national 2030 climate target of a 51% reduction in GHG emissions.[426] This included a targeted ceiling for the agriculture sector for emissions not exceeding 17.25 million tonnes of carbon dioxide equivalent (Mt CO2 eq) by the end of 2030, requiring a 25% reduction in emissions compared to 2018. To help achieve this, along with other measures,[427] the government-established Food Vision Dairy Group recommended a target to tackle nitrous oxide – a key agricultural GHG[428] – in the dairy sector, by reducing chemical nitrogen use by 27%-30% by the end of 2030, with an interim 2025 target of a 22%-25% reduction.[429]

New Zealand has binding statutory targets to reduce biogenic methane emissions by 10% by 2030 from a 2017 baseline, and by 24–47% by 2050.[430] Given that agriculture accounts for 91% of New Zealand's biogenic methane emissions,[431] this is in effect very close to an agriculture sector target.

Climate targets also feature, along with food waste, in food sector voluntary agreements. The 2030 Courtauld Commitment has a Paris Agreement aligned target for those signed up to the voluntary agreement to "deliver a 50% absolute reduction in GHG emissions associated with food and drink consumed in the UK by 2030 (against a 2015 baseline)".[432]

Many companies in the agri-food sector have set their own net zero climate targets. At the moment, these corporate climate targets are voluntary. However, while UK law does not currently require companies to have climate targets, where they do have them, the law requires large companies to report on these.[433] EU law is currently much the same:[434] although the new Corporate Sustainability Due Diligence Directive (CS3D) makes climate targets mandatory for large companies.[435]

As with corporate biodiversity or nature-based targets and SBTN, so too on climate, large agri-food companies may sign up to the Science Based Targets initiative (SBTi)[436] with a view to ensuring that their climate targets are credibly aligned with the Paris 1.5°C goal. Whether the SBTi targets do ensure this in practice for participating food industry companies has been questioned,[437] leaving aside the broader question of whether voluntary corporate targets can ever achieve such alignment.[438]

Absolute climate targets are ultimately more likely to deliver a sustainable food system than intensity-based targets.[439] In its 2023 climate policy, large dairy food company Danone's target was to reduce its absolute emissions by 34.7% by 2030, compared to a 2020 baseline.[440] In its earlier policy it had a target to achieve a 50% reduction in its emissions intensity by 2030.[441] The problem with intensity-based targets is that they allow for growth in output and sales, and therefore while each pot of yoghurt, for example, may be lower carbon, absolute emissions for a company will not have been lowered if they are now selling

many more pots. As Danone reported in 2016,[442] it had reduced its carbon intensity (CO2eq / ton of product sold) between 2007–2015 by 46%. However, Danone's sales grew by 51% over that period. Thus, while a 46% figure looks impressive at first sight, the 51% volume growth meant that absolute emissions actually increased, albeit only by 1% in this case.[443]

What GHG emissions 'scopes' from within the Greenhouse Gas Protocol[444] are included in a company's targets is also important for assessing the strength of its sustainability commitment. Scope 1 covers direct GHG emissions from the company's own controlled operations. Scope 2 covers a company's indirect GHG emissions from purchased electricity or other forms of energy. Scope 3 covers other indirect emissions from a company's upstream and downstream value chain. Danone's targets above include all three scopes. Companies may also have separate targets for scope 1 and 2 GHG emissions which are more within their control, enabling them to achieve greater reductions. Premier Foods, for example, committed to reducing absolute scope 1 and 2 GHG emissions 66.8% by 2030 from a 2021 baseline. It then also committed to reduce absolute upstream scope 3 GHG emissions 'from purchased goods and services' by 25%.[445]

For companies in the food sector pursuing sustainability improvements – particularly those in the meat and dairy sectors – it is important to have a separate target, within the company's overall GHG emissions reduction target, for methane.[446] This is because methane is a particularly powerful GHG, and it therefore enables those companies to focus on reducing emissions from the parts of their operations with a high immediate climate footprint. Danone, for example, as part of its regenerative agriculture targets, has a target to reduce methane emissions from its fresh milk by 30% by 2030, from a 2020 baseline.[447]

Agri-food sector companies may also have targets on the social and not just the environmental aspects of sustainability. Both may also be characterised as ESG (environment, social and governance) targets, with environmental sustainability coming under E and social aspects under S. Premier Foods has a range of social targets including, for example, gender balance for senior roles by 2030, and providing the equivalent of I million meals per year to those in food poverty by the same year.[448] The previous UK Government's policy on the social sustainability of the agri-food sector was thin on targets. The 2022 *Government Food Strategy* contains only one extremely broad one, "to ensure that by 2030, pay, employment and productivity, as well as completion of high-quality skills training will have risen in the agri-food industry in every area of the UK, to support our production and levelling up objectives."[449] While it also mentions an 'aspirational' public procurement-based social sustainability target that "at least 50% of food spend must be on food produced locally", this is described as one for future consultation.[450]

In considering a transition to HSD, there are then also *health* targets. UN SDG 2 sets a goal, which includes health elements, to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture."[451] UK government policy currently appears relatively light on health targets in relation to the food system, at least if one looks at the previous Government's core 2022 *Government Food Strategy*. The Strategy itself contains only one concrete *future* health target, to halve childhood obesity by 2030.[452] It also mentions its earlier policy on childhood obesity,[453] in which the Government had set manufacturers a voluntary target to reduce sugar in food and drink that children eat most, by at least 20% by 2020. They could do this via a range of methods including for example reducing sugar levels in products, or, for food like chocolate bars where this would be difficult, by reducing portion size. Although not mentioned in its 2022 Strategy, there is also an associated voluntary calorie reduction programme under which the food industry was set a target to reduce the calories in product categories

contributing significantly to children's calories by 20% by 2024.[454] Likewise, there is also a longstanding voluntary but progressively ambitious rolling set of salt reduction targets applicable to all foods, stemming from a 2003 report.[455] The latest of these sets targets for 2024.[456]

Agri-food companies have a wide variety of different healthy diet-related targets. Unilever, for example, had a target for 95% of its packaged ice cream to contain 22g or less total sugar per serving by 2025.[457] Premier Foods has a target to "more than double sales of products that meet high nutritional standards" by 2030,[458] with progress referenced against the UK Nutrient Profiling Model (NPM).[459] Tesco has a target to increase "sales of healthy products, as a proportion of total sales, to 65% by 2025, as defined by the Government's [NPM]", an increase of 58% from the 2021 target-setting date. It also has a target that the percentage of its ready meals containing "at least one of the recommended five a day", should increase from 50% to 66% by 2025.[460] Nestlé has a target to grow the sales of its more nutritious products by about 50% by 2030,[461] using the Australia and New Zealand Health Star Rating (HSR) system developed for those countries' front-of-pack labelling system, designed to rate the nutritional profile of packaged food.[462] What becomes clear from looking at this variety in corporate health targets is that there is a need for a common global science-based health equivalent of SBTN and SBTi for nature and climate targets. Target setting for healthy diets is currently too much of a non-standardised free-for-all. Some, commendably, use a national scientific nutritional benchmark in the form of a Nutrient Profile Model (NPM) like the UK NPM or the Australia and New Zealand HSR. However, given the cross-national variation in these, the ability to draw comparisons between different company targets internationally is difficult.[463] There is also a need, not just for a common international basis for nutritional measurement, but also for a more standardised framework for how targets should be set out. There is currently significant scope for 'health washing', by setting targets which give the impression of caring about healthy diets, but actually do very little to make a meaningful contribution to the shift to HSD.

That risk of health washing arises for example when companies choose separate rather than proportional targets on healthy foods. This was highlighted in the shareholder resolution filed in March 2024 by ShareAction in relation to Nestlé's healthy food target discussed above.[464] ShareAction rightly criticised this on the basis that "[i]f its sales of unhealthier products also increase at a similar rate, there will be no improvement in the impact of the food it sells on consumer diets and public health."[465] Instead, it called for Nestlé to adopt a proportional target, "whereby at least 50% of their sales would come from products that meet healthy thresholds by 2030."[466] However, even a proportional target is not ideal because there is a further absolute versus intensity-based targets issue, as with climate targets discussed earlier. Food companies may be increasing the percentage of healthy options as a proportion of their total sales figures, or may have made and met targets to reformulate individual products; but if their absolute sales of unhealthy options, or their total number of reformulated but still relatively unhealthy products sold has increased, then overall health benefits will still not be seen.

It is also important to note Nestlé's response, however, as it helps to shine a light on the limitations of voluntary action by companies and the place of targets in driving such action. A spokesperson stated:

> We disagree with the notion that we should aim to limit growth in specific areas of our portfolio. A proportional target would require us to weaken valuable parts of our portfolio and create opportunities for competitors without yielding public health benefits.[467]

The competitors point is an important one and the argument is similar to the one often made by the fossil fuel industry in response to pressure from some stakeholders to reduce supply: they point instead to the need to reduce demand for fossil fuels, because otherwise the supply will be met by competitors, who may be selling dirtier fuels with a much greater climate emissions intensity.[468]

In a food context, one might point to Unilever's decision to sell off its ice cream business.[469] This will likely help Unilever to achieve a greater proportional share of healthy foods in its brand portfolio. But if the ice cream part of the business is now owned by a company which does not see fit to reduce sugar content of the ice cream any further, or chooses to increase it, then the overall health impacts will not be better. The way to achieve those healthy diet improvements is by tackling demand via, e.g., a sugar and saturated fat tax on ice cream, that applies to all companies. Supply-side voluntary corporate targets alone can be met by spinning off the unhealthy food parts of a company to others. Post spin-off, the selling company now looks like one with a healthier footprint. But that is to look at the company and its targets in isolation. If one also takes into account the buying company, onto which the unhealthy food has been offloaded, then the overall health picture has not improved. Indeed, if the latter company is less health-driven than the first, then the picture may actively worsen. This does not mean that such spin-offs should be discouraged, nor that proportional targets are a bad idea. While the above is a risk, there is also a counter argument to the effect that large multinationals with considerable financial power like Unilever or Nestlé can replace their unhealthier foods with healthy ones and then spend their considerable marketing budgets on promoting the latter. Assuming their unhealthy food sales have been replaced by a competitor with less marketing power, then the overall health picture could still end up positive.

Finally, some targets may produce potential synergies, delivering across both environmental sustainability and health. Economy-wide[470] targets to reduce consumption of meat and dairy fit into this category, particularly where red meat is concerned, as reductions there produce clear methane GHG benefits, biodiversity benefits, as well as disease health benefits. Although the Conservative Government was reluctant to set targets in this area, likely for nanny state and consumer choice reasons, the independent *National Food Strategy* recommended a target of a 30% meat reduction by 2032 (from 2019 levels), which it argues is required to meet the UK's carbon budget and the UK's GBF biodiversity commitments.[471] The independent Climate Change Committee's (CCC) balanced pathway under the Sixth Carbon Budget also assumes a target of a 20% shift away from meat and dairy products towards plant-based alternatives by 2030, and a 35% reduction in meat by 2050.[472] The CCC references the independent UK Climate Assembly here, which had recommended somewhere between a 20–40% reduction in meat and dairy consumption by 2050, to be achieved on a voluntary basis with an emphasis on education as a tool.[473] Industry body, the IGD (Institute of Grocery Distribution), has similarly suggested a 20% reduction in carbon intense red meat and dairy.[474]

Policy recommendations on targets

- **The Government should set more concrete binding targets on health in relation to diets.** *Dietary guidelines and nutrient profiling models are not the same* thing as targets, as the former do not have dates by which improvements in health outcomes – or in percentage increases or decreases in foods or ingredients designed to achieve those outcomes – can be expected. While the setting of such targets may have gone against the previous Government's wish to avoid being labelled as encouraging a 'nanny state', without clear ambitious targets on healthy diets, there is likely to be insufficient action and nothing in place to provide accountability for progress.
- **The Government should update its sugar targets, making these applicable to adults too and placing them on a similar rolling basis to the existing salt reduction programme.** Adult obesity is as much of a health problem as childhood obesity and although there is a Soft Drinks Industry Levy in place which has had some success – reducing the amount of sugar in within scope drinks by 44%[475] – this is an indicator without an accompanying target (and applies only to soft drinks).

- **There needs to be greater standardisation for the format of corporate health targets, preferably with a science-based underpinning for health targets equivalent to SBTN or SBTi.** Without greater standardisation, there is a clear risk of 'health washing' and difficulty in making comparisons between health targets across different companies.
- **In setting health targets, companies should distinguish more clearly between intensity-based and absolute targets.** Unless attention is also given to absolute targets, there is a danger that health improvements in individual food and drink products will be overshadowed by an increase in overall volumes of now healthier, but still not very healthy products.
- **The Government needs to set clear targets on the social sustainability of the agri-food sector.**
- **The food sector is one characterised by low wages, a reliance on migrant labour and some small farms which are struggling to make ends meet.** Unless adequate attention is paid to improving the social conditions in the food sector, especially of food sector workers and small farms, then it will be difficult to ensure that other food system problems are addressed and there may also be backlash against necessary changes. Socio-economic sustainability is a key part of achieving a just transition in the food system.
- **The Government should introduce binding farm to fork food waste targets, in a legislative form.** Accountability will be better served by legally binding targets on food waste and they will provide an important backdrop for sector reporting on food waste.
- **The UK Government should introduce binding pesticide reduction targets or, like in Scotland, set a target for the proportion of land under organic management.** Merely focusing on means or tools like integrated pest management is inadequate. Only a target will provide a clear framework for measuring data on pesticide use over time and ensuring that a full range of tools are in place to reduce it. Alternatively, a land use target for organic production would serve a similar purpose.
- **The Government should set reduction targets for meat and dairy that match its 2050 net zero commitments.** To avoid backlash these targets could initially be non-binding, with a change to mandatory targets if progress against the voluntary targets is insufficient.
- **The Government should set GHG reduction targets for the agriculture sector and for the livestock sector within this.** While economy-wide climate targets are important, in order to ensure that all sectors are making their fair share, and for greater justification of carbon budget trajectories, there is a need to move increasingly towards sector-specific GHG reduction targets, like in Ireland.

6.2 Instruments to achieve these targets

6.2.1 Command-and-control instruments

Command-and-control instruments – despite their unfair, pejoratively framed title[476] – are an important set of tools for tackling the various food system problems and for helping to meet relevant targets discussed in previous sections. They include a wide range of regulatory solutions, ranging from environmental permits[477] (and associated process, performance or emissions standards set out in permit conditions), through land use controls,[478] to product standards, bans and quotas. They are all mandatory, rule-based instructions that are set by the state which then require compliance by private actors. Regulatory monitoring and enforcement are an important feature of command-and-control

approaches to ensure that compliance occurs. Monitoring of farm pollution in England takes the form of risk-based farm inspections by the Environment Agency, with monitoring focused on higher risk farms.[479] Enforcement regimes are generally underpinned by statutory criminal offences. However, prosecution is typically regarded as a last resort – to be used to bring actors into compliance only where others approaches, including advice and persuasion, have failed.[480] In the UK there has also been a steep rise in the use of civil sanctions in place of criminal prosecutions,[481] including in relation to pollution-related permit breaches by companies in the food sector.[482] Not all non-prosecution has been strategically chosen however: significant cuts to the English Environment Agency budget over the last 15 years[483] have also led to lower inspection levels and reduced enforcement of command-and-control regulation, including the rules applicable to farms.[484]

As seen in section 5.1.3 above, agricultural pollution is often diffuse (e.g. fertiliser run-off into surface waters, or field emissions to air), although pollution can also stem from point-sources on farms (e.g. yard drainage discharge, or, in the case of air, roof fan outlets). Command-and-control approaches, requiring operators to have an environmental permit[485] and to comply with its conditions, are the standard way to tackle point source pollution, although as will be seen below, these are not currently required for all farms. While diffuse pollution requires a range of regulatory tools including economic instruments,[486] command-and-control – including but beyond just permitting – still plays an important part in that mix.[487]

The case of poultry farming in the River Wye catchment provides a good illustration of relevant command-and-control rules seeking to tackle the food system problem of pollution from agriculture. In its response to claims made by the campaign group River Action, the Environment Agency drew attention to:[488] the Farming Rules for Water,[489] the Environmental Permitting Regulations,[490] the Slurry Silage and Agricultural Fuel Oils (SSAFO) Regulations,[491] and the Nitrate Pollution Prevention Regulations.[492] The Agency could also have mentioned the licensing controls on abstraction of water,[493] because, as seen earlier in section 5.1.3, low water quantity and flow can affect pollution and hence water quality.

The Farming Rules for Water[494] were introduced to tackle diffuse water pollution from agriculture. They take the form of command-and-control land-use rules which specify how organic manure or manufactured fertilisers should be applied and stored; they also set out rules on livestock distances from watercourses, as well as crop management practices to prevent soil run-off. The Rules require farmers to assess the risks of diffuse pollution and to have a plan for each application of manure or fertiliser on their land. Insofar as the Rules address soil,[495] they can also be expected to help tackle not just water pollution but also the food system problem of soil health.[496]

Most farms do not require an environmental permit under The Environmental Permitting Regulations. Permits are, however, required for intensive rearing of pigs or poultry in an installation with more than 40,000 places for poultry, 2,000 places for production pigs over 30kg or 750 places for sows.[497] There have been calls to reduce these high threshold numbers and to extend permitting to other types of intensive livestock operations, notably cattle.[498] Where a permit is currently necessary, this covers both point sources and aspects of diffuse pollution via controls such as management systems and operating techniques based on best available technique (BAT) standards for the sector.[499]

The SSAFO regulations generally require farmers to avoid storing silage, slurry or fuel oil within 10 metres of inland or coastal waters, which offers a somewhat limited distance protection to such waters. Like SSAFO, which is a land-use-based command-and-control measure, The Nitrate Pollution Prevention Regulations place land-use restrictions on farms in designated areas known as 'nitrate vulnerable zones' (NVZs). The Regulations include measures such as the need for fertiliser plans to be drawn up, presumptive limits on the total amount of nitrogen in livestock or organic manure applied, and

presumptive distance controls on the application of organic manure near surface waters – which are as low as 6 metres in some cases.[500] NVZs currently apply across 55% of England.[501] There are no equivalent designated areas for phosphorous (P) – another key diffuse agricultural pollutant giving rise to nutrient overload of watercourses. However, as the Environment Agency notes, while NVZs are aimed at nitrate, they will also indirectly reduce P losses where the designation applies.[502] Likewise, the Farming Rules for Water controls will work on both nitrates and P.[503]

Farms and others abstracting more than 20 cubic metres (20,000 litres) per day are likely to require an abstraction licence from the Environment Agency[504] – a licence being similar to a permit in command-and-control terms. In the case of the River Wye, while the joint regulators (the Environment Agency and Natural Resources Wales) aim to ensure that licences involve safe levels of abstraction,[505] there also needs to be close attention to both illegal abstraction where someone is abstracting more than 20 cubic metres without a licence or in breach of their licence, and legal abstractions below those levels which do not require a licence.[506]

Product standards are another form of command-and-control tool which can be used to address a number of HSD food system problems. In relation to packaging waste and plastic pollution in the environment for example, the EU Single Use Plastics (SUP) Directive sets out product design standards requiring tethered lids on bottles.[507] Minimum quality standards are also a form of product standard, whereby a product can only be sold on the market if it meets required quality, safety or content levels. As seen earlier, at one time only carbon-intensive mined or synthetic chemical fertilisers had such standards and were able to be sold on relevant markets.[508] However, moves have been made in the EU, and were due to be made in the UK, to extend fertiliser product standards to lower-carbon organic fertiliser, enabling it to access the market and to provide lower-carbon competition. Similarly, conscious of the high risk of cardiovascular disease, the EU Regulation on Trans Fats lays down health-based product standards, with a maximum limit of trans fat content in food intended for supply to retail and the final consumer of 2 grams per 100 grams of fat.[509] This Regulation remains part of assimilated law in the UK.

Public procurement is a mixed instrument.[510] In the case of food, it has strong elements of command-and-control (in the setting of mandatory health or sustainability *standards* that suppliers must meet as a condition of government contracting), but also economic instruments (it is a demand-side trade measure, with public procurement acting as government demand),[511] and voluntary instruments (if suppliers choose not to contract, the standards are not mandatory for them).

Bans are the most extreme form of command-and-control tool. They may be used to tackle food system problems around health or sustainability, and may apply to products (or their ingredients) or processes. The UK, for example, bans the sale of meat from hormone-treated animals – a ban which applies to both domestic producers and imports.[512] There have also been calls for a ban on carcinogenic nitrites in bacon.[513] While these are examples of product standards aimed at health, the call for a change in national planning policy guidance to direct local authorities to ban new intensive animal mega farms,[514] involves a ban on a process or production method aimed at both health and sustainability. For the UK to transition to healthy diets, people need to be eating less meat, especially red meat; and having more large-scale intensive animal agriculture is unsustainable on climate (emissions) grounds and, in some catchments like the Wye, on water pollution grounds (excess nutrients from manure). Such bans might also be based in part on the animal welfare aspect of sustainability.

