The impact of climate change on consumer food behaviours: Identification of potential trends and impacts

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Foreword

The Advisory Committee on Social Sciences (ACSS) formed a Working Group on Climate Change and Consumer Behaviours (CCCB).

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The Advisory Committee on Social Sciences (ACSS) was established by the Food Standards Agency (FSA) to bring social science expertise to the Agency's pursuit of food safety, food authenticity, and regulatory excellence. In fulfilling its remit, the Agency needs advice from a wide range of expertise, and this includes insights from disciplines such as behavioural science and economics as much as from the medical, agricultural, and animal health domains. It is crucial to understand how we as consumers, as well as the industries that feed us, might

adapt our behaviours, perceive risks or alter our purchasing patterns.

Climate Change is now widely accepted as one of the gravest risks facing human well-being, not least because of its possible effects on the food system. These effects could be radical and sudden and are inherently unpredictable. At the same time, humans are extraordinarily adaptable and innovative, and so responses to this threat are also unpredictable. Many people are already ‘doing their bit’ towards the ‘Net Zero’ aspiration by adapting their diet, changing their consumption patterns, or striving to avoid waste. As one of the many governmental bodies concerned with food supply the FSA has a strong interest in horizon scanning likely responses to climate change and understanding where it might impact its work.

The ACSS therefore offered to help with this large task and formed a Working Group on Climate Change and Consumer Behaviours (CCCB). We were fortunate to be able to begin our work by hosting a workshop with experts in the field to illuminate the trends already being observed, or considered possible. Following this we then convened a group of colleagues across the FSA to deepen understanding of how the identified trends might impact on food safety, food authenticity and regulation. We took as our initial scope end consumers (rather than the businesses that serve them), and we looked for behaviours that appear to be ones that consumers have adopted to respond to the Net Zero call. The concepts of ‘choice’ and ‘preference’ in relation to behaviour is complex, as much behaviour does not follow choice or preference. In future, climate change may bring about changes to food availability and price that mean that choices are constrained. Equally, consumer preferences may feed back into the supply chain, and lead to a degree of choice ‘editing’ by food businesses. These complexities are beyond our scope for the moment, but, as experts participating in our workshop emphasized, must be considered.

To get the full value of the expertise we were able to assemble, and the added value from our consultants, Ipsos UK who constructed and ran the first workshop, it is important to read the full report. It is also important to go directly to the centres of expertise for the insights that surfaced, but that we could only dip into and summarise. In this overview, the CCCB working group wants to highlight what we felt were some of the most interesting lines of enquiry, which are shown in table 1 below. We have to stress that these are possible trends of concern to the FSA, not necessarily with already observable effects, and more work needs to be done to explore them.

We are conscious that the Science Council also has a WG on Net Zero, with a wider scope than that of the ACSS, and we are closely in touch to ensure that the work is complementary.

I would therefore like to commend the work of the ACSS CCCB working group to the FSA, and we look forward to discussing how we can be of further help. I would also like to wholeheartedly thank everyone involved in making the workshops such stimulating and insightful exercises.

Julie Hill
Chair, CCCB Working Group
Deputy Chair, ACSS

Table 1: Key climate change relevant behavioural trends, implications for FSA policy areas, and potential actions.

Behavioural Domain of interest and possible trends of concern	Who are the potential stakeholders?	Reasons for concern?	Potential actions
1. Increased consumption of novel/alternative proteins Incorporating novel proteins in response to demands for vegetarian or vegan food without adequate testing/consideration.	Food manufacturers, retailers, consumers	Food Safety authenticity as novel proteins could generate hypersensitivity or increased food safety risks (for example, through new cooking practices)	Building knowledge on production standards and novel proteins role in nutrition. Seek partners including the Office for Health Improvement and Disparities (OHID). Consider an overarching framework of oversight within the FSA.

Behavioural Domainof interest andpossible trends ofconcern	Who are the potential stakeholders?	Reasons for concern?	Potential actions
2. Increased use of alternative packaging, including reusable containers Incorporating recycled material in packaging without appropriate safety testing. Re-use of food containers without adequate cleansing.	Packaging designers and manufacturers, retailers, consumers. Food delivery companies.	Food safety - possibility of contaminants migrating to food, risks of food residue contamination.	Consider suitable messaging on re-usable containers regarding use and cleaning. Ensure that the system is ready for a proliferation and increase in volume of novel and recycled materials.
3. Avoiding Food Waste Eating food dangerously beyond its use by date. Increased use of sharing apps.	Consumers at home, retailers	Food safety	Develop support mechanisms to help companies improve the accuracy of dates use by dates, and consumers to observes the dates correctly. Consider Food sharing apps as vehicles for FSA messaging.

The terms of reference for both the ACSS and the CCB working group can be found on the ACSS website.

Executive Summary

The aim is to provide an overview of the possible areas of change that climate change concerns could provoke in consumer behaviour, and explore how such potential change might impact on the key FSA policy areas.

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Background and objectives

To ensure access to the most recent evidence and specialist thinking, the Food Standards Agency (FSA) has input from independent experts in Scientific Advisory Committees. The Advisory Committee for Social Science (ACSS) provides advice on social science's contributions to the FSA's objectives. It does so primarily through working groups, including the recently created working group on climate change and consumer behaviour (CCCB) which advises on how consumer behaviour may change due to climate change.

To guide activity of the working group, and inform FSA research priorities, a two-phase expert elicitation exercise was undertaken. The aim of this was to provide an overview of the possible areas of change that climate change concerns could provoke in consumer behaviour, and explore how such potential change might impact on the key FSA policy areas:

1. Regulating food businesses (under the Food Safety Act 1990) ensuring that:

- businesses do not include anything in food, remove anything from food or treat food in any way which means it would be damaging to the health of people eating it

- the food businesses serve or sell is of the nature, substance or quality which consumers would expect
- the food is labelled, advertised and presented in a way that is not false or misleading.

2. Ensuring food authenticity (for example, that food is what it says it is) in terms of (but not limited to) origin, method of production, expiry date, advertised benefits, nutritional claims, and ingredient. This is a key area of food crime (serious fraud and related criminality in food supply chains) but can also be unintentional (depending on point of supply chain). Key risks to food authenticity are:

- adulteration - including a foreign substance which is not on the product's label to lower costs or fake a higher quality
- substitution - replacing a food or ingredient with another substance that is similar but inferior
- misrepresentation - marketing or labelling a product to wrongly portray its quality, safety, origin or freshness

3. Ensuring/Encouraging food safety in terms of the conditions and practices that preserve the quality of food to prevent contamination and food-borne illnesses. This refers to the regulation of food businesses (under the Food Safety Act 1990) as well as exploring potential unsafe behaviours in the home and educating consumers accordingly.

Stage 1: Method and key findings

Stage 1 started with an initial online expert elicitation exercise, followed by an expert workshop. Ipsos UK (in partnership with ADAS), were commissioned to carry out these stage 1 activities. The online exercise was sent to experts in relevant research areas and sought their feedback on a draft framework mapping climate change relevant behaviours against FSA priority areas (developed by the FSA and ACSS working group members, with input from Ipsos UK), hereby referred to as the CCCB map. There were suggestions to include additional specific behaviours, but general support for the 4 broad classifications used in the map:

- Dietary change
- Purchasing preferences
- Behaviours in the home
- Eating outside the home

As part of the online exercise, participants were invited to submit an abstract for a presentation at a subsequent workshop to explore the topic of climate change and consumer behaviour. The expert workshop ran online on the 18th May 2021, with 38 attendees (6 members of the project team, 5 ACSS members, 5 selected presenters and 22 additional invitees). The first section of the workshop contained presentations from experts on topics relating to climate change's impact on consumer food-related behaviours, with the second section focusing on discussing the map of climate change relevant behaviours against the FSA priority areas.

Based on stage 1 findings, the trends identified as having the highest potential impact on FSA priority areas are shown in table 2.

Table 2: Key climate change relevant behavioural trends and potential implications for FSA policy areas.

Behavioural trend	Potential implications
Avoiding food waste	Consumers may consume food dangerously beyond its use by date. Increased use of unregulated food sharing apps, possible contaminant risk.
Increased use of alternative packaging	Incorporating recycled material in packaging without appropriate safety testing, potentially leaving trace levels of toxic substances.
Increase use reusable containers to purchase food/drink in	Cross contamination from re-use of food/drinks containers without adequate cleansing.
Novel proteins increase	Some novel proteins, such as pea protein, raise allergen concerns. Some plant-based foods are highly processed (for example, excessive added salt), and health effects unknown. Consumers may lack knowledge on the practices of cooking alternative proteins, such as plant-based meats, insects, and legumes, and cook them in a way that poses risks for their health.