Bans can also be temporary. In the case of droughts, abstraction licence conditions typically provide for restrictions during periods of drought and low flow; alternatively, abstraction for the purpose of spray irrigation can be restricted under section 57 of the Water Resources Act 1991.[515] Although seldom used,[516] drought orders can also be used to ban abstraction.[517]

Finally, in terms of important command-and-control measures to address food system problems, there are quotas.[518] Quotas may be put in place on the amounts of food that can be caught (fish), grown (crops), or imported (trade). In the language of trade, like bans, quotas are a type of 'quantitative restriction', because they specify what quantities are allowed. They can be used for environmental sustainability purposes: quotas providing for total allowable catches in fishing for example are used to protect fish stocks.[519] Quotas may also serve dual health and environmental sustainability aims: production quotas on sugar beet have been called for both to help lower sugar levels in the UK diet on health grounds and also because sugar beet impacts soil health via soil loss.[520] Environmentally, any trade-offs with sugar beet use for biofuels would also need to be considered.[521]

As can be seen from the above examples, command-and-control instruments are generally supply-side controls, whereas other tools considered in this report, such as labelling, tend to be more directly aimed at consumer demand. Some, like taxes considered in the next section, may be addressed at both: as will be seen below, the drinks sugar tax, for example, in theory potentially incentivised both suppliers to lower sugar levels in their products and consumers to switch products.

Policy recommendations on command-and-control instruments

- **The Government needs to ensure that the Environment Agency is appropriately funded.** The Agency needs to be able to properly enforce the range of command-and-control regulation applicable to farming and the wider food sector, including using criminal prosecution where appropriate so as to provide a deterrent effect. The same applies to devolved agencies such as the Scottish Environment Protection Agency, Natural Resources Wales, and the Northern Ireland Environment Agency.
- **Closer attention needs to be paid to water abstraction licensing, including enforcement.** Water quantity and flow is crucial for water quality. With pressure on water quantity from climate change in increasingly hot summers, water quality is likely to face further challenges unless abstraction levels are properly allocated and enforced.
- **The environmental permitting regime should be extended to dairy and intensive beef farms.** The previous Government observed that, since bringing pig and poultry farms within the environmental permitting system, emissions had reduced by around 30%.[522] It was considering expanding environmental permitting to dairy and intensive beef farms.[523] Given the pollution stresses on many rivers from manure, this should now be taken up.
- **Attention also needs to be paid to the differences and overlaps between existing command-and-control land use rules (like the Farming Rules for Water) and the environmental permitting system.** The advantages and disadvantages of each need to be analysed and consideration given to whether having a single system within environmental permitting for all farms, including arable farms, would bring benefits in terms of environmental effectiveness and ease of use.
- **Rules on distances of diffuse pollution sources from watercourses need to be the subject of further research.** With nutrient pollution at critical levels in many areas, there is a clear need to establish whether existing presumptive distances are sufficient.
- **The Government should consider introducing statutory designated Phosphorous Vulnerable Zones in addition to Nitrate Vulnerable Zones.** Given that phosphorous levels are now also a major agricultural pollution problem, it is important that legal controls reflect this.

- **Quotas on UK sugar beet production should be considered in order to reduce soil loss and to address high dietary sugar levels.** This needs to form part of a national land use strategy. As things stand, the UK devotes too much land to growing unhealthy food, including sugar, and too little on healthy horticultural products, notably fruit and non-starchy vegetables. However the design of any sugar beet land use quota will need to ensure that the policy is not undermined by substitute imports.
- **The UK should introduce mandatory product design standards requiring tethered lids on all bottles sold on the UK market.** Many UK manufacturers are already doing this because they are selling into the EU internal market where it is a requirement. However, given high litter levels and low recycling of plastic lids in the UK, this also needs to become law across the UK's own internal market.
- **The UK should extend fertiliser product standards to lower-carbon organic fertiliser.** This will enable these fertilisers to access the market and to provide lower-carbon competition.

6.2.2 Economic instruments

Properly enforced command-and-control approaches such as environmental permitting on farms and in food manufacturing clearly have an important role to play in ensuring the sustainability of the UK food system and hence in HSD. However, economic instruments are sometimes preferred for cost-effectiveness and flexibility reasons.[524]

The centrepiece of both UK and EU climate mitigation policy is an economic instrument in the form of their respective emissions trading systems or schemes (ETS). These are cap-and-trade systems where sectors falling within the scope of the ETS typically have to buy allowances via auction or via the trading market. The overall ETS system cap provides a ceiling on emissions which (unlike a tax) provides certainty of result. The cap is reduced over time so that total emissions fall. Some sectors vulnerable to so-called 'carbon leakage', where the industry is considered to be at risk of relocating abroad to countries with low carbon pricing, have historically benefitted from free allowances. However these are gradually being phased out in the EU, because the new Carbon Border Adjustment Mechanism (CBAM) is designed to address the problem of carbon leakage instead, by imposing a border carbon tax to level up carbon pricing on imports. The UK has also consulted on introducing its own CBAM.

The ETS has historically covered high GHG-emitting, energy-intensive sectors. Under the EU ETS, new sectors have been added in recent years, including aviation within the European Economic Area, and shipping. And a new separate 'ETS 2', created to cover emissions from fuels used in buildings and road transport,[525] became law in 2023 and will become operational in 2027. However, despite being a high GHG emitting sector (especially from ruminant livestock farming, with methane as a powerful GHG), agriculture has not so far been included in the UK or EU ETS, although there is a comprehensive 2023 report commissioned by the European Commission, which looks in detail at a range of different designs for an ETS 'that could incentivise climate mitigation action in agriculture effectively and efficiently.'[526]

An ETS was also, at one stage, mooted in New Zealand as a fall-back option. The agriculture sector represents 50% of New Zealand's GHG emissions,[527] and accounts for around 94% of its nitrous oxide emissions and 91% of its biogenic methane emissions. Approximately 75% of agricultural emissions are methane and nitrous oxide from livestock.[528] In its First Emission Reduction Plan, the Government delegated the issue of agricultural GHG emissions pricing to the He Waka Eke Noa – Primary Sector Climate Action Partnership, with a default legislative backstop threat of bringing agriculture within

scope of the New Zealand Emissions Trading Scheme (NZ ETS).[529] The ETS would have operated at manufacturer processor-level, rather than at farm level.[530] In the end, the ETS backstop was avoided, with the Partnership recommending and the government adopting instead a farm-level, split-gas (short and long lived gas) emissions levy.[531] This levy-based agricultural emissions pricing system was due to start in late 2025, but the ETS backstop and, it seems, the levy, was abandoned by the new centre-right government in 2024.[532] The levy had been designed to provide farmers with an economic incentive to reduce emissions, because if they did so they would pay a lower levy sum. It was therefore primarily aimed at the supply side of the food system, although insofar as higher costs were passed through to consumers, it may also have had the effect of reducing demand for carbon-intensive products via higher prices.

Where New Zealand has stepped back, Denmark has stepped forward – with a carbon tax on livestock emissions. The agricultural sector accounts for around a quarter of Denmark's GHG emissions[533] – and without further action would be around 50% by 2030.[534] The bulk of those emissions are from livestock production, especially cattle and pigs.[535] The tax, which was agreed in partnership with stakeholders including the farming industry, will help Denmark to meet its 2030 climate target to reduce GHG emissions by 70%. The tax has been set at DKK 300 (£34) per tonne of CO2e in 2030 increasing to DKK 750 (£84) per tonne in 2035.[536] It is accompanied by a set of tax breaks or 'deductions' of 60% and a range of available subsidies which will support carbon efficient producers.[537] This supportive package no doubt helped agreement to be reached on the tax. The overall carbon impact of the tax will depend in part on whether farmers increase feed to try to avoid on-farm emissions by earlier slaughter, and the emissions associated with such feed.[538]

Although Danish farmers will be paying a carbon tax on their GHG emissions for their *negative* impacts on the climate, farms are also an important *positive* part of the mitigation picture in terms of 'removals' via what is now commonly referred to as 'carbon farming'. Soil sequestration of carbon is a key element of this, as is tree planting. The New Zealand agricultural levy system was due to be used to reward sequestration, with the longer term plan to do so via credits within the NZ ETS.[539] In the EU, the Carbon Removals and Carbon Farming (CRCF) Regulation[540] creates a voluntary EU-wide system to certify carbon removals, including those from agriculture. Certification is designed as a first step towards the creation of a high quality removal credits market, where farmers and others are incentivised to undertake removals by the monetary value of credits, whether by selling them on voluntary carbon markets (VCMs) or setting them off against emissions in the compliance market if agriculture is eventually brought within the ETS.

While an ETS, or agricultural carbon tax, targets the supply side (production), an alternative would be a meat tax. A general tax on meat could be politically controversial,[541] as then UK Prime Minister Sunak's 2023 mention of a fictional one illustrates.[542] Such a tax would be aimed directly at the demand side, targeting consumers. While an ETS or supply-side tax or levy on emissions might also lead to costs being passed through into increased prices for consumers, Humpenöder and others argue that the price inelasticity of meat means that such price increases would likely be nowhere near enough to shift dietary patterns to HSD levels of meat consumption.[543] Rather than a supply-side approach or a general demand-side meat tax, they suggest a targeted meat tax on beef and lamb. Price elasticity effects here, they claim, will encourage consumers to switch away from taxed beef and lamb to untaxed pork and poultry. However, there are also environmental sustainability risks of such an approach, because increased demand for chicken for example, would lead to increased supply which, if concentrated in areas like the River Wye, then involves trading off climate and healthy diet benefits against more local environmental harms from excessive nutrient concentration.[544]

Economic instruments aimed at addressing the environmental sustainability problem of packaging in the food system include both a packaging tax and deposit-return schemes (DRS).[545] A Plastic Packaging Tax came into force in the UK in 2022.[546] The tax, which applies to manufacturers and importers of plastic packaging, has two related aims.[547] First, by excluding plastic made using 30% or more recycled plastic from the tax, it aims to encourage a greater use of recycled plastic in new plastic packaging. This should then create an increased demand for recycled plastic, which helps to fulfil the second aim of encouraging greater levels of collection and recycling of plastic waste, thus diverting it from landfill or incineration.

A DRS is in effect a purchase levy or tax that is refundable on the return of the packaging and is designed to reduce carbon emissions and littering in the environment, and to increase recycling (or, potentially, re-use) rates.[548] It does so by providing the consumer with an economic incentive to return the packaging. Scotland planned to be the first devolved administration to introduce such a scheme, for single use drinks containers (including glass).[549] However, in 2023 it was forced to delay the scheme as a result of the Conservative UK Government's refusal to grant an exclusion from the United Kingdom Internal Market Act 2020.[550] The Conservative Government subsequently announced plans for a DRS to start from 2027 – plans adopted and implemented by the Labour Government in January 2025.[551]

Just as fiscal tools like the Danish agricultural carbon tax can be used to address the sustainability aspect of HSD, they can also be used to address the health part. They can be employed to combat excessive consumption of food groups or ingredients that are known to be particularly damaging to health. A sugar tax, or taxes on red and processed meat or on salt for example, are all areas of possible intervention. As things stand, the only UK current example is the Soft Drinks Industry Levy (SDIL), introduced in 2018 as part of the government's childhood obesity plan,[552] which targeted sugar levels in soft drinks sold in the UK. The independent *National Food Strategy* called for the introduction of a wider £3/kg tax on sugar beyond just soft drinks, as well as a £6/kg tax on salt used in processed foods, restaurants and catering.[553]

The main aim of the SDIL – and one which succeeded – was to encourage a supply-side reformulation of drinks by manufacturers.[554] They were incentivised to reduce sugar levels to avoid the levy, and sufficient lead-in time was provided to enable them to do this. A criticism that has been made of the Levy's structure is that it is threshold-based rather than graduated on a per gram of sugar/100mls basis.[555] Once the Levy was introduced, prices for high sugar, non-reformulated drinks rose. There was some demand-side response by consumers, shifting away from higher priced, levied products. However, due to price inelasticity, this demand-side response was limited.[556] The data suggests that the SDIL led to calories per week from soft drinks consumption dropping by 5.9bn, with reformulation representing around 83% of this, and the other 17% coming from consumer response to higher prices.[557]

Higher prices for non-reformulated drinks as a result of the Levy are potentially distributionally regressive. However, this was not a problem in practice because reformulation was a common response and prices for reformulated products remained relatively unchanged.[558] Lower income consumers were typically able to choose these reformulated products to avoid the price rises. In addition, the obesity health benefits from a switch away from high sugar drinks by those on low incomes have been progressive, with a positive association between the Levy and a reduction in obesity amongst girls aged 10 and 11, and the greatest difference for children in deprived areas.[559] While childhood dental health benefits associated with the Levy in terms of reduced hospital tooth extractions have also been demonstrated, these benefits were not limited to areas of high deprivation.[560]

Besides disincentivising the production and consumption of unhealthy food via levies, economic instruments, in the form of subsidies, can be used at the same time to positively incentivise the

consumption of healthy food.[561] Such subsidies might include reductions in VAT, although healthy non-out of home (OOH) food in the UK is already zero rated.[562] Affordability of healthy food is an important element of the social sustainability of food systems, and subsidies for healthy food could usefully be directed at those on low incomes. The *National Food Strategy* recommended a series of measures to increase the affordability and availability of healthy fresh food and ingredients, especially for low-income households with children, and those suffering or at risk from diet-related illness or food insecurity.[563] The recommendations included expanding the (pre-school) Healthy Start[564] scheme and free school meals, extending the Holiday Activities and Food programme,[565] and trialling a 'Community Eatwell' programme enabling GPs to prescribe fruit and vegetables to relevant patients.[566] While Healthy Start and GP fruit and vegetable prescribing can be seen as forms of demand-side subsidy to encourage access to affordable HSD, healthy free meals in schools and holiday programmes are more focused on the dietary supply side.

Supply-side subsidies can also be used to help the transition to HSD in relation to sustainability. In England, the Environmental Land Management (ELM) schemes provide subsidies for public goods including biodiversity as part of the gradual, phased replacement of the previous area-based EU Direct Payments scheme under the Common Agricultural Policy (CAP). The ELM schemes pay farmers for positive contributions to the environment, climate, and animal health and welfare, alongside food production. Section 1(1) of the Agriculture Act 2020 provides powers to the Secretary of State to give financial assistance for or in connection with a range of sustainability purposes, including:

> managing land or water in a way that protects or improves the environment ... managing land, water or livestock in a way that mitigates or adapts to climate change ... managing land or water in a way that prevents, reduces or protects from environmental hazards ... protecting or improving the health or welfare of livestock" and "protecting or improving the quality of soil.

Subsection 2 also allows financial assistance to be given for improving food productivity, and subsection 4 further requires the Secretary of State to "have regard to the need to encourage the production of food by producers in England" alongside "its production by them in an environmentally sustainable way".

Section 4 of the Act then requires the Secretary of State to produce a multi-annual financial assistance plan setting out how they intend to use their powers under section 1 over the period of the plan. This plan was produced in 2020 in the form of *The Path to Sustainable Farming: Agricultural Transition Plan 2021 to 2024*,[567] which sets out a seven year plan period as required under the Act, running from 2021–2027.

Core to this plan and the transition away from previous Direct Payments, are the three new ELM schemes.[568] Set out in the plan, these consist of the Sustainable Farming Incentive (SFI), Local Nature Recovery, and Landscape Recovery. They were meant to replace existing agri-environment schemes like Countryside Stewardship (CS), which was to be gradually incorporated into the Local Nature Recovery scheme. In the end, however, the Conservative Government decided to do the reverse: instead of introducing a new Local Nature Recovery scheme, it chose to 'evolve' CS to include what had been planned for Local Nature Recovery.[569]

SFI is a universal scheme, available to all farmers, designed to support sustainable farming, including improving water quality and soil health. It contains standards which farmers must meet to receive the payments, such as a nutrient management standard, an integrated pest management standard, soils standards, and a hedgerows standard.[570] CS and Landscape Recovery are both about restoring nature and biodiversity, with the former aimed at on-farm biodiversity improvements going above and beyond SFI standards, and the latter targeted more towards larger, landscape-scale projects.[571] As things stand,

Landscape Recovery is currently closed. CS saw changes in 2024, with Mid Tier also closed, and the more complex, negotiated Higher Tier (CSHT) delayed until summer 2025.[572]

Like the previous Direct Payments system, the new ELM schemes are *voluntary*. But farmers can now access state support for growing food only via the environmental public goods requirements of the relevant ELM schemes. This means that many are likely to apply for at least the base-level SFI scheme. However, concerns were expressed about protection gaps that arose in the switch-over to the new schemes.[573] The former Direct Payments scheme had so-called 'cross-compliance' requirements in place. These included mandatory environmental rules on issues like hedgerows and water buffer strips, which farmers had to meet in order to receive payment. A number of these protections were not directly carried across like-for-like to the new schemes, hence the gap problem. Although the various SFI standards mentioned above may cover the same broad issue (e.g. the new SFI hedgerows standard),[574] the previous cross-compliance requirements were, in a number of instances (e.g. hedgerows)[575] more comprehensive.[576]

While subsidies under the ELM schemes help to move farmers towards more *positive* contributions to the environment and climate, state subsidies as a regulatory instrument can also be used to incentivise a move away from *negative* contributions. The onetime proposed Irish culling levy is a good example of the latter. In Ireland, the government-appointed Food Vision Dairy Group floated the policy idea of a voluntary 'Exit/Reduction Scheme' for dairy farmers as a means to meet Ireland's climate targets – with agriculture responsible in 2021 for 37.5% of Ireland's GHGs emissions.[577] Under this proposal, farmers would have been given culling payments either to completely destock and exit from breeding ruminants, or to partially destock and reduce their numbers.[578] This was a policy targeted at the production/supply side aiming to reduce the national herd, as opposed to a subsidy aimed at consumer demand.

Furthermore, subsidies not only can be *given* to incentivise a move away from negative contributions;[579] if they are already existing, they can also be *reduced* from activities which we need less of on HSD grounds like animal production,[580] and redirected to more positive activities,[581] including plant-based food production.[582] As Springmann observes, "[w]hat food farms choose to grow has a greater effect on the environment and health than how it is grown."[583] Meat and livestock sector subsidies or subsidies for the marketing[584] of meat might therefore be lowered or removed on this basis because, as the section on targets made clear, in order to transition to HSD, the UK needs to reduce the amount of meat it consumes and increase its intake of plant-based foods. Subsidies for farmers to move away from livestock production to plant-based alternatives (where geographically feasible) may also prove less likely to attract farmer backlash than a climate levy or ETS carbon price-paying incentive, which farmers may see as more punitive.[585] However, as seen with the Danish livestock carbon tax earlier, it is also possible to create a palatable design that combines the two (i.e. both taxes and subsidies).

Policy recommendations on economic instruments

- **The UK Government should either bring agriculture within the UK ETS or else introduce an agricultural GHG emissions tax.** As in Denmark, this could be combined with tax-breaks and subsidies to promote greater industry acceptance. Ensuring that UK agriculture, as an economic sector, takes its fair share of the responsibility for reducing emissions and pays for its externalities in accordance with the polluter pays principle is important. Voluntary approaches alone, without some form of legally binding regulatory incentive, are unlikely to work in a highly competitive sector: margins are tight and few farmers are likely to take carbon emissions-

reducing action unilaterally. If carbon pricing is introduced for the sector then consideration also needs to be given to introducing a CBAM for agricultural imports so that UK farmers are not undercut by products from countries which do not face an equivalent agricultural carbon price. However, designing a CBAM for a sector with such a diffuse range of supply chains may prove challenging.[586]

- **Urgent action is needed to close any remaining protection gaps between the former cross-compliance system and the new environmental land management (ELM) scheme standards.** The new post-Brexit farm support system should be an opportunity to increase the standards of environmental protection on farms, not to weaken them.
- **Consideration could be given to subsidies to encourage farmers to reduce ruminant numbers or to exit ruminant livestock farming.** While predominantly a climate measure to reduce GHG emissions, such subsidies could also be aimed at areas where pollution and biodiversity harms are high. Given the media attention and backlash this climate measure attracted in Ireland, care would need to be taken to ensure that a relevant scheme was both well designed and proactively communicated. Moving subsidies away from livestock production to encourage plant-based alternatives like in Denmark may be less controversial.
- **The existing levy on sugar in soft drinks should be extended to all processed foods and there should also be a levy on salt in food.** To avoid these levies being regressive, revenues should be spent on relevant subsidies to bring down the price and access to healthy foods for those in need. See too the voluntary instruments recommendations below.
- **In the draft report we had recommended the rapid introduction of a UK-wide Deposit Return Scheme for drinks containers.** We are pleased to note the Labour Government's move to bring a DRS into force in England and Northern Ireland from October 2027. Such schemes are an important tool for tackling the environmental sustainability problems of littering, GHG emissions, and low recycling rates.

6.2.3 Informational instruments

Consumers are at the heart of the transformation of our food system to one based on HSD. They are direct beneficiaries of better diets and food production. Consumers also have a role to play as demand drivers behind this transformation, helping to shape what industry does and what is provided on supermarket shelves. However, a food system approach recognises that it is not possible to rely on consumers alone to deliver the broad systemic change that is needed. That involves all actors in the food system.

Nevertheless, changing consumer behaviour is an important part of any transformation of food production and consumption. To make changes, consumers need to see a value in new food habits and be able to buy into them. Policy makers have long favoured information as a vehicle to aid consumer decision making, using a range of information tools in the process. The type of information that can be used to help shape consumers' choices can, of course, include labelling. However, labelling is only one of many informational tools. Others, such as national dietary guidelines, educational interventions, and agri-food sector reporting also contribute to policy and are detailed below.

While informational instruments are important for consumers, they are not the only actors who rely on or react to such instruments. NGOs often take an interest in labelling, holding companies to account for greenwashing claims where the labels are likely to mislead consumers into thinking that products

are greener than they are. And farm-based and corporate reporting on issues like food waste and GHG emissions is important both to others in the value chain who may be trying to improve the sustainability of their suppliers, and to investors,[587] who may be keen to engage with or to divest from agri-food companies that are failing to take sufficient action on health or sustainability transitions. The media too relies on information to hold actors in the food system to account where they are failing to deliver.

6.2.3.1 Informational instruments as part of a toolkit, not as a main lever for change

In regulatory welfare economics terms, informational policy instruments can be seen as seeking to correct two key sources of market failure.[588] First, there may be an *asymmetry of information* between consumer and producer. With meat for example, consumers have no way of telling what the animal welfare situation was like in production without labelling. Second, there are negative *externalities* or costs imposed on society and the environment which, if not internalised by the producer, will lead to more of that good being produced than would be the case in an efficient market. In an agri-food context these external costs include, for example, those associated with obesity and cancer on the health side, and climate and pollution harms on the environmental side. Informational instruments including labelling can help tackle this inefficiency by steering consumers away from the unhealthy and unsustainable food which imposes these external costs. Investors and lenders too may be steered away from financing the producers of such foods because corporate disclosure and reporting information likewise alerts them to the financial risks involved (e.g. transition risks as consumers move away from such foods). Information may therefore play a part in preventing inefficient overproduction of these foods.

However, to make healthy and sustainable choices, consumers cannot rely on information alone. It is important to note that regulation that solely or primarily relies on information is unlikely to be successful in shifting consumer habits and production patterns. This is so for a variety of reasons explored below. Instead, tools such as labelling need to be understood not as solutions in themselves, but as part of an overall policy toolkit. On the environment side, that toolkit needs to include other instruments including taxes, ETS and command-and-control permitting, which are better equipped to address externalities than informational instruments.[589] On the health side, it also needs to include action on pricing, availability and visibility of healthy and sustainable food products, actions on composition of food to reduce unhealthy and unsustainable components and to improve nutritional content, and the cultivation of a social environment that is conducive to making healthy and sustainable food choices.[590] The point is important because current policy initiatives such as Farm to Fork in the EU for example, rest on the premise that "the 'well-informed, sovereign consumer' can always choose what to buy and eat."[591] The reality is different, however, with research showing:

> that food-related behaviours are often dominated by habits, routines and emotional processes, and that the food environment strongly shapes consumer choices, concerns and priorities. Even motivated consumers have limited opportunities to choose sustainable products if retail outlets do not carry convenient alternatives. Finally, customers are unable to assess a product's actual impact on the environment, the climate and social issues unless trusted information is available to them.[592]

Consumers can be assisted in making decisions on their diet via a range of tools aimed at informing them about the product qualities of the food they consume as well as its mode of production. However, to make an effective transition to healthy diets, consumers cannot be relied on to make good choices solely based on the information they are given. Some of the key barriers to effective consumer choice include:

a) Cognitive capabilities.

Consumers' cognitive capabilities are limited, and they are easily influenced by the food sector. A study by the *Put Change on the Menu Project* showed that the way consumers buy, prepare and consume food is largely the result of food sector decisions rather than consumer choices. Those choices are shaped by a series of factors which include price, shopping environment and marketing to such a point that consumers' agency in food choices is limited.[593] This conclusion is supported by observations, adverted to above, to the effect that people do not make selections of food based purely on rational reflection but, rather, on a range of factors including food availability, habits and routines, emotional and impulsive reactions, and their financial and social situation.[594]

b) Time

Consumers often lack time. It is impractical to assume that the average consumer can spend time meaningfully comparing the labels of numerous different food offerings on supermarket shelves, whether during shopping or in advance (e.g. reading sustainability information from corporate reports).

c) Knowledge

Consumers lack knowledge. They find themselves dealing with information that effectively requires specialist knowledge, for example when it comes to food composition and nutritional values. Consumers reading labels on composition will typically be hard pushed, for example, to make sense of the various E number additives and their potential impact on health, or be able to determine from composition if one food is healthier than another.

Other levers beyond labelling are needed therefore, including making healthy and sustainable food the most affordable type, ensuring HSD foods are widely available and attractive to consumers, the most marketed, and (especially when eating out) making them easy to consume. In addition, HSD food could be the *default* choice for public procurement.[595] Information is normally favoured as an intervention because it is perceived as a low hanging fruit. It is relatively easy to achieve for manufacturers and ensures they remain free to formulate food in the way they choose. It also places the burden of making a good choice onto the consumer. Other tools have often been resisted by producers for being costly and complex to put in place, unfair, or ultimately ineffective. To make HSD a reality, however, in addition to efforts focussed on informing consumers and other stakeholders, action on the supply side is paramount (as detailed in e.g. sections 6.2.1 and 6.2.2 above).

6.2.3.2 Labelling

Food labelling can inform consumers about e.g. origin, nutritional value, portion sizes, allergies, and social and environmental sustainability, including animal welfare. In the UK, food labelling is underpinned by food law, under which it is mandatory to provide information on a range of elements.[596]

The primary goal of the UK 'General Food Law' (which consists of assimilated EU Regulation 178/2002)[597] is to protect human health and consumers' interests in relation to food[598] – with a core requirement that food placed on the market is safe.[599] Food is deemed unsafe if it is injurious to health[600] or unfit for human consumption.[601] The General Food Law sets out a range of rules governing food production, processing and distribution designed to protect human health,[602] a number of which relate to information.[603] The General Food Law also includes other rules that ensure consumer safety, such as those on traceability,[604] and on withdrawal and recall[605] of unsafe food, which likewise involve an informational element.[606]

Informational tools are fleshed out in further food law legislation. The key general legislation concerning information requirements is the assimilated EU Food Information to Consumers (FIC) Regulation.[607] This requires most pre-packed food to be labelled with the amounts of calories, saturated fat, sugar, salt, protein, carbohydrates etc they contain. In addition to this general, horizontal labelling law, there is also a range of specific, vertical legal obligations[608] in the UK which apply to the labelling of food products. There are, for example, specific requirements applying to the labelling of meat products,[609] food additives,[610] GM products,[611] and out of home (OOH) calorie labelling.[612]

6.2.3.2.1 Labelling to empower consumers to make healthier choices

Labelling is an important vehicle for conveying health information on food products, although providing information to the consumer does not necessarily mean it will be understood and that consumers can or will make the best choices for their health based on it.[613] In this section we look at how information can best be delivered to consumers to maximise its effectiveness, and how to avoid them being misled by labelling.

a) Traffic light, warnings and front-of-pack as the most effective ways to provide information

Nutritional information on packaging is mandated under assimilated FIC Regulation 1169/2011.[614] As mentioned above, the required display of nutritional information covers a range of elements including calorific energy value, amount of total fat, saturated fat, carbohydrate, sugars, protein and salt. The value used is per 100g or 100ml (although per portion disclosure is also possible). While it therefore covers HFSS content, and will require ultra-processed foods (UPFs) to list those elements, there are no current labelling requirements on the degree of processing itself.[615]

The FIC Regulation does not require nutritional information to be positioned in the most prominent place. As a result, to date, the nutritional information has been provided mostly on the back of packets. Front-of-pack labelling (FOPL) schemes – which typically add a visual 'interpretive' element like colours on top to guide consumers – are currently voluntary in the UK and EU,[616] although there have been calls to make them mandatory.[617] In the US, the Food and Drug Administration (FDA) is consulting on introducing mandatory FOPL.[618]

The scientific evidence available shows that FOP information, rather than information on the back of the product (and hence not seen on the shelf without picking it up) is the most useful in helping consumers to make healthier food choices.[619] An EU Commission study suggests that consumers appreciate FOP nutrition labels for enabling them to acquire information relating to their purchasing decisions quickly and easily and for making them feel empowered in their choices.[620] The WHO's manual on FOPL offers guidance for countries on implementing effective, evidence-based FOPL systems in the European region.[621]

What do existing examples of FOPL schemes look like, and what makes them effective? Most are based on some combination of easy-to-follow interpretive symbol (e.g. stars), warning (e.g. indicating high in salt) and colour (using traffic light, or multiple traffic light colours). The voluntary Australia and New Zealand Health Star Rating (HSR) system for example, shown in Figure 5,[622] uses stars and there have been calls for it to use colours too (as well as to make it mandatory).[623] The voluntary FOP Nutri-Score (N-S) system first established in France and now used widely across the EU, is a good example of a colour-based system (Figure 6), as is the voluntary UK multiple traffic light (MTL) system (Figure 7).[624] All of the labels rest on underlying Nutrient Profile Models (NPMs) that provide an official determination of healthy and unhealthy (including HFSS) foods.[625]

Figure 5: Australia and New Zealand Health Star Rating system

Figure 6: Nutri-Score

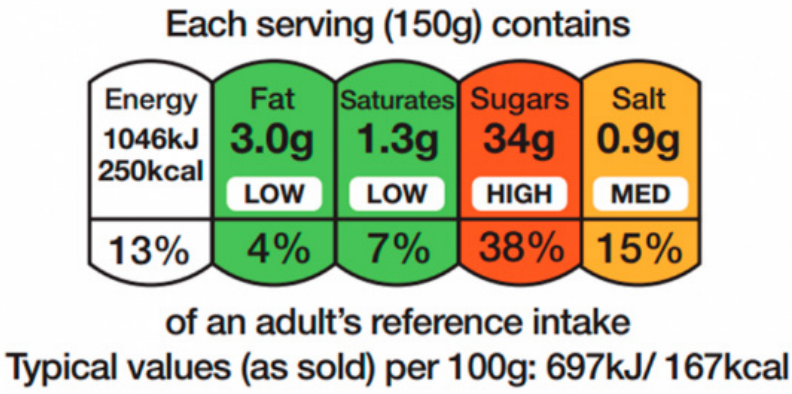

Figure 7: UK MTL system

There is evidence from some countries that stand-alone (e.g. 'high in') warning labels (WLs),[626] that specifically highlight unhealthy nutritional qualities, have been effective in discouraging the purchase of less healthy options.[627] While there are also experimental studies that likewise highlight the effectiveness of WLs,[628] one such study of UK consumers showed a greater effectiveness for N-S and MTL systems than for WLs, although all FOPLs were more effective than none.[629] In any event, comprehensive FOPL schemes such as the UK MTL, HSR, and N-S, aim at improving the *overall* healthiness of choices, encouraging not only a decrease in the unhealthy elements, but also an increase in the healthy ones (e.g. fibre in Figure 5).[630]

b) Labelling bans and restrictions to bolster consumers' healthy choices

Encouraging, or preferably mandating, the *positive* disclosure of information is necessary but not sufficient in helping with a transition to healthier diets. There are situations where *negative* restrictions around the labelling provided to consumers, including bans, may also be necessary to ensure that consumers are in a position to make healthy choices. This can include preventing misleading claims via labels about the nutritional benefits of food or drink products. It can also involve controls on appealing mascot labelling on unhealthy foods.

i. Restricting misleading nutrition and health claims on labels

In the UK, food information law requires that the food sold to consumer shall be of the nature or substance or quality demanded[631] and that the information or presentation does not mislead consumers or, worse, falsely describe food.[632] Specifically on nutrition and health claims, Regulation 1924/2006 created a list of the conditions in which such claims on food can be made, which for Great Britain post-Brexit is now contained in the Nutrition and Health Claims Register.[633] For example, in the UK, some manufacturers choose to label their food as having 'no added sugar'. To be able to make that nutrition claim, the product in question cannot contain any added mono- or disaccharides or any other food used for its sweetening properties.[634] If sugars are naturally present in the product, the label also needs to indicate that the product contains naturally occurring sugars.[635] In contrast, Australia and New Zealand are moving to ban 'no added sugar' claims on products like fruit juices that are naturally high in sugars without any added, and where that label might mislead consumers into thinking they are a low sugar option.[636] As will be seen in the section on mascot labels below, *wider* rules on misleading marketing do not apply to labelling because products and their packaging are generally not within the scope of the relevant non-broadcast 'CAP' Code discussed there.

ii. Controls on mascot labels

Empowering healthier choices is not just a matter of preventing claims that make less healthy food appear healthier than it is; it also involves preventing unhealthy elements from being glossed over by diverting non-food messaging. Food packaging is typically designed to attract the consumer's attention and entice a purchase. In the UK, cereals and other food or drink products aimed at children can display mascots on their products or packaging to attract them. These are, in effect, a type of fun label.

The role of mascots or 'licensed characters' has been deemed so influential that, to help steer children away from unhealthy choices, the Mexican government has adopted a ban on their use on the front of packaging for foods that have a high calorie, sugar, saturated fat, trans fat or sodium content. Those foods are mandated to carry a warning label on the packet in the form of a stop sign, as well as to refrain from using mascot characters. The measures are designed to help combat childhood obesity, having acknowledged the powerful influence that marketing using popular characters may have on children.

The Mexican food industry challenged the measures in court.[637] It is reported that multinational food companies have also argued about the legality of such a ban in terms of trade law. The industry regards the ban as creating unfair trading barriers contrary to WTO rules.[638] Food companies also responded with avoidance techniques, rendering the mascot ban somewhat ineffective. These included alternative marketing tactics. For example, relying on the strong power of association between the product and its mascot, Kellogg's orchestrated a campaign involving a drone show above Mexico City, with drones drawing the mascots in the sky. Other marketing campaigns included a Spotify playlist in the name of a well-known mascot, and TV advertising with well-known football stars.[639]

Efforts have also been made to modify packaging to bypass the rules. Products are now being placed on shelves with similar labels at both the front and back, with the compulsory warning only showing on one side. This enables supermarkets to display the products back to front and thus avoid consumers seeing the warning.[640] Another example is that of a pancake manufacturer who removed the mascot from the outer packaging only to print it on the pancake product itself, with the outer packaging transparent and the mascot visible.[641]

A further avoidance technique targeted the composition of products. In Mexico, artificial sweeteners cannot be used without a clear mention that the product contains them. A list of what is classed as an artificial sweetener was established, but did not include allulose because of food industry lobbying.[642] The sugar content of cereals was thus altered to replace sugar with allulose, thereby bypassing not only laws on sweeteners but also enabling producers to evade the HFSS ban on mascots. Allulose is a sweetener extracted from a few sources including figs, molasses or wheat and is reported to cause laxative effects. It has a similar chemical formula to fructose but is not absorbed in the blood. While it has been deemed safe by the Food and Drug Administration in the USA, it is not yet authorised for sale in the EU.

Current UK rules on mascots can be found in the UK Code of Broadcast Advertising (the 'BCAP Code')[643] issued by the Broadcast Committee of Advertising Practice (BCAP), and the Code of Non-broadcast Advertising and Direct & Promotional Marketing ('CAP Code')[644] issued by the Committee of Advertising Practice (CAP). Both are enforced by the independent Advertising Standards Authority (ASA). The CAP Code is media industry self-regulation whereas the BCAP Code is co-regulation because OFCOM also has an oversight role.[645]

Both the BCAP and CAP Codes contain provisions to control the use of licensed characters and celebrities in adverts targeted directly at children under 12.[646] However, unlike the situation in Mexico, using Tony the tiger as a fun 'label' on the Kellogg's cereal packet itself is not caught by the UK rules since products and their packaging are generally not within the scope of the CAP Code.[647]

6.2.3.2.2 Labelling to empower consumers to make sustainable choices

The previous section (6.2.3.2.1) examined labelling and health. In this section we turn to explore how labelling as an informational instrument can help consumers make more sustainable choices alongside improving health outcomes. Unlike current health-based food labelling, which is focused on the *product* itself, sustainability labelling typically aims to provide consumers with information on the *process* of food production. The two types of labels may of course be used together: there is, for example, emerging experimental research evidence that messaging that includes health warnings alongside environmental messaging (e.g. on high GHG emissions from animal rearing) performs better in influencing consumer choice than health warnings alone.[648]

a) Lack of information on food production and animal welfare

Animal welfare is one environmental sustainability food system problem discussed earlier (section 5.1.8) where informational instruments may be used to tackle the source of market failure – an asymmetry of information there about the production process involved in animal rearing including the conditions in which animals are kept. In the UK, 62% of respondents were more likely to buy higher welfare products if they were clearly labelled.[649] In the EU, a majority of consumers would like access to such information, including conditions on slaughter, adequate feeding, outdoor access and housing.[650] However, mandatory animal welfare labelling obligations currently exist only for eggs.[651] All eggs must be labelled as to their production methods used (free range, cage etc).[652] Other food does not have to follow labelling laws concerning animal production methods. The egg welfare labelling rules have

been deemed a successful improvement,[653] and 3 out of 4 consumers in a BEUC study were in favour of extending them to meat.[654] While there is a limited set of EU descriptors for types of poultry meat labels (free range, barn-reared etc), these are not mandatory.[655] The rules are binding in the sense that only the descriptions listed can be used, but voluntary in that, unlike eggs, producers are not obliged to label their products.

In the absence of mandatory labelling rules for other food, there has been a proliferation of claims made on packaging concerning animal welfare. Most schemes are national schemes. A European Commission study found that there were 51 different voluntary animal welfare claims in use.[656] A multiplicity of such schemes means that consumers are likely to be confused[657] and to misinterpret labels – a problem exacerbated when animal welfare claims are accompanied by wider sustainability claims.[658]

The lack of a common framework for labelling regarding animal welfare is an issue that has an impact beyond consumer choice inasmuch as it also influences competition on food markets.[659] High welfare producers seeking to export can struggle to get recognised in destination state markets, and may equally be undermined in their home state by imports from producers in countries lacking a high welfare standard where they are able to produce more cheaply.[660] The lack of high welfare standards for competing imports has been a particular point of contention raised by UK farmers in relation to the UK-Australia trade deal.[661] In the first half of 2024, Defra consulted on proposals on fairer food labelling with a view to helping consumers to better identify imports that do not meet UK animal welfare standards.[662] The Labour Government has also pledged to protect farmers "from being undercut by low welfare and low standards in trade deals."[663]

b) Environmental food information (wider sustainability claims)

What then of wider environmental sustainability claims beyond animal welfare? There is, to date, no internationally agreed standard for food eco-labelling. There is also no universal definition of what sustainable production of food means or what should be measured to conclude that a food production process is good for the planet.[664] This means consumers do not have an easy reference point to assess environmental claims made about the food they buy and consume. To influence a change in the food system, being able to know the environmental footprint of food is nevertheless an important element of the information consumers should receive – in the same way that calorie or sugar content is important to orient choice of foods and remain healthy. In the absence of a universal system, and in light of consumer demand and perceived commercial advantage, many different types of environmental claims have appeared on products labels, with the potential for confusion on the part of consumers. As a result, rather than be helped by the labelling, consumers may instead struggle to make sense of all the disparate claims.

With companies wanting to capitalise on sustainability concerns, 'greenwashing' has now become a concern for enforcement authorities protecting consumers in retail sectors. Food is no exception. A 2022 study by the food company Cargill found that 55% of global consumers were more likely to purchase a packaged food item labelled with a sustainability claim.[665] The same study determined that 51% of consumers in the UK said they placed emphasis on sustainability, a reported 8% increase in 2 years.[666] The potential for greenwashing is thus clear.

In the UK, misleading claims come within consumer protection laws, notably The Consumer Protection from Unfair Trading Regulations 2008.[667] The Competition and Markets Authority (CMA) introduced the Green Claims Code in 2021 to help businesses navigate what is and what is not compliant.[668] In 2023 the CMA announced a scrutiny inquiry into environmental claims in the fast moving consumer goods (FMCG) sector, which includes food and drink.[669] This announcement produced a rapid sectoral response, including amendments or removal of claims by some producers.[670]

It is not only claims relating to the food or drinks products themselves that are important: claims about the nature of the packaging they come in also have the capacity to mislead consumers. Much has been made, for example, of the scope for greenwashing around products claims/labels to be 'recyclable', 'biodegradable' or 'compostable'. The point is that just because product packaging can *in theory* be recycled does not mean that it will be recycled in practice. If data shows – as it does – that a very small percentage of plastic drinks bottles ends up being recycled, then it is misleading to draw consumers' attention to their recyclability.[671] Similarly, if materials are touted as biodegradable or compostable, but the conditions for them to biodegrade are seldom present, then that too is misleading without more precise information.

There is, therefore, a need to cater for the consumer's appetite for more information and assistance in making the right choices for sustainable food consumption. A more standardized system of food eco-labels, replacing the current confusing array of claims, could empower consumers to make informed purchasing decisions based on a clear understanding of how food is produced and its environmental impact. Benefits of an eco-labelling scheme may include incentivising producers into altering their production methods to match environmental credentials consumers come to expect (in the same way that information on nutrition can lead to reformulation).