Stage 2: Method and key findings

In order to expand on the findings from stage 1, a second workshop was held on the 18th February 2022, with representatives from relevant FSA teams (such as Chemical Safety Policy and National Food Crime Unit).

For each of the 4 trends identified in stage 1 participants were asked:

- How concerned should the FSA be about the issues identified?
- What relevant activity is the FSA currently engaged in?
- Is further evidence needed on any area?

Participants in the workshop included ACSS members, as well as FSA staff covering a broad range of relevant policy areas. These included regulatory compliance, chemical safety policy, field operations, social research, additives and food contact materials, labelling, food crime, meat hygiene, general hygiene, strategic insights, wine standards, and novel proteins.

The workshop built cross-FSA understanding of the potential changes in consumer behaviour due to climate change and highlighted a number of key questions and opportunities for further exploration:

1. **Food Waste and Best Before/Use By dates:** How could the FSA support companies to ensure that accurate dates are used and that consumers observe the dates in the right way?
2. **Food Sharing Apps:** How could the FSA incorporate FSA messages into apps?
3. **Re-use of containers:** How could the FSA ensure messaging on suitable containers to use, and the importance of cleaning and maintaining containers?
4. **Novel/recycling packaging materials:** How could the FSA identify and plug any gaps in coverage of safety regulations, and ensure that the system is ready for a proliferation and increase in volume of novel and recycled materials?
5. **Novel proteins:** How could the FSA build understanding about the production standards for novel proteins, and their role in overall diet and nutrition? The FSA will need to seek partners for this kind of enquiry, including the Office of Health Improvement and Disparities (OHID). How could the FSA build an overarching framework of oversight bringing together the many parts of the organisation with an interest?

Cross-cutting themes: In all these areas, businesses could take much more responsibility. It would be helpful to have channels to understand businesses'

expectations and discuss FSA’s expectations of the businesses. Partners such as WRAP, through voluntary agreements such as the Courtauld Commitment, may be able to help establish such channels.

Conclusions

Concerns about climate change and sustainability are likely to influence consumer behaviours in a number of ways, from what food they choose to eat and how they access this food, to how they prepare and store food in the home. As consumer behaviours change this will have food safety, authenticity, and regulation implications for the FSA. This report via engagement with the FSA provides an overview of the main behavioural changes which could occur as a result of climate change and sustainability and has prioritised these potential avenues for further exploration as above.

Findings

This sections explains the main findings of the report categorised by each stage.

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Stage 1: Online Survey

Participants were asked to consider how climate change and/or climate action might impact consumer food behaviours, and to provide feedback on the CCCB map. Responses have been grouped thematically and reported below. However, it should also be noted that some participants raised some broader issues about the way in which the question was framed, or the best approach to understanding the impact of climate change and/or climate action on consumer food behaviours.

These included the need to: take a systems-based approach to understanding impacts; have a transitional view of the food system given global scale; consider consumers' role as producers in some cases, for example, through home growing; and, consider socially influenced practices in order to gain a fuller, holistic picture.

Dietary change

Respondents flagged a general shift to more sustainable, lower carbon diets, usually in the form of more plant-based diets with an increase in consumption of meat and dairy alternatives. This may be due to consumer choice (for example adopting this dietary change as alternatives provide lower carbon options) or a lack thereof. Respondents acknowledged that this is highly contingent on the type and depth of knowledge and information consumers have on the climate impact of foods and food behaviours(footnote), and flagged the potential need for clearer information on how consumers can adopt sustainable diets.

Socio-economic factors were also thought to influence the scale of the impact of climate change on consumer food behaviours. These included age, income levels, culture and identity, and balancing sustainability concerns against other needs in relation to food choices. One respondent also suggested that a shift to lower carbon diets may create co-benefits in terms of gains in animal welfare as consumers potentially move away from meat consumption.

Feedback on the dietary change theme within the CCCB map, related to breaking down ways in which consumers could achieve a low carbon diet (for example adopting a vegan diet, meat reduction, consuming more sustainably farmed meat and dairy).