Worldwide, there are over 450 ecolabels in 199 countries in 25 industry sectors, with 147, mostly *specialist*, labels on food.[672] Currently there is a lack of agreed *general* standards for ecolabelling of food meaning that there is no consistent benchmark.[673] This presents a risk of misinformation.[674]

In the UK, the Sunak Government had no plans to introduce a mandatory food eco-label, nor to endorse an existing or new eco-labelling scheme, citing limited evidence that eco-labelling has an impact on consumer and business behaviour.[675] However, recognising that voluntary ecolabels were being used, the Government acknowledged that it was "important that they provide fair and accurate representation of a product's environmental impact, so that genuinely more sustainable products can successfully differentiate themselves."[676] Thus the Government was supportive of quantification of environmental impacts and improving the data on which this is based, endorsing a life cycle assessment (LCA) approach as the gold standard in this regard.[677]

Ecolabelling also has the capacity to provide assurances in relation to the issue of packaging material discussed above. LCAs for food and drink ecolabelling may include information on the percentage recycled content used in the packaging and on its post-use recyclability or biodegradability. Organic labels, for example, consider packaging as part of the certification process:

> Our packaging standards aim to maximise the benefits and avoid the negative impacts of packaging. They extend throughout the food supply chain to ensure that sustainability is built into the whole packaging cycle and aim to embed the organic principles into product packaging wherever possible. When people purchase organic products certified by Soil Association Certification, they can do so with the confidence that the packaging is consistent with organic principles of Health, Ecology, Fairness and Care.[678]

6.2.3.3 Dietary guidelines and other food literacy tools

a) Dietary guidelines

Dietary guidelines are another type of informational instrument that can be used in helping in the transition to a healthy (and potentially also sustainable) diet. As seen at the start of this report (section 3), many examples of such guidelines exist. In the UK, recommendations such as 5-a-day are now

relatively well known by the public following television advertising campaigns and general signposting at GP practices and other places where nutritional information can be effectively delivered (including schools). The guidelines in the UK are embodied in the Eatwell Guide.[679] The Guide was developed in 2016 to encourage healthier choices and has been regularly updated and revised since then. Modifications were the result of updated research on dietary requirements rather than prompted by the effectiveness or lack thereof of the informational messaging. However, sustainability was not a guiding aspect in developing the guidelines: they were not made with sustainability goals or the Paris Agreement in mind. Indeed, sustainable diets have been afforded very little consideration in UK policy development.[680]

In 2016, Public Health England commissioned the Carbon Trust to help them understand the environmental impacts of the guideline Eatwell Guide diet when compared to actual diets.[681] The Carbon Trust's report concluded that:

> the Eatwell Guide shows an appreciably lower environmental impact than the current UK diet ... We also note that parallel improvements in production efficiency and waste reduction will help too. A number of differences contribute to the reduction, such as increasing potatoes, fish, wholemeal & white bread, vegetables and fruit whilst reducing amounts of dairy, meat, rice, pasta, pizza and sweet foods.[682]

While the recommendations may therefore help improve the sustainability of UK food consumption habits, this outcome is merely a general byproduct of a healthier diet rather than an explicit goal in its own right. However, it is not realistic to expect consumers themselves to make specific comparisons between health information with sustainability goals and to adapt the dietary guidelines accordingly.

Hence, the UK government needs to arrive at a revised set of guidelines that also focus on sustainability in healthy diets. In Germany, the German Nutrition Society's new nutrition recommendations do just that. The recommendations omit unhealthy processed foods, and alcohol, altogether and limit eggs, meat and fish to a very small proportion of the diet.[683] This updated guidance follows in the footstep of the Nordic Nutrition Recommendations, which likewise consider both sustainability and health in arriving at a mostly plant-based diet.[684] In the UK, more needs to be done to achieve the 20% reduction in meat and dairy consumption by 2030 recommended by the UK Climate Change Committee for the UK to meet its net zero climate target.[685]

However, despite long-standing dietary guidelines, studies show that consumers are not eating in line with them. In the UK, poor diets are endemic, with high levels of adult and childhood obesity.[686] Consumers are also far from eating more plant-based diets. In the EU, meat consumption is still 2 to 4 times higher than the recommended intake.[687] In Scotland, only around one in five adults (22%) consumed 5-a-day fruit and vegetables in 2019, not very different to 2003 levels (21%).[688] While 2023 UK-wide figures show a more encouraging 33% reaching the 5-a-day target, the UK has among the highest obesity levels in the developed world.[689] Thus, although necessary, UK dietary guidelines are clearly not sufficient to secure a transition to a healthy diet – let alone a healthy *and* sustainable one.

b) Consumer education

Like labelling and guidelines, education should not be seen as a silver bullet but, rather, as one tool to be used among a range of measures:

> Education is not the answer; despite marketing campaigns like Change4Life and Better You, as well as an app to help make healthier choices, these initiatives have not resulted in sustained or widespread behaviour change.[690]

Those existing educational initiatives are targeted at the general population. Change4Life, later rebranded as Better Health, targets families and offers a range of tools such as information on the 5-a-day campaign, recipes, information on healthier food swaps etc.

The campaign essentially runs alongside school education. In that area, the *National Food Strategy* proposed a bolstering of the school food programme and the launch of an 'Eat and Learn' initiative with a number of key action points[691] seeking to improve the delivery of education on food in schools. Although an important initiative, if parents are not provided with the same knowledge and understanding, then efforts in schools may not yield effective results. The Better Health programme therefore needs to continue to make strides.

At present, much of the wider food education in the UK is delivered online, but it is for consumers to search for it, sometimes prompted by TV campaigns or GP advice. Consumers can find educational materials in several places. The NHS website for example, carries some information on healthy eating. Its 'Eat well' section contains information on how to eat a balanced diet, food guidelines and labels, 5-a-day, food types and digestive health.[692] The site also discusses food labels and includes information on traffic light colour coding.[693] However, the information is basic and puts the onus on the consumer to take the time to study labels and understand their meaning.

As a result, there is a need to complement government intervention to ensure positive media content relating to healthy food habits can reach a maximum number of adults and that any inspiration taken from there can easily be acted upon.

Cooking programmes are plentiful on British TV. They contribute by demonstrating skills and inspiring good eating habits. They also often feature positive messages around the provenance of food and understanding production which contribute to appreciating the sustainability aspects of the food system. Some chefs/programme hosts produce meals using their own home-grown ingredients or feature local food producers.[694] Some programmes focus on cooking on a budget,[695] while others have started to explore the link between the health merits of a plant-based diet and sustainability.[696] More content in that vein could help encourage consumers to switch away from their current diet and embrace more HSD. This is particularly useful to change the *social norms* around food.

Consumers obtain significant amounts of information today from social media, and hence positive activity in this sphere is also essential to educate the population to eat healthily and more sustainably. However, much of the efficacy of *positive* education is premised on how much *negative* content around food can be prevented from reaching consumers. Some of this is online educational misinformation, including by social media influencers, which requires better regulation. Other forms of negative information can come via advertising and marketing, controls on which are discussed below.

6.2.3.4 Controls on advertising/marketing

Section 6.2.3.2 above covered labelling as an informational instrument and included discussion of legal controls on misleading labelling claims, both health and greenwashing related. However, misleading claims can arise not just on product labelling, but also in media advertising. And, even when not *misleading*, advertising of *harmful* products may still be leading to inefficient overconsumption of unhealthy or unsustainable products (with producers not paying for the externalities associated with that overconsumption such as obesity related disease impacts and healthcare costs). Marketing strategies – for example around product placement location in retail stores and display multibuy offers – are also a form of visual information communication to consumers which may lead to overconsumption of unhealthy products (and underconsumption of healthy ones).

To assist consumers, rules are needed to define the limits of what advertising and promotions are acceptable. While the CMA is the primary UK consumer protection authority, on advertising it shares its consumer protection functions with the Advertising Standards Authority (ASA). The ASA's work includes "acting on complaints and proactively checking media, to take action against *misleading*, *harmful* or offensive advertising, promotional and direct marketing."[697] As seen in the discussion on mascots in section 6.2.3.2 above, the ASA enforces two advertising Codes, concerning broadcast and non-broadcast advertisements.[698]

Misleading environmental claims are caught by rule 11 of the CAP Code and nutritional food claims by rule 15 and, for broadcast advertising, by BCAP Code rules 9 and 13 respectively. On *harmful* advertising, the current broadcasting BCAP Code bans HFSS food product adverts during dedicated children's (under 16) TV programming.[699] Whether a food is HFSS is determined by the UK Nutrient Profiling Model (NPM).[700] However, HFSS TV food adverts are also broadcast during peak family viewing time (5.30–9pm) when children are also likely to be watching. The previous UK Government therefore sought to introduce a ban on TV[701] advertising of HFSS products during this period, under the Communications Act 2003.[702] The Act also bans paid advertisements for HFSS foods on the internet at all times, the wording of which is also likely to cover social media 'influencers'.[703] SMEs are exempted in both instances. Although the Conservative Government delayed implementation of the measures,[704] Labour introduced regulations to bring them into force from 1 October 2025.[705]

The CAP Code likewise restricts advertising of HFSS to under 16s across non-broadcast media. Advertisers are banned from advertising in media that is directed at children or any other media where under 16s make up more than 25% of the audience.[706]

Both the BCAP and CAP Codes contain provisions to control the use of licensed characters and celebrities in adverts targeted directly at children under 12.[707] However, their use is not restricted if the advertising is not thus targeted, nor where the character is self-created by the brand itself. Thus, using Peter Rabbit on a Cadbury eggs family holiday competition advert was held not in breach of the CAP Code because it was directed at adults.[708] Similarly, TV adverts using Kellogg's Tony the tiger would not be caught by the BCAP Code mascot restrictions because it is a self-created brand character. However, Kellogg's stopped advertising Frosties on children's TV after the current BCAP Code banning HFSS food advertising in children's programming came in. In other words, it was the dedicated children's TV rule and not the mascots rule that led to that.[709]

Billboard advertising of HFSS food is also an issue. Although the ASA has, for example, ruled ice cream advertising within 100m of a school in breach of the CAP Code, beyond that, the Code does not place restrictions on it.[710] To fill this regulatory gap, a number of local councils as well as organisations like Transport for London have used their contractual freedom to introduce own-estate bans on HFSS adverts on their rented billboard spaces.[711]

As for visual information associated with marketing, the restriction of volume and location promotions of unhealthy food was one of the tools identified in the Johnson Government's 2020 obesity report.[712] Legislation was introduced in the form of The Food (Promotion and Placement) (England) Regulations 2021,[713] restricting multibuy promotions (e.g. BOGOF) and placement of less healthy or HFSS food and drink in high visibility locations (e.g. end of aisle). The measures on location promotions came into force in October 2022,[714] but the measures on volume pricing (BOGOF etc) were delayed by the previous Government until 1 October 2025.[715] Local authority capacity to enforce these measures is also a crucial part of the implementation picture, and a lack of funding has impeded this.[716]

6.2.3.5 Farmer education, training and advice

Just as consumer information can play a role as an instrument in the transition to HSD, so too can information at the producer end of the food system in the form of education, training and advice for farmers.

In achieving the transition, behaviour change by farmers as well as consumers is needed. Farmers are not necessarily opposed to change, and education (including peer-to-peer) can be a tool in helping to achieve it. But education has to be applied in context. To make changes – e.g. to mitigate their GHG emissions – farmers need to not only understand the issues, but also to see how they apply within the context of their own farm, and its profitability.[717] Likewise important for behaviour change are "demonstrating clear links between environmental and economic benefits, and ensuring practical options are available."[718] In a New Zealand study, the need for education was clear, as many farmers were not able to answer accurately a series of questions on the impact of farming on the environment.[719] While education is a tool in its own right for helping with farmer behaviour change, farmer information and advice is also a crucial supplement to other regulatory instruments seeking to achieve that change, such as command-and-control and pricing instruments.[720] A practical example of this can be seen in a Welsh case study, where a grant-paid advisory service assisted a farmer in drawing up a nutrient management plan, helping to prevent nutrient overload and to improve the economic sustainability of the farm through reducing bought-in fertiliser input costs. Here, subsidised advice aided compliance with command-and-control rules on nutrient management.[721] Thus, farmer education, training and advice, while not sufficient on its own to alter practice, is a necessary part of any broader package of intervention.

6.2.3.6 Corporate and farm reporting

Reporting by actors in the food sector, including companies and farmers, is a further informational instrument for helping in the transition to a healthy and sustainable food system.[722] Unlike labelling above, which is directed at consumers, reporting potentially serves a range of stakeholders including government, regulators, investors and lenders, NGOs, the media and the reporting company or farm itself. Which of these stakeholders is served by reporting depends on the precise content and scope of the relevant reporting requirements.

As the saying goes, "what gets measured, gets managed". Over-optimistic that may be, but if a company has to disclose or report on something, then it has to measure it. What that 'something' is, is important. In relation to climate change, under UK law, that something can be material financial risk and opportunity posed *by climate change to the company* in the form of physical climate risks and transition risks and opportunities, as well as any climate targets they have set.[723] Mandatory climate-related financial disclosure requirements along these lines currently exist for listed and large companies,[724] including those in the food sector. But that something can also be GHG emissions, which is more related to risks posed *by the company to the climate*. Under UK law, listed and large companies, including those in the food sector, are currently only required to disclose their Scope 1 and Scope 2 emissions in annual reports under the Streamlined Energy and Carbon Reporting (SECR) framework.[725] However, in late 2023, the Conservative Government consulted on extending this to scope 3 value chain emissions.[726] For supermarkets, that might, for example require them to report on customers' food waste emissions as well as those from suppliers, including farmers.

The stakeholders served by the two UK climate reporting measures above are different. While both types should help the company itself, the reporting of information on financially material risks,

opportunities and targets, under the first, is principally aimed at investors and lenders. The SECR GHG reporting obligations, in contrast, serve not only investors and lenders (for whom such data may be a proxy on transition risk), but also wider stakeholders such as climate NGOs and the media, enabling them to hold businesses to account for their emissions. Both types can help with the HSD food system transformation. Investors and lenders can support low carbon food businesses or those taking meaningful steps to decarbonise. And wider stakeholders can use reported Scopes 1–3 emissions both to pressure food businesses to reduce them and to hold them to account by comparing them with promises made in corporate net zero targets and transition plans.

There have also been increasing developments around the disclosure of *nature*-related information by corporates, involving the extension of reporting requirements beyond just climate change as a food systems problem, to include biodiversity loss and associated nature-related risks.[727] The EU Corporate Sustainability Reporting Directive[728] (CSRD) contains wider nature reporting obligations in addition to climate, as does the EU Corporate Sustainability Due Diligence Directive (CS3D).[729] Where UK food companies operate across the EU, they may be caught by these directives. For other UK companies, while the former UK Conservative Government expressed support for the *voluntary* Taskforce on Nature-related Financial Disclosures (TNFD), it had no plans for making nature-related reporting mandatory for UK companies.[730]

As an informational instrument, reporting intersects in important ways with other regulatory instruments. First, as in the case of New Zealand at the time when it was planning to include agricultural GHG emissions within an ETS,[731] measuring agricultural emissions and reporting on these is a necessary prelude to the eventual introduction of an ETS,[732] or indeed an agricultural carbon tax. Second, the independent UK *National Food Strategy* advocates corporate reporting on *voluntary* action so that government, investors and other stakeholders can see what business are doing and respond accordingly:

> We do believe that food retailers and hospitality businesses want to be part of the solution. However, voluntary measures work best if they are monitored and subject to public scrutiny. We therefore recommend that there should be a statutory duty for all food companies with more than 250 employees – including retailers, restaurant and quick service companies, contract caterers, wholesalers, manufacturers and online ordering platforms – to publish an annual report on the following set of metrics [it then proceeds to list sales of: HFSS food and drink excluding alcohol; protein by type (meat, dairy, fish, plant, or alternative protein) and origin; fruit and vegetables; and fibre; and then also total food and drink sales and amounts of food waste.[733]

The previous UK Government responded to this in the *Government Food Strategy 2022*.[734] It promised a number of mandatory reporting requirements in relation to large food and drink companies, including reporting against a set of metrics on health, sustainability and animal welfare.[735] Like a number of other informational instruments discussed above, *health*-related reporting on HFSS and healthy food sales is dependent on Nutrient Profile Models (NPMs).[736] However, citing a wish to avoid imposing additional costs on business in the cost of living crisis, the Government chose not to proceed,[737] despite the following benefits listed in its 2022 Food Strategy:

> Reporting will allow for better comparability and scrutiny across the sector, allowing government to regularly report on the impacts of the food system – the independent review made the strong case for a more transparent system being fundamental to stimulating positive change.[738]

The Conservative Government dropped plans for mandatory food waste reporting on similar, cost grounds,[739] despite it being an important instrument for helping to assess the delivery of food waste targets discussed in section 6.1 above. While mandatory food waste reporting is advisable for all parts of the food system, including farms, it has been particularly widely called for in relation to supermarkets. As the campaign group Feedback has observed:

> Tracking the effectiveness of supermarket action on food waste requires accurate and transparent data. Transparent data is important as it enables citizens, business and policy-makers to compare the best and worst performing retailers. Transparency also enables government, social entrepreneurs and charities to create data driven solutions ... Additionally, without clear and detailed data, it is difficult to take seriously supermarket claims that they are implementing targeted action to prevent waste.[740]

In 2023, Feedback sought judicial review of the Government's decision not to proceed with mandatory food waste reporting after its consultation exercise.[741] While this challenge apparently prompted limited further closed consultation with industry, it did not lead to a change in the policy decision.[742]

Policy recommendations on informational instruments

The Government should:

- **Recognise the limitations of labelling as a means of changing consumer diets.** Careful assessment is needed of the ability of consumers to use the information provided to effect change in eating habits. Consumers are not a homogenous group and while labelling will work for some, there are others whom it will have difficulty reaching.
- **Consider the efficacy of informational tools as part of a package of tools and not as a reflex 'go to'.** Information is seldom effective on its own. However, on the producer level, it can often act as a crucial supplement to other regulatory instruments such as subsidies, emissions trading and environmental permitting. At the consumer level, information will be used by some, but helping others to avoid unhealthy food is likely to require changes to the product to make it healthier. That requires other policy levers such as levies or taxes.
- **Favour mandatory front of pack, traffic light and warning message labelling.** These have, to date, proved to be the most effective at delivering messages to consumers about food that has particularly poor health outcomes.
- **Consider banning mascot 'labels' on food products and packaging.** Mascots are generally aimed at children and young people. They should be banned where they are used as a means of enticing people to purchase unhealthy food products.
- **Carefully consider the interaction between sustainability and health labelling.** Using labelling to communicate with consumers about both the health and sustainability qualities of food products brings its own challenges. Interaction between sustainability and health labelling needs careful attention so that consumers do not confuse the two.
- **Introduce a mandatory, standardised but comprehensive methodology for food ecolabels.** Food ecolabels are an important part of the messaging on sustainability and may help to drive consumer and producer behaviour change. While official product ecolabels have long featured

in many sectors, food has largely been missing. An official scheme, or, failing that, a mandatory methodology, is a means to ensure that consumers are not confused by multiple manufacturer examples, each based on different life cycle assessments of sustainability.

- **Complement labelling with education for consumers, not only on food but also on how to read labels effectively to maximise the benefits of labelling requirements.** Food education and literacy are informational levers for behavioural change in their own right, including by helping to shape social norms. However, they are also important complements to food labelling as an informational instrument.
- **Ensure that advertising and marketing does not overstate the positive health and environmental credentials of food products, thereby misleading consumers through health washing or greenwashing.**
- **Ensure advertising of harmful food products that have poor health and environmental outcomes is tightly controlled on TV, online and offline and consider extending restrictions where necessary.** Ensure too that the marketing of such foods is controlled. There is no use creating good food environments if these are then undermined by bad ones. The Labour Government's implementation of laws banning advertising of unhealthy HFSS foods in family TV viewing time before 9pm is a positive step. However, controls on HFSS food advertising could be further extended.[743]
- **Put in place mandatory reporting requirements for the production and retailing of food that is unhealthy or damaging to the environment as well as food waste arisings.** As the voluntary instrument recommendations below state, reporting on food waste should be made mandatory, as should corporate reporting on HFSS food sales.
- **Ensure that the farm production side is also educated and alive to poor health and environmental outcomes as part of supporting farmers to make the transition towards HSD.** Farmer education is an important informational tool in aiding the transition. If farmers understand and are onside with the changes that need making, they are more likely to help make the necessary changes. However, evidence suggests that this information needs to be specific to particular farms and their local contexts.

6.2.4 Voluntary approaches

This section considers the legal status of many of the targets and instruments discussed in previous sections (e.g. whether labelling schemes are voluntary or mandatory) as well as discussing voluntary instruments as a measure in their own right within voluntary environmental programs (VEPs).

How far can voluntary approaches take us towards achieving the necessary transition to HSD in the UK? What do they add to the HSD instrument toolkit beyond instruments that are always mandatory (like environmental permitting within command-and-control), or where instruments can be mandatory (economic instruments like ETSs and taxes, or informational instruments like labelling) *or* voluntary (subsidies as economic instruments, or voluntary labels)? Of course, that something is *voluntary*, does not necessarily mean that it is not set out in *law*. Some may not be: food producers may, for example, have their own informal environmental labelling on products.[744] However, voluntary instruments are often *inscribed in legislation*, including subsidies, many voluntary labelling schemes, and some voluntary organisational environmental management schemes.

Voluntary instruments tend to sit within, or form part of a voluntary instrument programme (VEP). These are typically categorised based on who initiated them,[745] and how they are structured. They may be private voluntary VEPs unilaterally initiated by industry; "public voluntary VEPs initiated by government"; or structured as voluntary agreements between government and industry.[746]

The ISO 14001 environmental management standard is an example of the first of these (a private voluntary VEP initiated by industry). The government's voluntary sugar reduction programme (which set a voluntary target or ambition for the food industry to reduce sugar by 20% by 2020 in foods such as breakfast cereals and yoghurts) is an example of the second, as are the EU's Eco-Management and Audit Scheme (EMAS) and the EU ecolabel scheme. These latter three are all public led voluntary schemes, although only the latter two are inscribed into law. Post-Brexit, neither EMAS nor the EU Ecolabel Regulation applies in Great Britain. EMAS never had significant UK take-up, with only 17 UK-registered organisations as against more than 16,000 for the global, but weaker ISO 14001 standard.[747] Data on the ecolabel suggests that there were 50 UK organisations using the EU Ecolabel,[748] across around 500 products.[749] However, food and feed products are, in any event, not currently covered by the EU ecolabel.[750] The Courtauld Commitment 2030, discussed in section 6.1 on targets above, is an example of the final type of VEP above. Structured as a voluntary agreement between government and industry, it is aimed at delivering reductions in food waste, GHG emissions and water use across the sector from farm to fork.

The advantages typically claimed for voluntary approaches is that they offer more flexibility than command-and-control regulation, they play a gap-filling role in addressing environmental issues not currently subject to mandatory regulation, and they encourage firms to go 'beyond compliance' with existing command-and-control regulation to make further, voluntary improvements to their products or processes.[751] The advantages they offer to firms may include attracting green consumers (for example through voluntary sustainability labelling), helping to cut costs by identifying efficiencies (e.g. via environmental management systems), and buying time from or fending off costly mandatory regulation.[752] The main question mark against them relates to their typical effectiveness.[753] In practice, firms are only likely to take voluntary action that does not affect their competitiveness; they will not take costly voluntary, unilateral action that other firms are not taking which threatens this.[754] Industry-wide voluntary agreements can to some extent alleviate this collective action problem where they ensure that a sufficient number of participants sign up. And a credible legislative 'stick' threat as a background to voluntary programmes may also increase their effectiveness.[755] In the end, voluntary instruments are best considered as useful supplements to mandatory regulation, which may help to achieve small improvements in environmental or health outcomes at relatively low cost. However, because of free rider problems, they should not be considered as alternatives or replacements for mandatory regulation. In policy design terms, their future role has to assess their advantages and disadvantages in particular settings in comparison with mandatory regulation.[756] Any such assessment of disadvantages should consider the lock-in potential of voluntary measures and how this may delay the introduction of effective legislation.

Voluntary approaches are often pushed for by industry so as to promote their interests, with financially powerful large multinational food corporations often translating this into political power to lobby against mandatory regulation. It has, for example, been alleged that the part of The Food (Promotion and Placement) (England) Regulations 2021 on multibuy offers (e.g. BOGOF) on HFSS food was delayed[757] until October 2025 by the previous Conservative Government because of lobbying by the food industry.[758] However, as will be seen with food waste reporting below, large food companies do not always lobby *against* mandatory measures – on occasions they publicly push *for* them.

Perhaps the most notable UK example of a mandatory instrument replacing a previous voluntary one in the food sector is the soft drinks industry levy or 'sugar tax', which was introduced in 2016 and entered into force in 2018. This replaced the previous 2011 voluntary agreement in the form of the *Public Health Responsibility Deal*,[759] which had produced little impact on levels of obesity. As noted earlier, the levy led to widespread product reformulation, lowering sugar in relevant products so that manufacturers escaped the tax threshold. However, product reformulation to cut sugar levels in food and drink not within scope of the levy – including for example milkshakes, fruit juice, sweets, cakes, biscuits and breakfast cereals – remains voluntary under the 2016 *Voluntary Sugar Reduction Program* started by Public Health England (PHE).[760] This program set an ambition for the food industry voluntarily to reduce sugar by 20% by 2020 in these food categories. As the 2022 *Government Food Strategy* notes, it has seen mixed progress, although sugar in breakfast cereals and yoghurts has been reduced by around 13%.[761]

There have been widespread calls by food health campaigners and others to extend the current levy so that these other products are also caught by the mandatory incentive it provides, and to widen it to include other elements of HFSS, notably salt.[762] Reflecting the level playing field competition point made above, the Dimbleby *National Food Strategy* observes that the CEOs of large food companies had privately mentioned the need for such mandatory measures as the only way to make it economically possible for them to introduce the necessary reformulation changes.[763] The Strategy thus goes on to state that "[v]oluntary action alone will not be enough which is why we are calling for the world's first Sugar and Salt Reformulation Tax."[764]

Food reporting, discussed briefly in section 6.2.3.6 above, is another key area where there have been calls to rely on a mandatory rather than voluntary approach, including in relation to reporting on food waste and HFSS food.

The existing voluntary reporting scheme for food waste exists as part of the WRAP-led Courtauld Commitment 2030 targets on food waste discussed in section 6.1 above. Under the UK Food Waste Reduction Roadmap, food and drink businesses use a 'Target, Measure, Act' toolkit – adjusted in 2023 to clarify that measure means 'measure and report'[765] – to report to WRAP annually.[766] The Government's 2023 response to its consultation on whether to make food waste reporting mandatory for large companies noted WRAP information showing that the businesses measuring and reporting data "collectively saved 251,000 tonnes of food from going to waste in 2021, worth £365 million."[767] However, set against WRAP's 2021 estimated total UK food waste arisings[768] of 10.7 million tonnes,[769] this is a relatively modest figure, which raises questions about the effectiveness of voluntary reporting.[770] Feedback has argued that mandatory measuring and reporting is key to improving things.[771] Following consultation – and despite majority support from the large food companies which responded[772] – the Conservative Government cited regulatory cost as a reason for deciding not to introduce mandatory food waste reporting. As noted in section 6.2.3.6 above, they stepped back from that decision after the threat of a judicial review challenge by Feedback and were reported as conducting a further, closed, industry consultation exercise in 2024.[773] Major supermarkets and food manufacturers, including Waitrose, Tesco, Aldi and Sainsbury's, Nestlé, and Danone, have since publicly called for mandatory action on food waste reporting.[774]

Reporting on healthy versus 'junk' or HFSS food sales by manufacturers, supermarkets, restaurants and food platforms is an important accompaniment to the setting of corporate targets to increase sales of healthy foods discussed in section 6.1 above. Measuring and reporting enables companies and wider stakeholders to see how companies are progressing against those targets. Healthy food reporting in the UK is currently voluntary under the Food Data Transparency Partnership (FDTP).[775] The FDTP is a

partnership "between government, industry and experts" to "improve the environmental sustainability and healthiness of food and drink through better food data."[776] The Health Working Group was created under the FDTP to "consider metrics that support food and drink companies to voluntarily report on the healthiness of their sales in a consistent format", based on the assumption that transparent data will enable and incentivise companies to measure progress on improving the healthiness of their food.[777] Current industry practice is inconsistent. For example, of those who report, some food companies do so only for own-brand, and others for both own-brand and branded; and some report based on tonnage and others on the unit volume of sales.[778] As noted in the section on reporting in 6.2.3.6 above, the Dimbleby *National Food Strategy* called for a mandatory statutory duty on large food companies to publish an annual report on the sales of HFSS food and drink (excluding alcohol) as well as sales of fruit and veg, different types of protein,[779] and fibre.[780]

As seen in section 6.2.3.2, food eco-labelling is also currently voluntary. The FDTP announced in 2024 that the Conservative Government had no plans to introduce a mandatory food ecolabel.[781] One reason given for this was the limited evidence of the impact of eco-labelling on consumer and business behaviour,[782] meaning that the costs of introducing it would outweigh any benefits. However, in accordance with its terms of reference, the FDTP Eco Working Group was continuing to look into a mandatory *methodology* for eco-labelling to improve the data and basis on which environmental impacts are quantified.[783]

Policy recommendations on voluntary instruments

- **Voluntary instruments are generally of limited effectiveness because companies are not willing to make significant changes to their unhealthy and less sustainable food products due to competitiveness concerns.** Mandatory obligations across all companies remove such concerns and create a level playing field.
- **Voluntary approaches to sugar and salt reduction have not been sufficiently effective and both should be made subject to mandatory levies (in the case of sugar beyond the existing Soft Drinks Industry Levy).**[784] The sugar levy has been effective but its scope is limited to drinks and only certain types of those. The levy should be extended to more drinks, especially those aimed at children like milkshakes, as well as to food including biscuits, yoghurts, cakes, breakfast cereals and sweets. Salt is also a health concern and would similarly benefit from the product reformulation incentivisation provided by a levy.
- **Voluntary restrictions on multibuy or BOGOF offers on HFSS food need to be replaced by mandatory restrictions.** These are already in place in the law – the relevant part of the regulations simply needs urgently implementing. See further the recommendations on informational instruments, above.
- **Reporting on food waste should be made mandatory.** Mandatory food waste reporting is advisable for all parts of the food system, including farms. However, it has been particularly widely called for in relation to supermarkets. The previous Conservative government dropped plans for mandatory food waste reporting on cost grounds. This was despite it being supported my many large food companies and despite its importance in helping to assess the delivery of food waste targets.

- **Reporting on HFSS food sales by large businesses should be made mandatory.**[785] Reporting on healthy versus unhealthy HFSS food sales by manufacturers, supermarkets, restaurants and food platforms is an important accompaniment to the setting of corporate targets to increase sales of healthy foods. Measuring and reporting enables companies and wider stakeholders to see how companies are progressing against those targets.
- **Although food ecolabelling should probably remain voluntary, a mandatory methodology for those using eco-labels on food should be introduced.** See further the recommendations on informational instruments, above.

7. Conclusions

While driven by a range of factors, the relative space in this report dedicated to each type of instrument in part reflects the popularity of those instruments in both the public policy literature and in practice, with informational instruments enjoying a dominant place.[786] Their dominance is connected with their level or intensity of intrusiveness as a policy instrument when compared with economic instruments and command-and-control approaches.[787] Along with nudging as an instrument (not considered in depth in this report), informational instruments sit on the less intrusive end of the policy instrument spectrum. Voluntary instruments are also on the less intrusive end, although many of these are of course themselves informational (e.g. voluntary labelling, and voluntary reporting).

Along with targets as a tool, government and industry tend to reach for these less intrusive instruments first, for a range of reasons including regulatory cost, freedom of choice, and flexibility. However, their use often comes at the expense of other key regulatory values, notably effectiveness.[788] More intrusive instruments may involve additional regulatory costs to business, but those costs are often outweighed by the health and environmental benefits they can bring via increased effectiveness.

Achieving a *healthy* diet is partly about securing appropriate behaviour change on the part of consumers. We know what a healthy diet looks like – the dietary guidelines on that are clear. People need to behaviourally steer their diets away from the unhealthy elements (like HFSS food, processed and red meat etc) to the healthy ones (fruit and veg, fibre, legumes, oily fish etc). They can *steer themselves*, guided by information, including national dietary guidelines and voluntary or mandatory labelling. And they can also be *steered by* voluntary, nudging-style choice architecture, which makes the healthy option the default or the easier one to choose.

But we know that this is not enough.[789] Behaviour change will not easily happen if people are confronted by, not good choice architectures, but bad ones (like BOGOF marketing displays for unhealthy food, or food swamps full of takeaway food outlets), or if good information (like dietary guidelines) is drowned out by bad information (like advertising of junk food). The creators of those negative food *environments* (often linked to *services* like advertising, marketing, and retail) have tended not to change them voluntarily. Hence we need mandatory policy levers like strict planning controls on takeaway density and location,[790] and bans on HFSS food advertising.

We know therefore that a range of policy instruments, including "financial incentives, bans and mandates, information campaigns, and, more recently, nudges", provide "concrete opportunities for governments to stimulate behavior change."[791] And it is also clear that, to change behaviours effectively will, in many instances, require the use of mandatory rather than voluntary levers.

However, regulation towards healthy diets is not all about consumer behaviour change[792] and the food environments, services and information that encourage or hinder that. It is also about the *product*. We can steer people towards good food products (and restrict steers away from these), but we also need to make the bad food and drink products better, because social realities mean plenty of people will still not choose the good.[793] In other words, even with steering efforts, many consumers will not change their behaviour, so we must change the product. Thus, regulation towards securing healthy diets is not all about individual consumer *behaviour change*: we also need the levers associated with *product regulation*. However, producers are unlikely to change products very much on a voluntary basis due to competitiveness concerns (will consumers choose their healthier reformulated product if it is the only one on the market?). Those concerns limit *producer* behaviour change. That product change therefore needs to be shaped by command-and-control or sugar tax-style economic instruments, so that all producers are legally obliged or strongly incentivised to make their unhealthy food and drink healthier.

Figure 8: Types of regulation involved in HSD transformation

In examining the regulatory levers needed to produce a transformation in the UK to healthy and sustainable diets, the report highlights that those levers are different when one adds sustainability into the picture along with health. This is illustrated in Figure 8 above. Health is mostly about the product itself, especially its nutritional content. Although, as just discussed, the environment (including the informational environment) around the *consumption* of that product is also important, a healthy diet is not typically a matter of what, in the trade literature, are known as process and production methods (PPMs).[794] The word 'typically' is important here because many, in both the UK environmental movement and farming, are concerned by the implication of PPMs on human health, including genetic modification (GM) and gene-editing techniques, excessive pesticide use, and the use of growth hormones and excessive antibiotics in livestock rearing. The UK has high precautionary health-based standards on many of these – often reaching for command-and-control type bans on the PPM used (e.g. GM, or use of growth hormones). The US, in trade disputes and discussions with the EU and the UK, has historically routinely contested the basis for such bans, arguing that the resulting food products are safe for human consumption (and that the PPMs used are thus irrelevant).[795] In any event, these are generally[796] more a matter of food *safety* in relation to health, and not about the *nutritional value* of the foods concerned, which is the main focus of most of the policy discussion on the transformation of diets. Recent public concerns over ultra-processed foods (UPFs) likewise involve the effects of processing. However, it would amount to regulatory overreach to ban or restrict all processing, because it is so widespread and some of it produces clear benefits. For the moment, the regulatory focus with UPFs therefore still remains on the nutritional features of the product (e.g. the HFSS content of UPFs).[797]

However, while *healthy* diets are mostly about the healthiness of the product itself (and mostly then about nutrition) and not about PPMs – and for the US they have always been about the product itself – *sustainable* diets are different. PPMs there are much more important. Even if pesticides for example do not impact human health on consumption, their use in the production of food can pollute the environment. Similarly, intensive agricultural production methods that produce or use large quantities of manure and fertilisers can, as we have discussed, lead to problems of nutrient pollution and harm to biodiversity.

Much of *environmental* sustainability is about PPMs – which leads many to suggest *process* changes such as switching to regenerative agriculture or to organic or agroecological production methods. What then of the social and economic side to sustainability? We have seen that, for consumers, issues like physical access and affordability of HSD food are about the food environment and positive choice conditions. Those are obviously not PPM-related (not least because they involve the *consumption* level). But at the production level, labour-related food system problems like low wages or poor EDI practice are PPM-type issues.

Beyond possible international trade law (WTO) implications of national regulations aimed at PPMs as opposed to products, why does this distinction matter for regulatory levers? It matters because the transition to a *healthy* diet requires one set of policy levers (around the food environment but also the product). And, as noted above, the health destination is clear – we know what a healthy diet looks like. However, a transition to a healthy *and environmentally sustainable* diet requires another set of levers (mostly for producer behaviour change to make process and production methods more sustainable). And, as Röös observes, "there is no clear definition of the term 'environmentally sustainable food consumption' because it depends on what is included in the term and in what context the term is used."[798] However, the two objectives, health and the environment, will often be in harmony (eating less red meat, for example, is likely to be positive for both health and environmental sustainability), but may at times be in conflict (intensively-grown monocrop healthy food may end up plentiful, but at a cost to the environment). Adding to environmental sustainability the transition to a *socio-economically sustainable* diet complicates the picture because it involves both sets of levers. From the perspective

of socio-economic sustainability for consumers, the levers are, again, more concerned with achieving positive choice conditions rooted in food justice. From the perspective of socio-economic sustainability at the production level, the relevant policy levers are more directed at achieving fairness and social justice for workers and farmers and ensuring a just transition.

In the end, the conclusion is a commonly made one – that we need a mix of different regulatory instruments[799] to help the UK transition to HSD. However, policy coherence across these various levers is crucial, with a careful assessment needed of synergies and trade-offs between different types of externalities.[800] A key added value of the current report is, we suggest, its food system problem based approach. Only by closely analysing the range of particular food system problems and their causes can we consider exactly what, from that mix, is most suitable in a particular context.[801] For localised pollution from farms for example, command-and-control is the standard choice (and within that, permitting should be even more standard), but needs to be backed up by ELM-style subsidies as well as informational assistance on best practice. For climate change as a food system problem caused by farms, the regulatory levers needed are different: we know that voluntary measures there have thus far largely been ineffective at reducing emissions, and some form of carbon tax or agricultural ETS seems increasingly necessary – albeit with a need to avoid trade-offs with water pollution, biodiversity, and animal welfare, and without simply shifting emissions overseas.

Endnotes

1. On these three different instrument types, see eg Evert Vedung, 'Policy Instruments: Typologies and Theories' in Marie-Louise Bemelmans-Videc, Ray Rist, and Evert Vedung (eds), *Carrots, Sticks, and Sermons: Policy Instruments and Their Evaluation* (Transaction Publishers 1998) 21.
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4. Torraco (n 2) 358.
5. Flagged in DHSC, 'Government Response to The House of Lords Food, Diet and Obesity Committee's Report 'Recipe For Health: A Plan to Fix Our Broken Food System'', CP 1235, 30 Jan 2025.
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15. Lawrence Lessig, *Code and Other Laws of Cyberspace, Version 2.0* (Basic Books 2006).
16. See eg Pelle Hansen and others, 'Nudging Healthy and Sustainable Food Choices: Three Randomized Controlled Field Experiments Using a Vegetarian Lunch-Default as a Normative Signal' (2021) 43 J Public Health 392. On nudging more generally see eg Lucia Reisch and others, 'Viewpoint: Beyond Carrots and Sticks: Europeans Support Health Nudges (2017) 69 Food Policy 1. However, insofar as informational instruments count as a form of nudging, they are covered.
17. See eg <**https://ukfoodsystems.ukri.org/research-projects-training-reports/sneak/**>.
18. <**https://ukfoodsystems.ukri.org/food-systems-transformation-whats-in-the-policy-toolbox/**>. See too eg Rob Bailey and David Ross Harper, *Reviewing Interventions for Healthy and Sustainable Diets* (Chatham House 2015); Corinna Hawkes and others, *42 Policies and Actions to Orient Food Systems Towards Healthier Diets For All* (Centre for Food Policy, City, University of London 2020) <**www.foodsystemsdashboard.org/policies-and-actions**>.
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45. Willett and others (n 41) 453.
46. Summary Report (n 36) 10, 12.
47. From the leguminous plant family; these include eg beans, soybeans, lentils, peanuts, and chickpeas.
48. Summary Report (n 36) 9-10.
49. ibid 11. I.e. mostly plant-based, but including modest amounts of fish, meat and dairy as an option.
50. Summary Report (n 36) 12. Eg in the USA, reduction of meat consumption would appear a priority for achieving a population-level healthy diet, whereas in other countries or regions (eg Africa), a reduction in starchy vegetables may be required.
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126. Strauss and Westcott (n 100). How the judgment will fit with 'Environmental Outcome Reports' as the planned replacement for EIA remains to be seen: HM Treasury, 'Government Goes Further and Faster on Planning Reform in Bid for Growth' *News Story* (26 Jan 2025) <**www.gov.uk/government/news/government-goes-further-and-faster-on-planning-reform-in-bid-for-growth**>.
127. Under The Conservation of Habitats and Species Regulations 2017 (SI 2017/1012). For relevant guidance, see Defra, 'Habitats Regulations Assessments: Protecting a European Site' (2023) <**www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site**>. The Labour Government has issued a consultation on proposals to move away from individual site assessment to a more strategic approach: see MHCLG and Defra, 'Planning Reform Working Paper: Development and Nature Recovery' (15 Dec 2024) <**www.gov.uk/government/publications/planning-reform-working-paper-development-and-nature-recovery/planning-reform-working-paper-development-and-nature-recovery**>.
128. See eg *Harris v Environment Agency* [2022] EWHC 2264 (Admin); and *CG Fry & Son v Secretary of State for Levelling Up, Housing and Communities* [2024] EWCA Civ 730 (under appeal).
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131. See eg PfSH, Joint Committee, 30 Sept 2024, Item 12 ('Local Nutrient Mitigation Fund') <**www.push.gov.uk/work/our-meetings/joint-committee/**>; and see <**www.push.gov.uk/work/nitrate-mitigation/**>.
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136. eg art 6, Directive 2019/904 on the reduction of the impact of certain plastic products on the environment (the SUP Directive) [2019] OJ L155/1.
137. WWF, *"Net Positive Water": Considering its Role in Water Stewardship and Solving the Linked Freshwater, Biodiversity And Climate Crises* (2022).
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143. eg Water Management grants under The Farming Investment Fund: Gordon Jones, 'Water Management Grants: Get Ready for Round 2' *DEFRA Farming Blog* (4 April 2023) <**https://defrafarming.blog.gov.uk/2023/04/04/water-management-grants-get-ready-for-round-2/**>.
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271. Katherine Sievert and others, 'Meat Production and Consumption for a Healthy and Sustainable Australian Food System: Policy Options and Political Dimensions' (2022) 33 Sustain Prod Consump 674; Kirsty Blair and others, 'Worldviews, Values and Perspectives Towards the Future of the Livestock Sector' (2024) 41 Agric Hum Values 91; Katharina Schleicher and Annette Töller, 'Dietary Behavior as a Target of Environmental Policy: Which Policy Instruments Are Adequate to Incentivize Plant-Based Diets?' (2024) 16 Sustainability 2415.
272. The *National Food Strategy* recommends development of an updated national 'reference diet', in line with health and sustainability goals, to underpin policies and advice: Dimbleby (n 105) 22.
273. (n 57).
274. Lindsey Smith Taillie and others, 'Testing Front-Of-Package Warnings to Discourage Red Meat Consumption: A Randomized Experiment With US Meat Consumers' (2021) 18 IJBNPA 114.
275. ibid.
276. See Chloe MacKean and others, *The State of the Nation's Food Industry report 2023* (The Food Foundation 2023) 16.
277. (n 105).
278. Helena Horton, 'Ministers 'Run Scared' of Targeting Meat Consumption in Land Use Strategy' *The Guardian* (5 Jan 2023) <**www.theguardian.com/environment/2023/jan/05/ministers-run-scared-of-targeting-meat-consumption-in-land-use-strategy**>.
279. Dimbleby (n 105) 147.
280. Bethan Grylls, 'Retailers Urged to Set Targets for Plant-Based Sales' *Food Manufacture* (22 Oct 2024) <**www.foodmanufacture.co.uk/Article/2024/10/22/uk-retailers-urged-to-boost-plant-based-protein-sales/**>.
281. Franziska Funke and Linus Mattauch, 'Meat Tax: No UK Politician Is Calling For One – But Maybe They Should' *The Conversation* (6 Oct 2023) <**https://theconversation.com/meat-tax-no-uk-politician-is-calling-for-one-but-maybe-they-should-215112**>.
282. Cristina Stewart and others, 'Trends in UK Meat Consumption: Analysis of Data From Years 1–11 (2008–09 to 2018–19) of the National Diet and Nutrition Survey Rolling Programme' (2021) 5 Lancet Planet Health e699.
283. cf Sanchayan Banerjee, 'Meat Taxes Are Inevitable, Yet We Seem to Shy Away From Them. But Why?' (2025) 130 Food Policy 102787. Making indirect changes by raising VAT on meat might also be a more politically acceptable route (as proposed in Markus Springmann and others, 'A Reform of Value-Added Taxes on Foods Can Have Health, Environmental and Economic Benefits in Europe' (2025) Nat Food <**https://doi.org/10.1038/s43016-024-01097-5**>.)
284. For such a tax, see Denmark, discussed in section 6.2.2 of this report.