Purchasing preferences

Respondents posited that climate change and climate action may not only cause consumers to consider the physical content of their meals, but also where it has come from and the conditions under which it was produced. This included shifts towards:

- Local produce and an increased interest in provenance
- Seasonal eating
- Higher welfare / standards produce and an increased expectation that farming practices will align with the carbon agenda
- Urban farming practices, such as vertical farming
- Sustainably produced / manufactured products.

Respondents also referred to a shift in purchasing preferences extending to how food is wrapped/covered, with consumers moving towards alternative food packaging. A need to better understand the composition of such packaging was flagged.

Feedback on the purchasing preferences theme within the CCCB map referred to the ‘soft’ preferences some consumers may display for UK produce over food potentially causing climate harm overseas (for example, deforestation). Linked to this, it was also felt that an increased preference for fair, sustainable foods from outside the UK should also be considered. Respondents felt it may also be appropriate to examine the increased use of digital tools to help consumers make more sustainable food choices.

Behaviours in the home

Respondents proposed that consumers may adopt behaviours that would reduce food waste or exhibit better food management practices, such as buying less to control portion sizes (thus avoiding the potential need to throw food away) or reusing leftovers. One respondent also raised the need to consider the role of innovation in this case as, in future, gene technologies may give food longer shelf lives, potentially either helping reduce food waste, or creating excess food supplies. Whilst it wasn’t identified as a key current trend, some respondents felt that consumers may move towards more energy efficient food preparation (for example, over cooking rather than slow cooking) and cooking practices.

Feedback on the behaviours the home theme within the CCCB map, suggested that it may be appropriate to consider the increased use of food sharing apps.

Eating outside the home

Whilst out of scope of this initial work, respondents flagged the importance of forms of collective, public provisioning when seeking to understand consumer food behaviours and choice (or lack thereof), such as a move towards sustainable food provision in establishments like schools, hospitals, prisons and care homes.

Feedback on the behaviours the home theme within the CCCB map, suggested including a preference for sustainable food choices, in addition and separate to, sustainable venue choice (for example choosing a sustainable menu option in a venue not necessarily recognised for sustainable produce/practises). Respondents also flagged the need to consider food choices in collective public provision (as per above) in a more holistic view of consumer food behaviour and choices (or

lack thereof) outside the home.

Overarching points

Respondents raised broader points around the understanding of the impact of climate change on food-relevant consumer behaviour, and the need to acknowledge:

- the **interplay between environmental motivations** behind consumer food behaviours. For example, some consumption behaviours are a win-win for animal welfare and climate/environmental concerns while others require trade-offs between motivations
- the role of **inequality and poverty** in determining food choices with less affluent consumers having constrained choice in what food they purchase
- the need for **economic and policy support** for transitions to sustainable diets and regulate some of the associated trends within the food system driven by climate change and environmental concern for example, understanding the impact of new recycled food packaging on human health, regulating ‘sustainable’ food labelling
- the role that **diversity and cultural politics** can play in consumer food behaviour. The UK is home to many people from diverse backgrounds with different food experiences and cultures to consider
- the role of **individual and group identities** among consumers. For example, the social meaning attributed to vegetarianism and veganism; and how age, gender and social class may interact with consumer behaviour
- the role of **social norms and influence** that can include media representations of sustainable diets, the impact of social media influencers in shifting diets and consumer choice and responses to past food campaigns (either commercial or from government)
- the role of **knowledge, (mis)information and technologies** in how the link between climate change and food is presented and transforming consumer insights.

Participants also flagged that climate change creates new **microbe and pathogen risks** in the short to medium term which may affect consumer food behaviours, and that climate change will impact and change which **food types and varietals** are available, which will in turn influence consumer behaviours and choice –behaviours should be considered within that context.

Stage 1: Expert workshop

The first session of the workshop focused on a series of 5 presentations given by leading researchers in the field. Presentations were selected from abstracts submitted at the online survey stage to reflect a range of issues and debates:

1. Food, behaviour and climate change- Feedback loops, the need for a long view, and misinformation (Dr. Christian Reynolds, City University).
2. Food safety and consumer behaviour in response to climate change (Professor Lynn Frewer, Newcastle University).
3. Relating production to consumption, and back again: an integrative approach (Dr Jonathan Beacham and Professor David Evans, University of Bristol).
4. Consumer packaging choices and the need for regulation of sustainable packaging for food safety (Antony Lord Smithers SME Ltd).
5. The role of edibility and food culture in transitioning to alternative proteins/meat alternatives (Professor Michael Goodman, University of Reading).

The second section of the workshop focused on the CCCB map. Using Google Jamboards, attendees were invited to provide feedback on the map, commenting on potential behaviour trends (both those noted in the map and those potentially missed) and their prevalence (flagging any supporting evidence). Findings are presented below, grouped by the behavioural classifications used in the map.

Dietary change

The most common theme identified under this classification was a move towards low carbon diet, with a preference for seasonal produce, reduced palm oil consumption and shorter supply chains. It was acknowledged that seasonal produce requires a trained, skilled and valued labour force to produce it, with Brexit identified as a risk to the labour market. It was noted that low carbon diets are difficult to define if the consumer is not well informed on the sustainability requirements for specific labels on food. Information that is available relating to food production was viewed as being disparate and attendees identified a need for harmonisation of labelling across the supply chain, using, robust environmental indicators to give the consumer a complete picture of the environmental impact of the food they are consuming. Regulation of the use of such indicators was discussed to prevent consumers being misled.

A potential increase in the consumption of alternative proteins (such as insects) was flagged, along with the need for regulatory change to reflect this increase. There was also felt to be a potential impact on food authenticity, with an

increased demand for meat alternatives, potentially leading to an increase in fraudulent products. Potential positive impacts of the reduction of meat consumption on food safety were also raised, for example reductions in incidences of food-borne disease, and levels of antibiotics in the food chain.

A move away from products with a deforestation footprint, such as palm oil, was anticipated to impact on other commodities (such as soy) in time. This trend was viewed as potentially growing in the future, enabled by more transparency in supply chains.

A preference for a low carbon diet was seen as a possible motivation for veganism, ‘flexitarianism’ and vegetarianism. ‘Flexitarianism’ was identified as a current increasing trend that could gain importance in the future.

A further theme identified on the Jamboards was the relationship between different demographic groups and dietary change, with some groups being able to make more food choices than others. It was highlighted that diet changes could lead to an exacerbation of health inequality because more affluent consumers may find it easier to make food choices that are more sustainable and healthier. Age was also raised as a factor affecting dietary trends. Young people were identified as a group that may be aware of the environmental impacts of food but constrained in the choices they can make due to limited financial resources. Additionally, it was anticipated that an increasing trend could be that consumers are purchasing more food that is produced in other people’s homes and therefore potentially unregulated. This trend was viewed as being attractive to consumers due to the shorter supply chain but the upregulation was highlighted as a potential safety issue (for example to consumers who have an intolerance or hypersensitivity).

Purchasing behaviours

The most common theme identified under this classification related to social inequalities, with affordability being the most significant driver for those in food poverty. Additionally:

- an increased demand for local suppliers and better food traceability were highlighted as increasing purchasing trends, and it was suggested that this could pose a risk to food authenticity, with consumers potentially being misled by inaccurate marketing/labelling
- geography was posed as a limitation restricting consumers’ purchasing choices, as using local suppliers to achieve a healthy sustainable diet is not

possible in all areas of the UK
- technology and apps were identified as playing a role in influencing consumer purchasing decisions, such as apps which connect customers to restaurants that have surplus food. However, it was felt that such technology was not accessible to all (particularly the elderly and those living in rural locations
- the avoidance of single use plastic packaging and the increased use of reusable containers to purchase food were raised under this theme. The potential for cross-contamination health risks were flagged for the latter
- an increase in less processed farm produce (for example unpasteurised milk) was flagged as potentially causing a food safety risk
- the increase in grocery and meal kit deliveries was also flagged as potential food safety risk, if left on doorsteps for long periods of time. It was highlighted that it is important for the FSA to maintain the integrity of the chill chain.

Behaviours in the home

The most common theme identified on this Jamboard was the impact that social factors have on the way people cook in the home, for example: access to space, cooking facilities, the priority given to cooking in the home, and the impacts of changes in working practices due to Covid-19, for example, moving from office working to working at home.

Avoidance of food waste was identified as a key trend, and it was noted that this could negatively impact on food safety practices, such as consuming foods beyond their used by date.

An increased use of alternatives to plastic packaging (such as beeswax wraps) was highlighted as a potential food safety risk if not properly used/washed. Food safety risks from microwaving unsafe plastics on ready meals was also highlighted.