285. See Florian Humpenöder and others, 'Food Matters: Dietary Shifts Increase the Feasibility of 1.5°C Pathways in Line with the Paris Agreement' (2024) 10 Sci Adv eadj3832 (also discussed in section 6.2.2 below). Regressive effects of agricultural carbon taxes can be addressed via eg a 'fee and dividend' compensation scheme: Julian Schaper and others, 'On the Emission and Distributional Effects of a CO2eq-tax on Agricultural Goods—The Case of Germany' (20225) 130 Food Policy 102794.
286. Lukas Fesenfeld and others, 'Policy Packaging Can Make Food System Transformation Feasible' (2021) 1 Nat Food 173.
287. The use of cultivated ('lab-grown') meat, as opposed to conventional protein sources has raised concerns in some quarters (Blair n 271). However, the science is still developing (Good Food Institute, 'The Science of Cultivated Meat' <**https://gfi.org/science/the-science-of-cultivated-meat/**>) and it may bring some health as well as a range of environmental sustainability benefits.
288. Vallone and Lambin (n 262).
289. Marco Springmann, 'Meat and Dairy Gobble Up Farming Subsidies Worldwide, Which is Bad For Your Health and the Planet' *The Conversation* (11 Jan 2022) <**https://theconversation.com/meat-and-dairy-gobble-up-farming-subsidies-worldwide-which-is-bad-for-your-health-and-the-planet-174644**>.
290. Vegconomist, 'Dutch Municipalities to Ban Meat and Dairy Ads in Public Spaces' *Politics & Law* (6 Nov 2023) <**https://vegconomist.com/politics-law/dutch-municipalities-ban-meat-dairy-ads-public-spaces/**>.
291. Carlos Monterio and others, 'Household Availability of Ultra-processed Foods and Obesity in Nineteen European Countries' (2018) 21 PHN 18, cited in Feedback, *Too Much Of a Bad Thing: The Use and Misuse of UK Soil and Land to Grow Sugar* (2019) 9 <**https://feedbackglobal.org/wp-content/uploads/2019/11/Too-much-of-a-bad-thing-the-use-and-misuse-of-land-and-soils-to-grow-sugar-Feedback-2019.pdf**>.
292. NHS, 'Sugar: The Facts' (19 May 2023) <**www.nhs.uk/live-well/eat-well/food-types/how-does-sugar-in-our-diet-affect-our-health/**>.
293. According to Feedback, citing the Food Foundation, "87% of adults, 99% of secondary school children and 100% of primary school children exceed the recommended level of daily sugar intake" (n 291) 9. The report (ibid) states that adults consume twice the recommended daily level of free sugars, and children and teenagers consume around three times.
294. NHS, 'Fat: The Facts' (14 April 2023) <**www.nhs.uk/live-well/eat-well/food-types/different-fats-nutrition/**>.
295. NHS, 'Salt in Your Diet' (17 April 2023) <**www.nhs.uk/live-well/eat-well/food-types/salt-in-your-diet/**>.
296. Action on Salt, 'Salt and Stomach Cancer' <**www.actiononsalt.org.uk/salthealth/salt-and-stomach-cancer/**>.
297. Action on Salt, 'Salt and the Kidneys' <**www.actiononsalt.org.uk/salthealth/salt-and-the-kidneys/**>.
298. Action on Salt, 'Salt and Osteoporosis' <**www.actiononsalt.org.uk/salthealth/salt-and-osteoporosis/**>.
299. NHS, 'Overview: Malnutrition' (23 May 2023) <**www.nhs.uk/conditions/malnutrition/**>.
300. Although around 7% of sugar beet is grown for biofuels.
301. Feedback (n 291) 3.
302. ibid 4.
303. Dimbleby (n 105) 146.
304. Ashley Gearhardt and Alexandra DiFeliceantonio, 'Highly Processed Foods Can be Considered Addictive Substances Based on Established Scientific Criteria' (2022) 118 Addiction 589.
305. Charles Spence, 'Eating With Our Ears: Assessing the Importance of the Sounds of Consumption on Our Perception and Enjoyment of Multisensory Flavour Experiences' (2015) 4 Flavour <**https://doi.org/10.1186/2044-7248-4-3**>.
306. English (n 263).
307. BBC Food, 'How do Supermarkets Tempt You to Buy Unhealthy Foods?' <**www.bbc.co.uk/food/articles/supermarkets_unhealthy_foods**>.
308. RSPH, *Health on the Shelf* (2019) 3 <**www.rsph.org.uk/static/uploaded/5ec3d502-2e94-47c0-ad1bbe1d4a74218c.pdf**>.
309. Dimbleby (n 105) 146-8.
310. eg the 'Eat and Learn' initiative for schools proposed by the *National Food Strategy* (n 105) 148. Since 2014, schools have a legal requirement to teach cookery and nutrition to all children up to the age of 14 but in too many schools this is not happening. The report suggests curriculum changes, accreditation (such as food for life) which would provide training, inspection by Ofsted of the food curriculum, recruitment of adequately trained staff, funding of cooking lessons' ingredients as well as extra funding for the School fruit and veg scheme already in place.
311. Dimbleby (n 105) 152-3, recommendation 7.
312. ibid 161-2, recommendation 14.
313. ibid.
314. WHO, 'NCD Global Monitoring Framework' (30 May 2011) <**www.who.int/publications/i/item/ncd-surveillance-global-monitoring-framework**>.
315. The National Food Strategy (n 105) 156, recommendation 9, proposed a Land Use Framework (now taken up by the new Government) which potentially aligns with the quotas discussed here.
316. Feedback and Action on Sugar, *Sugar Pollution: Curbing Sugar Supply for Health and the Environment* (2023) <**https://feedbackglobal.org/wp-content/uploads/2023/10/Feedback-Sugar-Pollution-23-Report-Summary.pdf**>.
317. Matti Marklund and others, 'Estimated Health Effect, Cost, and Cost-Effectiveness of Mandating Sodium Benchmarks in Australia's Packaged Foods: A Modelling Study' (2024) 9 Lancet Public Health e861.
318. (n 309). Reporting is currently voluntary, with the Food Data Transparency Partnership (FDTP), considered further in section 6.2.4 below, examining data consistency issues involving this.

319. (n 105) 146.
320. A number of countries have earmarked excise tax revenues from sugar-sweetened beverages towards health programmes: WHO, *Global Report on the Use of Sugar-sweetened Beverage Taxes* 2023 (2023) 22 <**www.who.int/publications/i/item/9789240084995**>.
321. HM Treasury, 'Soft Drinks Industry Levy Comes Into Effect' *Press Release* (5 April 2018) <**www.gov.uk/government/news/soft-drinks-industry-levy-comes-into-effect**>.
322. Action on Sugar, *Extending the Soft Drinks Industry Levy* (2023) <**www.actiononsugar.org/sugar-awareness-week/sugar-awareness-week-2023/policy/**>.
323. HM Treasury (n 321).
324. Nina Rodgers and others, 'Estimated Changes in Free Sugar Consumption One Year After The UK Soft Drinks Industry Levy Came Into Force: Controlled Interrupted Time Series Analysis of The National Diet and Nutrition Survey (2011-2019)' (2024) 78 JECH 578.
325. Nina Rodgers and others, 'Estimated Impact of the UK Soft Drinks Industry Levy on Childhood Hospital Admissions For Carious Tooth Extractions: Interrupted Time Series Analysis' (2023) 6 BMJ NPH 10.1136/bmjnph-2023-000714.
326. Denis Campbell, 'Fewer Children in England Having Teeth Out Since Sugar Tax Began, Study Finds' *The Guardian* (15 Nov 2023) <**www.theguardian.com/society/2023/nov/15/fewer-children-in-england-having-teeth-out-since-sugar-tax-began-study-finds**>.
327. SI 2021/1368. On practical compliance with the regs, see Ella Hurst and others, 'Prevalence of High Fat Sugar Salt Products, Labeling Characteristics, and Categories of Foods Sold within In-Store Restricted Areas: A Survey in 3 UK Supermarkets after the 2022 Implementation of the Food (Promotion and Placement) Regulations' (2025) 9 CDN 104509.
328. DHSC, 'Restricting Promotions of Products High in Fat, Sugar or Salt by Location and by Volume Price' *Guidance* (29 Sept 2023) <**www.gov.uk/government/publications/restricting-promotions-of-products-high-in-fat-sugar-or-salt-by-location-and-by-volume-price**>.
329. See section 6.2.3.4 of the report.
330. OECD, *Health at a Glance 2023* (2023) <**www.oecd-ilibrary.org/social-issues-migration-health/daily-consumption-of-five-or-more-portions-of-fruit-and-vegetables-among-adults-by-sex-2019-or-nearest-year_516debe6-en**>.
331. NHS, 'Why 5 A Day?' (12 July 2022) <**www.nhs.uk/live-well/eat-well/5-a-day/why-5-a-day/**>.
332. Ram Singh and others, 'Effect of Diet and Moderate Exercise on Central Obesity and Associated Disturbances, Myocardial Infarction and Mortality in Patients With and Without Coronary Artery Disease' (1996) 15 J Am Coll Nutr 592.
333. The Food Foundation, 'Increasing Vegetable Consumption' <**https://foodfoundation.org.uk/increasing-vegetable-consumption#about**>.
334. eg the government 5-a-day logo may only be used to promote fruit and veg products without any added fats, sugars or salt, and to promote fruit and veg products that provide at least one portion per serving: OHID, 'Government 5 a Day Logo: Licensing Guidelines' (27 March 2023) <**www.gov.uk/government/publications/government-5-a-day-logo/government-5-a-day-logo-licensing-guidelines**>.
335. The Food Foundation (n 333).
336. (n 309).
337. Dimbleby (n 105) 151, citing figures from NHS Digital.
338. ibid, recommendation 4.
339. DfE, 'School Food Standards Practical Guide' (19 Sept 2024)<**www.gov.uk/government/publications/school-food-standards-resources-for-schools/school-food-standards-practical-guide**>.
340. Defra, 'Government Buying Standard for Food and Catering Services' *Guidance* (18 Aug 2021) <**www.gov.uk/government/publications/sustainable-procurement-the-gbs-for-food-and-catering-services/government-buying-standard-for-food-and-catering-services**>.
341. Dimbleby (n 105) 146-7, recommendation 1.
342. ibid 153, recommendation 7. The report also mentions 'Green social prescribing' under a then-existing scheme under which GPs could prescribe nature-based activities such as community gardening, which could also help fruit and veg consumption: NHS England, 'Green Social Prescribing' <**www.england.nhs.uk/personalisedcare/social-prescribing/green-social-prescribing/**>.
343. Dimbleby (n 105) 152, recommendation 6. The scheme enables those on certain benefits (or under 18) who are more than 10 weeks pregnant or with a child under 4 to buy healthy foods: <**www.gov.uk/healthy-start**>.
344. Fruit and Vegetable Alliance, *Cultivating Success: Priorities for Increasing Sustainable Production to Meet Growing Demand* (2023) 2 <**https://foodfoundation.org.uk/sites/default/files/2023-05/Cultivating-Success-Final-March-2023-2.pdf**>.
345. Defra, 'A Blueprint to Grow the UK Fruit and Vegetable Sector' (14 May 2024) <**www.gov.uk/government/publications/a-blueprint-to-grow-the-uk-fruit-and-vegetable-sector/a-blueprint-to-grow-the-uk-fruit-and-vegetable-sector**>.
346. ibid.
347. Community Supported Agriculture, 'Joint Letter to New Government – Support UK Horticulture' (9 July 2024) <**https://communitysupportedagriculture.org.uk/joint-letter-to-new-labour-government/**>.
348. Sustain, 'Defra Abandons its Plans for a Horticulture Strategy' *News* (3 May 2023) <**www.sustainweb.org/news/may23-defra-abandon-horticulture-strategy/**>.
349. PHE, 'SACN Advice on Fish Consumption' (1 Dec 2004) <**www.gov.uk/government/publications/sacn-advice-on-fish-consumption**>.

350. SACN and Committee on Toxicity, *Advice on Fish Consumption: Benefits and Risks* (TSO 2004) <**https://cot.food.gov.uk/sites/default/files/cot/fishreport200401.pdf**>.
351. Even eg the Dimbleby report (n 105) is light on solutions to increase the consumption of fish. While explaining that its focus in on land, it mentions a number of relevant problems in passing including the state of the oceans, overfishing, the impact of polluted waters, the impact of trawling on depletion of fish stocks, how low income families eat less fish, and the role of income in consumption of oily fish. The report's only (indirect) fish-related recommendation is for the introduction of mandatory reporting for large companies to include a metric on sale of protein by type (which includes fish).
352. Nutrition Foundation, 'Plenty More Fish in the Sea? Why We Should Choose More Sustainable Seafood' *Blog* (29 Oct 2021) <**www.nutrition.org.uk/news/plenty-more-fish-in-the-sea-why-we-should-choose-more-sustainable-seafood/**>.
353. Pallab Ghosh, 'Omega-3 Oils in Farmed Salmon 'Halve in Five Years'' *BBC News* (6 Oct 2016) <**www.bbc.co.uk/news/science-environment-37321656**>.
354. ibid.
355. NHS, 'Fish and Shellfish' (14 Nov 2022) <**www.nhs.uk/live-well/eat-well/food-types/fish-and-shellfish-nutrition/**>..
356. Defra, 'Contaminants in Fish and Seafood' (2018) <**https://moat.cefas.co.uk/pressures-from-human-activities/contaminants-in-seafood/contaminant-concentrations-in-seafood/**>.
357. Nutrition Foundation (n 352).
358. FAO, *The State of World Fisheries and Aquaculture 2024: Blue Transformation in Action* (2024) <**www.fao.org/publications/home/fao-flagship-publications/the-state-of-world-fisheries-and-aquaculture/en**>.
359. ibid.
360. ibid.
361. ibid 119.
362. MSC, 'Sustainable Seafood Recipes' <**www.msc.org/uk/what-you-can-do/sustainable-seafood-recipes**>.
363. Dimbleby (n 105) 49.
364. eg Shopmium, 'How is the Cost of Living Crisis Affecting Grocery Shopping Habits?' (31 May 2022) <**https://solutions.shopmium.com/en/how-is-the-cost-of-living-crisis-affecting-grocery-shopping-habits/**>.
365. L Emilio Morales and Angie Higuchi, 'Is Fish Worth More Than Meat? – How Consumers' Beliefs About Health and Nutrition Affect Their Willingness To Pay More For Fish Than Meat' (2018) 65 Food Qual Prefer 101.
366. OECD, 'Fisheries Subsidies' <**www.oecd.org/en/topics/fisheries-subsidies.html**>.
367. GBSF (n 207).
368. (n 339).
369. See eg FAO, 'Fish Health Campaigns' <**www.fao.org/in-action/globefish/fishery-information/resource-detail/en/c/338777/**>.
370. MSC, 'What is Overfishing?' <**www.msc.org/uk/what-we-are-doing/what-is-overfishing**>.
371. ibid.
372. See section 6.2.1 below.
373. Nutrition Foundation (n 352); and MSC, 'What Does the Blue MSC Ecolabel Mean?' <**www.msc.org/uk/what-you-can-do/what-does-the-blue-msc-ecolabel-mean**>. Eco labels in the UK are also available for fish and chips shops: MSC, 'MSC Certified Fish & Chips' <**www.msc.org/uk/what-you-can-do/msc-certified-fish-and-chip-shops-uk-ireland**>.
374. FAO (n 369) 72.
375. Chris Hilson, 'Hitting the Target? Analysing the Use of Targets in Climate Law' (2020) 32 JEL 195.
376. Maria Lee, 'Politics and Expertise: New Environmental Targets in English Environmental Law' in van Zeben and Hilson (n 195).
377. Hilson (n 375).
378. Hilson (n 375) 198.
379. Luis Abadie and others, 'Using Food Taxes and Subsidies to Achieve Emission Reduction Targets in Norway' (2016) 134 J Clean Prod 280.
380. Jan Willem Erisman, 'Setting Ambitious Goals for Agriculture to Meet Environmental Targets' (2021) 4 One Earth 15.
381. Hilson (n 375).
382. Ibid; Lee (n 376).
383. Hilson (n 375).
384. (n 80).
385. Proposal for a Directive amending Directive 2008/98/EC on waste COM(2023) 420 final.
386. Defra, *Our Waste, Our Resources: A Strategy For England* (2018).
387. ibid 10, 99.
388. Defra, *Environmental Improvement Plan 2023* (2023).
389. Variously described in the document as a 'strategic ambition' and an 'overarching commitment'.
390. (n 386) 17, emphasis added.
391. HMG, *Net Zero Strategy: Build Back Greener* (2021) 179.
392. WRAP, 'History of the Courtauld Commitment' <**https://wrap.org.uk/taking-action/food-drink/initiatives/courtauld-commitment/history-courtauld-commitment**>.
393. WRAP, 'The Courtauld Commitment 2030' <**https://wrap.org.uk/taking-action/food-drink/initiatives/courtauld-commitment**>.

394. WRAP, 'The Hospitality and Food Service Agreement: Taking Action on Waste (Final Report)' <**https://wrap.org.uk/resources/case-study/hospitality-and-food-service-agreement-taking-action-waste-final-report**>. The first was met but the second was not, reaching only a rate of 56% (although nearing 70% for recycling of packaging).
395. NAO, *The Government's Resources and Waste Reforms for England* (2023) HC 1513, Fig 3.
396. SI 2023/93.
397. Reg 5.
398. (n 388) 99.
399. Target 2.
400. Target 7.
401. Target 16.
402. Proposal for a Regulation on the sustainable use of plant protection products and amending Regulation (EU) 2021/2115 ('Sustainable Use Regulation') COM(2022) 305 final.
403. Olivia Gyapong, 'EU Commission Chief to Withdraw the Contested Pesticide Regulation' *Euractiv* (7 Feb 2024) <**www.euractiv.com/section/agriculture-food/news/von-der-leyen-to-withdraw-the-contested-pesticide-regulation/**>.
404. PM's Office, 'PM Commits to Protect 30% of UK Land in Boost for Biodiversity' *Press Release* (28 Sept 2020) <**www.gov.uk/government/news/pm-commits-to-protect-30-of-uk-land-in-boost-for-biodiversity**>.
405. Defra, *Delivering 30by30 on Land in England* (2023) <**www.gov.uk/government/publications/delivering-30by30-on-land-in-england**>.
406. ibid 10.
407. ibid 11.
408. Defra (n 192) 38-41.
409. PAN UK, *Introducing a UK Pesticide Reduction Target* (2018) <**www.pan-uk.org/pesticide-reduction-target/**>.
410. Defra (n 192) 27.
411. Defra (n 388) 165, 180. Around 70% of English soils are agricultural (ibid). Sustainable management is currently principally *process* rather than *outcome* based. As section 5.1.7 above notes, the SFI soil standards enable farmers to be paid for the process of completing a soil assessment, producing a soil management plan, and testing soil organic matter. They do not hold them to sustainable soil outcomes. This was raised by the NAO ("One of the Programme's objectives is to have 60% of agricultural soil managed sustainably by 2030, but Defra does not yet have a baseline to measure progress against"): NAO, *The Farming and Countryside Programme*, HC 123 (2024) 47. However, in the 2023 Improvement Plan (n 388), the Government committed to developing "a soil health index (including indicators such as the level of humus and biological activity in the soil) that can be used on farms to check whether their actions are having the desired effect" (43) which will help, although indicators are not targets.
412. Defra (n 388) 31. The latter restoration target is stated as existing 'alongside' the international 30by30 commitment.
413. ibid 32.
414. Welsh Government, *Sustainable Farming Scheme: Keeping Farmers Farming* (2023) 41. The 10% applied only to plantable areas of farms (not roads and hardstanding etc).
415. Arguably not quite a 'target' as such because, unlike the tree cover universal action, this does not contain a target date.
416. Steffan Messenger and Paul Pigott, 'Protest-hit Farm Subsidy Plan Pushed Back a Year' *BBC News* (14 May 2024).
417. In 2022, only around one-third of Europe's largest companies had set biodiversity targets: Joerg Rueedi and Esther Whieldon, 'Biodiversity is Still a Blind Spot for Most Companies Around The World' *S&P Global* (15 Dec 2022) <**www.spglobal.com/esg/insights/biodiversity-is-still-a-blind-spot-for-most-companies-around-the-world**>.
418. ibid.
419. <**www.unilever.com/planet-and-society/protect-and-regenerate-nature/strategy-and-goals/**>.
420. <**https://sciencebasedtargets.org/about-us/sbtn**>.
421. <**https://sciencebasedtargetsnetwork.org/resources/frequently-asked-questions/**>.
422. EU Commission and EU Business and Biodiversity Platform, *Practical Guide on Biodiversity for SMEs in the Agri-food Sector* (2022) 37-8.
423. Helen Harwatt and others, *Options for a Paris-Compliant Livestock Sector: Timeframes, Targets and Trajectories for Livestock Sector Emissions from a Survey of Climate Scientists*, Brooks McCormick Jr Animal Law & Policy Program, Harvard Law School (2024) 12-13.
424. (n 103).
425. As amended by the Climate Action and Low Carbon Development (Amendment) Act 2021.
426. Department of the Taoiseach, 'Government Announces Sectoral Emissions Ceilings, Setting Ireland On a Pathway to Turn the Tide on Climate Change' Press Release (28 July 2022) <**www.gov.ie/en/press-release/dab6d-government-announces-sectoral-emissions-ceilings-setting-ireland-on-a-pathway-to-turn-the-tide-on-climate-change/**>. In setting this sectoral target the Minister noted the need for "the protection and enhancement of our sustainable food production system, while ensuring that agriculture plays its part in climate change mitigation" (ibid).
427. Including a voluntary cull, discussed in section 6.2.2 below.
428. N2O emissions represented 24.8% of agriculture sector emissions in Ireland in 2021: Food Vision Dairy Group, *Measures To Mitigate Greenhouse Gas Emissions From The Dairy Sector* (2022) 17.
429. ibid 3.
430. Section 5Q of the Climate Change Response (Zero Carbon) Amendment Act 2019. See also New Zealand Government, *Te hau mārohi ki anamata: Towards a Productive, Sustainable and Inclusive Economy* (2022) 249.
431. ibid.

432. WRAP, 'The Courtauld Commitment 2030' <**https://wrap.org.uk/taking-action/food-drink/initiatives/courtauld-commitment**>.
433. Companies (Strategic Report) (Climate-related Financial Disclosure) Regulations 2022 (SI 2022/31).
434. Corporate Sustainability Reporting Directive (CSRD) 2022/2464 [2022] OJ L322/15, art 19a(2)(b) and recital 30.
435. Directive 2024/1760 on Corporate Sustainability Due Diligence [2024] OJ L2024/1760.
436. SBTi, 'What Are Science-Based Targets?' <**https://sciencebasedtargets.org/how-it-works**>.
437. Changing Markets Foundation (n 264) 40.
438. Yann Robiou du Pont and others, 'Corporate Emissions Targets and the Neglect of Future Innovators' (2024) 384 Science 388.
439. Changing Markets Foundation (n 264) 44. In a different sector (oil and gas), see Chris Hilson, 'Emissions Intensity: Do We Need a CBAM for Oil and Gas Imports?' (2024) 17 JWELB 136. Absolute targets have been recommended for companies across all sectors by a UN expert group: UN High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities, *Integrity Matters: Net Zero Commitments by Businesses, Financial Institutions, Cities and Regions* (2022) 7 <**www.un.org/sites/un2.un.org/files/high-level_expert_group_n7b.pdf**>.
440. Danone, *Climate Transition Plan* (2023) 15 <**www.danone.com/content/dam/corp/global/danonecom/about-us-impact/policies-and-commitments/en/danone-climate-transition-plan-2023.pdf**>.
441. Danone, *Climate Policy* (2016) 10 <**www.danone.com/content/dam/corp/global/danonecom/about-us-impact/policies-and-commitments/en/2016/2016_05_18_ClimatePolicyFullVersion.pdf**>.
442. ibid 11.
443. ibid.
444. Greenhouse Gas Protocol, 'About Us' <**https://ghgprotocol.org/about-us**>.
445. Premier Foods, 'Premier Foods ESG Strategy Reaches Key Milestone With Independent Validation of Carbon Targets' *News* (6 June 2023) <**www.premierfoods.co.uk/news/premier-foods-esg-strategy-reaches-key-milestone-with-independent-validation-of-carbon-targets/**>.
446. UN High-Level Expert Group (n 439) 17; Changing Markets Foundation (n 264) 44.
447. Danone 2023 (n 440) 23.
448. Premier Foods, 'Our People' <**www.premierfoods.co.uk/sustainability/our-people/**>.
449. Defra, *Government Food Strategy* (2022) 9.
450. That consultation took place: Defra, *Public Sector Food and Catering Policy for England: The Government Buying Standards for Food and Catering Services (GBSF)* (2022). However, although one was expected in 2023, there was no government response.
451. UN General Assembly (n 24).
452. Defra (n 449) 9.
453. DHSC, *Childhood Obesity: A Plan for Action* (2016). See further PHE, *Sugar Reduction: Achieving the 20%: A Technical Report Outlining Progress to Date, Guidelines For Industry, 2015 Baseline Levels in Key Foods and Next Steps* (2017).
454. PHE, *Calorie Reduction Technical Report: Guidelines for Industry, 2017 Baseline Calorie Levels and the Next Steps* (2020).
455. PHE, *SACN Salt and Health report* (2003).
456. PHE, *Salt Reduction Targets for 2024* (2020).
457. Unilever, 'Positive Nutrition' <**www.unilever.com/planet-and-society/positive-nutrition/strategy-and-goals/**>.
458. Premier Foods, 'Our Products' <**www.premierfoods.co.uk/Sustainability/Our-Products/**>.
459. DHSC, 'The Nutrient Profiling Model' (2011) <**www.gov.uk/government/publications/the-nutrient-profiling-model**>.
460. Tesco, 'Tesco Makes Ambitious New Commitments to Support Healthy, Sustainable Diets' *Press Release* (5 March 2021) <**www.tescoplc.com/tesco-makes-ambitious-new-commitments-to-support-healthy-sustainable-diets/**>.
461. Nestlé, 'Can You Tell Us More About Your Target to Grow the Sales of More Nutritious Products?' <**www.nestle.com/ask-nestle/health-nutrition/answers/nutrition-sales-target**>.
462. 'About Health Star Ratings' <**www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/About-health-stars**>.
463. The Food Data Transparency Partnership (FDTP), discussed further in section 6.2.4 below, is working on NPM use and consistency issues in the UK. For international efforts at greater standardisation, see ATNi, *Sector Alignment on the Use of Nutrient Profile Models* (2024).
464. ShareAction, 'Shareholders File Health Resolution at Nestlé' *Press* (14 March 2024) <**https://shareaction.org/news/shareholders-file-health-resolution-at-nestl%C3%A9**>.
465. ShareAction, 'New Nestlé Nutrition Target Falls Short of Shareholder Expectations' *Press* (3 Oct 2023) <**https://shareaction.org/news/new-nestl%C3%A9-nutrition-target-falls-short-of-shareholder-expectations**>.
466. ibid.
467. Madeleine Speed, 'Nestlé Shareholders Call on Food Giant to Reduce Reliance on Unhealthy Products' *Financial Times* (14 March 2024).
468. Chris Hilson, 'Masterplots of Demand and Supply and the Energy Trilemma: Delaying the Transition', forthcoming in David Gurnham and Chris Bevan (eds), *Law, Narrative and Masterplot: New Research Perspectives* (Routledge 2025) available at <**http://dx.doi.org/10.2139/ssrn.4556949**>.
469. Jonathan Wheatley, 'Unilever to Split Off Ice Cream Business and Cut 7,500 Jobs' *Financial Times* (19 March 2024).
470. As opposed to eg supermarket corporate targets on this, to sell proportionately less meat and dairy, which are also possible.
471. Dimbleby (n 105) 142.

472. Committee on Climate Change, *The Sixth Carbon Budget: The UK's Path to Net Zero* (2020) 165. The CCC may revise this target downwards in 2025 due to eg advances in technology: BBC, *Farming Today* (17 Jan 2025) <**www.bbc.co.uk/sounds/play/m0026vv7**>.
473. Climate Assembly UK, *The Path to Net Zero* (2020) 20.
474. IGD, *A Net Zero Transition Plan for the UK Food System* (Nov 2024).
475. Defra (n 449) [2.1.8].
476. The policy instruments literature sometimes uses the term 'legal' or 'regulatory' instruments instead (Kirsty Blackstock and others, 'Policy Instruments for Environmental Public Goods: Interdependencies and Hybridity' (2021) 107 Land Use Policy 104709). However, neither is entirely satisfactory because the other instruments (eg economic instruments) are also *regulatory* in purpose, and most also have some form of *legal* basis in statute etc.
477. Under eg the English environmental permitting regime. See also other regimes using similar command-and-instruments but called 'licences' (eg abstraction) or 'consents' (eg agricultural EIA regime). On permitting as a regulatory technique (in a US context), see eg Eric Biber and JB Ruhl, 'The Permit Power Revisited: The Theory and Practice of Regulatory Permits in the Administrative State' (2014) 64 Duke LJ 133.
478. On command-and-control to address land use, see eg Eric Lambin and others, 'Effectiveness and Synergies of Policy Instruments for Land Use Governance in Tropical Regions' (2014) 28 Global Environ Change 129.
479. See eg Environment Agency, 'Environmental Protection Inspection' *Guidance* (12 Jan 2016) <**www.gov.uk/guidance/environmental-protection-inspection**>; and DHULC, 'Nutrient Neutrality: Update (2023)' <**www.gov.uk/guidance/nutrient-neutrality-announcement-explainer**>: "continuing to conduct at least 4,000 risk-based inspections on farms each year – making sure that slurry and other pollutants are being handled in a way that minimises pollution of the water environment." This annual number of inspections (which still only covers around 4% of farms) only came in from 2022-23. Between 2012 and then it was more like a few hundred per year: NAO (n 411) 34.
480. In England, see eg Defra, *Agricultural Transition Plan Update January 2024* (2024): "Across schemes and regulation, we are moving from a 'detect and penalise' approach to a 'advise and prevent' approach. Our focus is on helping the vast majority of farmers who want to, and are trying to, do the right things and supporting them when things go wrong." See also Environment Agency, *Environment Agency Enforcement and Sanctions Policy* (2023).
481. The Regulatory Enforcement and Sanctions Act 2008 introduced civil sanctions (eg monetary penalties, enforcement undertakings etc) and they were selectively applied to environmental permitting offences under The Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675).
482. eg an enforcement undertaking against Müller UK & Ireland Group Limited for unauthorised discharge of processing effluent causing pollution of the River Tern in Jan 2018 (Environment Agency, 'Enforcement Undertakings Accepted by the Environment Agency: Updates for 1 June 2022 to 31 October 2023' <**www.gov.uk/government/publications/environment-agencys-use-of-civil-sanctions/enforcement-undertakings-accepted-by-the-environment-agency-1-june-2022-to-30-september-2022**>.
483. The Agency's environmental protection budget was more than halved, from £170 million in 2009-10 to £76 million in 2019-20: Alex Sobel, 'Environment Agency: Enforcement Budget' UK Parliament: Oral Answers to Questions 17 Nov 2022, HC 722 <**https://hansard.parliament.uk/commons/2022-11-17/debates/29A0035B-708A-4796-8C52-395CA86C7C54/EnvironmentAgencyEnforcementBudget#contribution-9D538682-8049-47A2-B939-2166EEFEDAAC**>. Cf the Agency's statement, in Jan 2024, that it had received an additional £10.1m in funding, which had enabled it to expand its work with the agricultural sector: Defra, 'Coverage of Environment Agency Enforcement of Farming Regulations in the River Wye' *Defra in the Media Blog* (14 Jan 2024) <**https://deframedia.blog.gov.uk/2024/01/14/coverage-of-environment-agency-enforcement-of-farming-regulations-in-the-river-wye/**>.
484. Hettie O'Brien, 'Dirty Waters: How the Environment Agency Lost its Way' *The Guardian* (13 June 2024).
485. Under The Environmental Permitting (England and Wales) Regulations 2016 (SI 2016/1154).
486. Blackstock and others (n 476). Eg ELM-based subsidies discussed further in section 6.2.2 below, and voluntary, informational instrument-based initiatives like the Catchment Sensitive Farming initiative (Natural England, 'Catchment Sensitive Farming: Advice for Farmers and Land Managers' (2023) <**www.gov.uk/guidance/catchment-sensitive-farming-reduce-agricultural-water-pollution**>).
487. Neil Gunningham and Darren Sinclair, 'Policy Instrument Choice and Diffuse Source Pollution' (2005) 17 JEL 51.
488. Defra (n 483).
489. The 'Farming Rules for Water' are the commonly used description for The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018 (SI 2018/151). See also associated guidance: 'Defra and Environment Agency, Rules for Farmers and Land Managers to Prevent Water Pollution' (2018) <**www.gov.uk/guidance/rules-for-farmers-and-land-managers-to-prevent-water-pollution**>.
490. (n 481).
491. The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010 (SI 2010/639).
492. The Nitrate Pollution Prevention Regulations 2015 (SI 2015/668).
493. The Water Resources (Abstraction and Impounding) Regulations 2006 (SI 2006/641).
494. (n 489). For Scotland see the 'Diffuse Pollution General Binding Rules', set out in The Water Environment (Diffuse Pollution) (Scotland) Regulations (SSI 2008/54).
495. eg reg 4(1)(a)(i), which states: "A land manager must ensure that, for each application of organic manure or manufactured fertiliser to agricultural land, the application ... is planned so that it does not ... exceed the needs of the soil and crop on that land."
496. See section 5.1.7 above.

497. Under Sch 1, Part 2, Section 6.9 Environmental Permitting Regulations (n 481).
498. Wildlife and Countryside Link, 'Permitting Reform: Reducing Environmental Damage from Intensive Livestock Farms' (2024) <**http://wcl.org.uk/docs/assets/uploads/Link_Briefing_Permitting_June_2024.pdf**>.
499. Environment Agency, 'Application for an Environmental Permit Part B3.5 – Rearing of Pigs or Poultry Intensively in an Installation With More Than 40,000 places for Poultry or 2,000 Places for Production Pigs (Over 30 kg) or 750 Places For Sows' EPB3.5 Version 4 (Sept 2022) <**www.gov.uk/government/publications/application-for-an-environmental-permit-part-b35**>.
500. Reg 17.
501. Environment Agency, *Phosphorus and Freshwater Eutrophication Pressure Narrative* (2019) 20.
502. ibid.
503. ibid.
504. Under The Water Resources (Abstraction and Impounding) Regulations 2006 (SI 2006/641).
505. In 2002, "licences granted by NRW allow a total of 306,291,346m3 of surface water to be abstracted from the River Wye catchment in Wales every year. Of that only 4.6% is attributed to the agricultural sector, with only 6 water abstraction licences issued for spray irrigation in the River Wye catchment in Wales": Fish Legal, 'Gaps in River Wye Abstraction Data Raise Questions Over Regulatory Oversight During Times of Drought' (2022) <**https://fishlegal.net/2022/09/06/gaps-in-river-wye-abstraction-data-raise-questions/**>.
506. ibid. See further House of Commons Environmental Audit Committee, *Environmental Change and Food Security*, Second Report of Session 2023–24, HC 312 (2023), which called for a review of the allocation of abstraction rights (39).
507. (n 136). These rules apply to Northern Ireland. While they are not formally binding in the rest of the UK, many large manufacturers who also sell into the EU market have chosen to follow them to avoid setting up an inefficient separate production line.
508. See n 109.
509. Art 1 of Regulation 2019/649 as regards trans fat other than trans fat naturally occurring in fat of animal origin [2019] OJ L110/17.
510. "Sustainable public catering, as a special example of public procurement, is a policy instrument to influence both the supply and demand of sustainable solutions": Stefan Wahlen and others, 'Endorsing Sustainable Food Consumption: Prospects from Public Catering' (2012) 35 J Consum Policy 7, 8.
511. Claudia Ghisetti, 'Demand-Pull and Environmental Innovations: Estimating the Effects of Innovative Public Procurement' (2017) 125 Technol Forecast Soc Change 178.
512. The Meat and Meat Products (Hormonal Substances) Regulations 1989 (SI 1989 No. 2133). Other countries including the US and Canada have contested the human health basis for this ban.
513. Denis Campbell, 'Nitrites in Bacon: MPs and Scientists Call for UK Ban Over Cancer Fears' *The Guardian* (8 July 2022) <**www.theguardian.com/food/2022/jul/08/nitrites-in-bacon-scientists-mps-call-for-uk-ban-cancer-fears**>.
514. Adam Vaughan, 'Growing Threat to Our Rivers from Rise of US-Style 'Mega Farms' *The Times* (12 Feb 2024) <**www.thetimes.com/uk/politics/article/growing-threat-to-our-rivers-from-rise-of-us-style-mega-farms-clean-it-up-3j9g2hg2v**>. Cf. the House of Commons Environmental Audit Committee (n 506) 42, calling for a presumption against granting planning permission for new intensive livestock units in areas with nutrient overload. However, as the Government response noted, if new units are likely to have a significant effect on relevant European protected habitat sites, then current nutrient neutrality rules are already likely to come close to a ban on them: 'Environmental Change and Food Security: Government Response to the Committee's Second Report' (21 March 2024) <**https://publications.parliament.uk/pa/cm5804/cmselect/cmenvaud/646/report.html**> (and see also section 5.1.3 above).
515. Environment Agency, *Drought Response: Our Framework for England* (2017) 22.
516. ibid.
517. s 73 Water Resources Act 1991.
518. See further Valérie Dupont and others, 'The Role of Quota Systems in Realising Planetary Boundaries' (2024) 36 JEL 203.
519. Martin Aranda and others, 'Command-and-Control Quota-Based Regimes' in Lorenzo Motos and Douglas Wilson, *Volume 36, Developments in Aquaculture and Fisheries Science* (Elsevier 2006) 143. For UK law on fishing quotas, see section 5.1.4 above.
520. Section 5.1.4 above.
521. In 2023, sugar beet for transport biofuels took up 2.6 thousand ha, with wheat a much larger 45 thousand ha. Maize for energy production from anaerobic digestion took up 73 thousand ha (representing 30% of the national maize crop): Defra, 'Official Statistics: Bioenergy Crops in England and the UK: 2008-2023' (2024).
522. Environmental Improvement Plan 2023 (n 388) 88.
523. ibid 89.
524. See further Chris Hilson, *Regulating Pollution: A UK and EC Perspective* (Hart Publishing 2000).
525. Attempts to include agricultural transport in this failed: Alice Hancock, 'EU Farmers Should Pay for Their Carbon Emissions, Says Denmark' *Financial Times* (5 Nov 2023) <**www.ft.com/content/0fa6edec-267f-4652-8bc5-486d60e4049e**>.
526. Trinomics (n 104) 2.
527. New Zealand Government (n 430) 249.
528. In 2022, nitrous oxide emissions from nitrogen fertiliser in New Zealand amounted to only 3.9% of agriculture sector emissions (ibid).
529. New Zealand Government (n 430) 254.
530. ibid.

531. New Zealand Government, 'New Emissions Reduction Plan Will Future-proof NZ's Largest Export Sector' *Press Release* (18 Aug 2023) <**www.beehive.govt.nz/release/new-emissions-reduction-plan-will-future-proof-nz%E2%80%99s-largest-export-sector**>.
532. New Zealand Government, 'Agriculture to Come Out of the ETS' *Press Release* (11 June 2024) <**www.beehive.govt.nz/release/agriculture-come-out-ets**>; Teodora Lyubomirova, 'New Zealand Abandons Plans to Price Farm Emissions – For Now' *Dairy Reporter* (13 June 2024) <**www.dairyreporter.com/Article/2024/06/13/new-zealand-shelves-farm-emissions-levy-plans**>.
533. Ole-Kenneth Nielsen and others, *Denmark's National Inventory Report 2023: Emission Inventories 1990-2021 – Submitted under the United Nations Framework Convention on Climate Change* (Aarhus University 2023) 408 <**http://dce2.au.dk/pub/SR541.pdf**>.
534. Maria Arboleas, 'Danish Carbon Tax on Agriculture, A Model for the Rest of Europe or a Splendid One-off?' *Euractiv* (28 June 2024) <**www.euractiv.com/section/agriculture-food/news/danish-carbon-tax-on-agriculture-a-model-for-the-rest-of-europe-or-a-splendid-one-off/**>.
535. Nielsen and others (n 533) 408.
536. Ministry of Foreign Affairs of Denmark, 'Denmark is The First Country in the World to Introduce Carbon Tax on Livestock Farming' *Insight* (5 July 2024) <**https://investindk.com/insights/denmark-is-the-first-country-in-the-world-to-introduce-carbon-tax-on-livestock-farming**>.
537. ibid; and Arboleas (n 534).
538. Holly Tomlinson, 'What Should (and Shouldn't) the UK Take From the Danish Tax on GHG Emissions From Agriculture?' *IEEP Blog* (12 Dec 2024) <**https://ieep.uk/news/blog-what-should-and-shouldnt-the-uk-take-from-the-danish-tax-on-ghg-emissions-from-agriculture/**>.
539. New Zealand Government (n 531).
540. 2022/0394 (COD).
541. cf Banerjee (n 283).
542. Editorial, 'The Guardian View on Farming's Green Transition: The Politics Aren't Looking Good' *The Guardian* (12 Nov 2023) <**www.theguardian.com/commentisfree/2023/nov/12/the-guardian-view-on-farmings-green-transition-the-politics-arent-looking-good**>. This article draws attention to the risk of populist backlash from such a tax. A meat tax was not recommended in the *National Food Strategy* because of its regressive nature: Dimbleby (n 105) 121. However, a more targeted meat tax, as discussed in the main text below, could avoid these effects.
543. Humpenöder and others (n 285). This is more likely to be so in developed economies like the UK: David Chen and others, 'Future Food Prices Will Become Less Sensitive to Agricultural Market Prices and Mitigation Costs' (2025) 6 Nat Food 85.
544. David Burrows, 'Why Claims of 'Sustainable' Beef Should be Taken With a Pinch of Salt' *Just Food Daily Newsletter* (21 Feb 2024) <**www.just-food.com/features/why-claims-of-sustainable-beef-should-be-taken-with-a-pinch-of-salt/**>. Burrows also mentions potential animal welfare trade-offs.
545. See also the pEPR waste fees discussed in section 5.1.5. The fee modulation from 2026 willhelp to incentivise greater use of recyclable material in packaging.
546. (n 162).
547. HMRC, *Plastic Packaging Tax: Summary of Responses to the Policy Design Consultation* (2020) 3. In practice, the tax has struggled to achieve these aims: David Burrows, 'Why Experts Think the UK's Plastic Packaging Recycling System is at Risk of Collapse' *ENDS Report* (21 Nov 2024).
548. Scottish Government, 'Managing Waste' <**www.gov.scot/policies/managing-waste/deposit-return-scheme/**>.
549. ibid.
550. Scottish Government, 'Deposit Return' *Press Release* (7 June 2023) <**www.gov.scot/news/deposit-return/**>.
551. (nn 165-6).
552. The Soft Drinks Industry Levy Regulations 2018 (SI 2018/41) introduced via the Finance Act 2017.
553. Dimbleby (n 105) 146.
554. Alex Dickson and others, 'Does a Spoonful of Sugar Levy Help the Calories Go Down? An Analysis of the UK Soft Drinks Industry Levy' (2023) Rev Econ Stat 1.
555. See the comment by Nina Rogers, reported in Tobi Thomas, 'Children's Sugar Consumption Halved Since Tax Announcement, Study Finds' *The Guardian* (9 July 2024) <**www.theguardian.com/society/article/2024/jul/09/childrens-daily-sugar-consumption-halves-just-a-year-after-tax-study-finds**>.
556. Dickson and others (n 554).
557. ibid.
558. ibid.
559. Nina Rogers and others, 'Associations Between Trajectories of Obesity Prevalence in English Primary School Children and the UK Soft Drinks Industry Levy: An Interrupted Time Series Analysis of Surveillance Data' (2023) 20 PLoS Med e1004160.
560. ibid.
561. Pourya Valizadeh and Shu Wen Ng, 'Promoting Healthier Purchases: Ultraprocessed Food Taxes and Minimally Processed Foods Subsidies for the Low Income' (2024) 67 AJPM 3.
562. Marco Springmann and others, 'A Reform of Value-Added Taxes on Foods Can Have Health, Environmental and Economic Benefits in Europe' (2025) Nat Food <**https://doi.org/10.1038/s43016-024-01097-5**>.
563. Dimbleby (n 105) 147.
564. Healthy Start (n 343).

565. DfE, 'Holiday Activities and Food Programme 2023' *Guidance* (11 March 2024) <**www.gov.uk/government/publications/holiday-activities-and-food-programme/holiday-activities-and-food-programme-2023**>. The aims of the programme include provision of 'healthy and nutritious meals', which have to meet School Food Standards.
566. Dimbleby (n 105) 151-3.
567. Defra, *The Path to Sustainable Farming: An Agricultural Transition Plan 2021 to 2024* (2020).
568. ibid. On the transition to ELM, see further Edward Scott, *Environmental Land Management: Recent Changes to the Sustainable Farming Incentive and Countryside Stewardship Schemes* (House of Lords Library 2024) <**https://lordslibrary.parliament.uk/environmental-land-management-recent-changes-to-the-sustainable-farming-incentive-and-countryside-stewardship-schemes/**>. For subsequent amendments, eg to make ELM more accessible, see Defra (n 480).
569. Janet Hughes, 'Environmental Land Management Schemes: Details Of Actions and Payments' *Farming Blog* (26 Jan 2023) <**https://defrafarming.blog.gov.uk/2023/01/26/environmental-land-management-schemes-details-of-actions-and-payments/**>.
570. ibid.
571. Defra (n 519).
572. Defra and RPA, 'Countryside Stewardship: Get Funding to Protect and Improve the Land you Manage' 11 Dec 2024 <**www.gov.uk/government/collections/countryside-stewardship-get-funding-to-protect-and-improve-the-land-you-manage**>.
573. Verity Winn and Hannah Blitzer, 'Why Farming Changes Do Not Tick the Box on Cross Compliance' *Wildlife and Countryside Link Blog* (Nov 2023) <**www.wcl.org.uk/farming-changes-do-not-tick-the-box-on-cross-compliance.asp**>. Other concerns include eg the balance against food production, with some farmers initially considered to be diverting too much land away from food production in the pursuit of environmental payments (subsequently corrected via amendments with new limits): Sarah Coe, 'New Approaches to Farm Funding in England' *House of Commons Library* (28 May 2024).
574. Defra, 'SFI Actions for Hedgerows' *Guidance* (27 Feb 2024) <**www.gov.uk/guidance/sfi-actions-for-hedgerows**>.
575. Rural Payments Agency, *The Guide to Cross Compliance in England 2022* (2022) 36-37 <**https://assets.publishing.service.gov.uk/media/61b21acb8fa8f5038358c1c9/Guide_to_cross_compliance_in_England_2022.pdf**>.
576. See Rural Payments Agency, 'Environmental Stewardship Agreements: Addendum to 2nd, 3rd and 4th Edition Environmental Stewardship Handbooks Guidance' (6 Dec 2023) <**www.gov.uk/government/publications/environmental-stewardship-terms-and-conditions-and-rules-for-existing-agreement-holders-from-1-january-2024/environmental-stewardship-agreements-addendum-to-2nd-3rd-and-4th-edition-environmental-stewardship-handbooks**>.
577. (n 428) 8. And the dairy sector for 40% of those (ibid).
578. ibid 47. The report notes stakeholder pushback on the proposal.
579. Kathleen Segerson and others, 'A Cautious Approach to Subsidies For Environmental Sustainability' (2024) 386 Science 28.
580. In the EU, 82% of agricultural subsidies are taken up by animal-based foods (38% directly and 44% indirectly via animal feed): Anniek Kortleve and others, 'Over 80% of the European Union's Common Agricultural Policy Supports Emissions-intensive Animal Products' (2024) 5 Nat Food 288.
581. Marco Springmann and Florian Freund, 'Options for Reforming Agricultural Subsidies From Health, Climate, And Economic Perspectives' (2022) 13 Nat Commun 82; Marco Springmann, 'Meat and Dairy Gobble up Farming Subsidies Worldwide; It's Bad For Your Health And The Planet' *Oxford Martin School Blog* (12 Jan 2022) <**www.oxfordmartin.ox.ac.uk/blog/meat-and-dairy-gobble-up-farming-subsidies/**>.
582. India Bourke, 'Denmark: The Major Pork Producer Trying to Wean Itself Off Eating Meat' *BBC Future Planet* (1 Dec 2023) <**www.bbc.com/future/article/20231201-denmark-the-major-meat-producer-switching-to-a-plant-based-diet**>.
583. Springmann Blog (n 581).
584. eg AHDB, 'Marketing' <**https://ahdb.org.uk/marketing**>.
585. As Bourke (n 582) notes, "by placing such a large focus on demand-stimulation, rather than punitive measures, Danish politicians are hoping their agricultural sector will see plant-based food as an opportunity to build new skills and jobs, not a threat to their livelihoods."
586. Trinomics (n 104) 65.
587. See eg Madeleine Speed, 'Nestlé Shareholders Call on Food Giant to Reduce Reliance on Unhealthy Products' *Financial Times* (14 March 2024).
588. See eg Chris Hilson, 'Information Disclosure and the Regulation of Traded Product Risks' (2005) 17 JEL 305; Alexander Stein and Marcelo de Lima, 'Sustainable Food Labelling: Considerations for Policy-Makers' (2022) 103 Rev Agric Food Environ Stud 143.
589. Elise Golan and others, *Economics of Food Labeling* (USDA 2001) <**www.ers.usda.gov/publications/aer793/aer793.pdf**>.
590. European Commission, DGfor Research and Innovation, Group of Chief Scientific Advisors, *Towards Sustainable Food Consumption* (2023) <**https://scientificadvice.eu/advice/towards-sustainable-food-consumption/**>.
591. ibid 6.
592. ibid.
593. Eurogroup for Animals, BEUC, and EPHA, *The Illusion of Choice: Why Someone Has Already Decided What You Will Eat for Lunch* (2023) <**www.beuc.eu/sites/default/files/publications/BEUC-X-2023-080_The_illusion_of_choice_report.pdf**>.

594. European Commission (n 540).
595. BEUC, 'New Evidence Shows Consumers' Diets Heavily Influenced by Food Sector' *Press Release* (28 June 2023) <**www.beuc.eu/press-releases/new-evidence-shows-consumers-diets-heavily-influenced-food-sector**>.
596. See further Defra and FSA, 'Food Labelling: Giving Food Information to Consumers' (2022) <**www.gov.uk/guidance/food-labelling-giving-food-information-to-consumers**>. On EU labelling (from which much UK food labelling law derives), see European Court of Auditors, *Food Labelling in the EU – Consumers Can Get Lost in the Maze of Labels*, Special Report 23 (2024) <**www.eca.europa.eu/en/publications?ref=SR-2024-23**>.
597. Regulation 178/2002 laying down the general principles and requirements of food law [2002] OJ L31/1. Assimilated means that, post-Brexit, the Regulation continues to apply in the UK.
598. FSA, 'General Food Law' (2020) <**www.food.gov.uk/business-guidance/general-food-law**>.
599. Art 14 of Regulation 178/2002 (n 597); s 8(2) of the UK Food Safety Act 1990 states "[f]or the purposes of this Part food fails to comply with food safety requirements if it is unsafe within the meaning of Article 14 of Regulation (EC) No. 178/2002".
600. Art 14; s 7 Food Safety Act 1990.
601. Art 14.
602. FSA (n 598).
603. eg art 16 of Regulation 178/2002 (n 597); s 15B Food Safety Act 1990.
604. Art 18.
605. Arts 14 and 19.
606. eg batch numbers displayed on food packaging which aid traceability and recalls.
607. Regulation 1169/2011 [2011] OJ L304/18.
608. For more details on a range of specialised legislation, see David Jukes, 'Food Labelling in the UK: A Guide to the Legal Requirements' *University of Reading* <**www.reading.ac.uk/foodlaw/label/index.htm**>.
609. eg The Beef and Veal Labelling Regulations 2010 (SI 2010/983).
610. Regulation 1333/2008 on food additives [2008] OJ L354/16.
611. eg Regulation 1830/2003 concerning the traceability and labelling of genetically modified organisms [2003] OJ L268/24.
612. Empowering consumers to make healthier choices when eating OOH. Large (250+ employee) OOH food businesses are required by The Calorie Labelling (Out of Home Sector) (England) Regulations 2021 (SI 2021/909) to display calorie information for the non-prepacked food they sell. The measures capture eating outand takeaways (including home delivery and third-party apps). Participation by smaller businesses, while not mandatory, has been encouraged by government. See Bukky Balogun, *Obesity Policy in England* (House of Commons Library 2023) <**https://commonslibrary.parliament.uk/research-briefings/cbp-9049/**>.
613. See further eg Andreas Drichoutis and others, 'Consumers' Use of Nutritional Labels: A Review of Research Studies and Issues' (2006) 9 AMSR 1.
614. (n 607).
615. Samuel Dicken and others, 'Nutrients or Processing? An Analysis of Food and Drink Items From the UK National Diet and Nutrition Survey Based on Nutrient Content, the NOVA Classification and Front of Package Traffic Light Labelling' (2024) 131 BJN 1619.
616. Hannah Nohlen and others, *Front-of-Pack Nutrition Labelling Schemes – An Update on the Evidence* (European Commission Joint Research Centre 2022) <**https://op.europa.eu/en/publication-detail/-/publication/2339cf79-2f25-11ed-975d-01aa75ed71a1**>.
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621. WHO Regional Office for Europe, *Manual to Develop and Implement Front-of-pack Nutrition Labelling: Guidance for Countries on the Selection and Testing of Evidence-informed Front-of-pack Nutrition Labelling Systems in the WHO European Region* (2020) <**www.who.int/europe/publications/i/item/WHO-EURO-2020-1569-41320-56234**>.
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631. s 14 Food Safety Act 1990.
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633. Art 3 Regulation 1924/2006 on nutrition and health claims made on foods [2006] OJ L404/9; DHSC, 'Great Britain Nutrition and Health Claims (NHC) Register' (31 Dec 2020) <**www.gov.uk/government/publications/great-britain-nutrition-and-health-claims-nhc-register**>. The Regulation continues to apply in Northern Ireland.
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649. RSPCA, 'Change Starts with the Choice' <**www.rspca.org.uk/getinvolved/campaign/labelling**>.
650. Mar Maestre and others, *Study on Animal Welfare Labelling* (Publications Office of the European Union 2022) 8.
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735. ibid [2.3.4].
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747. Hansard, HL Deb 795, 12 Feb 2019 <**https://hansard.parliament.uk/Lords/2019-02-12/debates/318FD706-91E8-4792-B388-B7B358A6A87F/Environment(AmendmentEtc)(EUExit)Regulations2019**>.
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763. ibid.
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765. WRAP, 'Food Waste Reduction Roadmap Toolkit' <**www.wrap.ngo/resources/tool/food-waste-reduction-roadmap-toolkit**>.
766. WRAP, 'Food Waste Reduction Roadmap' <**www.wrap.ngo/taking-action/food-drink/initiatives/food-waste-reduction-roadmap**>.
767. Defra, *Summary of Responses and Government Response: Improved Food Waste Reporting by Large Food Businesses in England* (July 2023).
768. Across households, hospitality and food service, manufacturers, retail, and farms.
769. WRAP, *UK Food Waste & Food Surplus – Key Facts* (Nov 2023) <**www.wrap.ngo/resources/report/food-surplus-and-waste-uk-key-facts-updated-november-2023**>.
770. Walker Morris, 'Government Reconsiders Mandatory Food Waste Reporting' (14 Feb 2024) <**www.walkermorris.co.uk/newsletters/newsletter-items/government-reconsiders-mandatory-food-waste-reporting/**>.
771. Leigh Day, 'Feedback Welcomes DEFRA U-turn on Food Waste Reporting Policy' (22 Nov 2023) <**www.leighday.co.uk/news/news/2023-news/feedback-welcomes-defra-u-turn-on-food-waste-reporting-policy/**>.
772. HC Written Questions, UIN 5090, 4 Dec 2023 <**https://questions-statements.parliament.uk/written-questions/detail/2023-12-04/5090**>.
773. For details, see further Malik and others (n 739).
774. Via an open letter to the then Secretary of State, coordinated by food waste organisation Too Good To Go, in conjunction with the British Retail Consortium: Lucy Bennett, 'Open Letter for Industry Support for Mandatory Food Waste Reporting' 18 March 2024 <**www.toogoodtogo.com/blog/open-letter-2024**>.
775. Defra, 'Food Data Transparency Partnership' <**www.gov.uk/government/groups/food-data-transparency-partnership**>.
776. ibid.
777. ibid.
778. The Food Foundation, 'Can the Mandatory Reporting of Healthy Food Sales be Gamified?' 9 July 2024 <**https://foodfoundation.org.uk/news/can-mandatory-reporting-healthy-food-sales-be-gamified**>.
779. Meat, dairy, fish, plant, or alternative protein.
780. (n 105) 147.
781. FDTP, 'Towards Consistent, Accurate and Accessible Environmental Impact Quantification for the Agri-Food Industry' (2024) <**www.gov.uk/government/publications/food-data-transparency-partnership-agri-food-environmental-data/fdtp-towards-consistent-accurate-and-accessible-environmental-impact-quantification-for-the-agri-food-industry**>.
782. ibid.
783. ibid; and Defra, *Food Data Transparency Partnership: Eco Working Group Terms of Reference* <**https://assets.publishing.service.gov.uk/media/65045b146771b90014fdab63/Eco_Working_Group_Terms_of_Reference.pdf**>.
784. To similar effect, see House of Lords (n 617) recommendation 8. In its response (DHSC n 5), the Government pointed to its inflation-linking measures on the current drinks levy and said it would be considering the sugar thresholds at which it applies and also whether to extend it to milk-based and milk substitute drinks. It also did not rule out further mandatory incentives for reformulation.

785. ibid recommendation 7. In its response, the Government supported this in principle but pointed to the need for a number of implementation issues to be resolved by the FDTP.
786. Jeanine Ammann and others, 'A Review on Policy Instruments for Sustainable Food Consumption' (2023) 36 Sustain Prod Consump 338.
787. ibid; Sanchayan Banerjee and others, 'Public Support for 'Soft' Versus 'Hard' Public Policies: Review of the Evidence' (2021) 4 JBPA 1.
788. Hilson (n 524).
789. Elin Röös and others, *Policy Options for Sustainable Food Consumption – Review and Recommendations for Sweden*, Mistra Sustainable Consumption Report 1:10 (Chalmers University of Technology 2021) 7.
790. (n 227).
791. Lars Tummers, 'Public Policy and Behavior Change' (2019) 79 Public Admin Rev 925, 925.
792. Cf Leneisja Jungsberg and others, *Policy Tools for Sustainable and Healthy Eating – Enabling a Food Transition in The Nordic Countries* (Nordregio 2024) <**https://nordregio.org/publications/policy-tools-for-sustainable-and-healthy-eating-enabling-a-food-transition-in-the-nordic-countries/**>.
793. Corinna Hawkes and others, 'The Full Picture of People's Realities Must Be Considered to Deliver Better Diets For All' (2024) 5 Nat Food 894.
794. See eg Elisabeth Bonanomi and Theresa Tribaldos, 'PPM-Based Trade Measures to Promote Sustainable Farming Systems? What the EU/EFTA-Mercosur Agreements Can Learn from the EFTA-Indonesian Agreement' in Marc Bungenberg and others (eds), *European Yearbook of International Economic Law* (Springer 2020).
795. This includes eg pesticide use because importing states like the UK set standards for maximum levels of pesticide residues left on the product. On the wider trade and safety issue, see further Hilson (n 588).
796. Again 'generally' is important here because there is evidence that eg organic food has some nutritional advantages: Denis Lairon, 'Nutritional Quality and Safety of Organic Food. A Review' (2010) 30 Agron Sustain Dev 33.
797. (n 615).
798. Röös and others (n 789) 11.
799. See eg Röös and others (n 789); Jungsberg and others (n 792).
800. Harriet Bartlett and others, 'Trade-offs in the Externalities of Pig Production Are Not Inevitable' (2024) 5 Nat Food 312.
801. The importance of context is emphasised in the ideas of both 'Smart' and 'Responsive' regulation: Neil Gunningham and others, *Smart Regulation: Designing Environmental Policy* (Clarendon Press 1998); Ian Ayres and John Braithwaite, *Responsive Regulation: Transcending the Regulation Debate* (OUP 1992).

Regulatory Tools for a Healthy and Sustainable Diet

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