Respondents identified a future need for consumers to have more knowledge on the practices of cooking with ‘new’ products, such as plant-based meats, insects, and legumes.

Eating outside the home

The most common theme identified under this classification related to sustainable choices in terms of venue selection and menu items. Attendees felt that price was

often a barrier to consumers selecting sustainable options. Additionally, it was felt that often consumers do not have access to the right information to make an informed choice, and that more information on sustainability (low carbon) and animal welfare needed to be provided. Packaging in takeaways was also discussed, with consumers potentially opting for low packaging options or reusable containers.

CCCB Map and behaviours for further consideration

The CCCB map was revised according to the expert feedback received in stage 1. The revised map is shown in table 4 with potential behavioural trends plotted against FSA priority areas, with those suggested to impact on priority areas shaded green and marked with a ‘Yes’. Further work by the project team, in consultation with FSA colleagues, identified 4 areas of behaviour change, with key implications for FSA policy areas, that would benefit from further consideration by the FSA and ACSS working group. These are shown in table 3.

Table 3: Key behavioural trends for further consideration

Behavioural trend	Potential implications
Avoiding food waste	Consumers may consume food dangerously beyond its use by date Increased use of unregulated food sharing apps, possible contaminant risk.
Increased preference for alternative packaging	Incorporating recycled material in packaging without appropriate safety testing, potentially leaving trace levels of toxic substances.
Increased use of reusable containers to purchase food/drink in	Cross contamination from re-use of food/drinks containers without adequate cleansing.

Behavioural trend	Potential implications
Increase in consumption of novel proteins	Some novel proteins, such as pea protein, raise allergen concerns. Some plant-based foods are highly processed (for example, excessive added salt), and health effects unknown. Consumers may lack knowledge on the practices of cooking alternative proteins, such as plant-based meats, insects, and legumes, and cook them in a way that poses risks for their health.

Table 4: CCCB Map: Potential behavioural trends and their impact on FSA policy areas

Dietary change

Potential behaviour trend	Food safety	Food authenticity	Regulation of food businesses
Vegan and vegetarian diet	-	-	-
Dairy reduction	-	-	-
Increase in consumption of novel proteins	Yes	Yes	Yes
Other novel foods	Yes	Yes	Yes
Palm oil reduction (includes other products related to deforestation such as soy)	Yes	Yes	Yes
Low carbon diets	-	Yes	Yes
Seasonal produce	-	Yes	-

Purchasing behaviours

Potential behaviour trend	Food safety	Food authenticity	Regulation of food businesses
Freeganism	Yes	-	-
Preference for sustainable packaging	Yes	-	-

Potential behaviour trend	Food safety	Food authenticity	Regulation offood businesses
Purchasing grocery/milk delivery and meal kits	Yes	-	Yes
Using local suppliers and delivery services for example, farm shops	-	-	Yes
Using digital tools to identify choice preference	-	-	-
Purchasing free range/organic	Yes	Yes	-
Purchasing fair trade	-	Yes	-
Increased use of reusable containers to purchase food/drink in	Yes	-	-

Behaviours in the home

Potential behaviour trend	Food safety	Food authenticity	Regulation of food businesses
Avoiding single use plastic in food storage	Yes	-	-
Avoiding food waste	Yes	-	-
Energy efficient cooking practices	Yes	-	-
Cooking novel or unfamiliar foodstuffs	Yes	-	-
Grow your own	Yes	-	-
Keeping livestock for example, poultry for eggs	Yes	-	-
Use of person to person food sharing apps for example, OLIO	Yes	Yes	Yes

Eating outside the home

Potential behaviour trend	Food safety	Food authenticity	Regulation of food businesses
Community kitchens	Yes	-	-

Potential behaviour trend	Food safety	Food authenticity	Regulation of food businesses
Low packaging options/reusable containers for takeaways	Yes	-	-
Sustainable hospitality choices	-	-	Yes
Sustainable food choices	-	Yes	Yes

Stage 2 findings

The findings present the breadth of discussion and are structured around the 4 key trends identified in stage 1:

1. Behaviours associated with avoiding food waste
2. The Increased Use of Alternative Packaging
3. The increased use of reusable containers
4. The Consumption of alternative proteins

Behaviours associated with avoiding food waste

Use of food waste avoiding apps

The use of apps designed to reduce food waste was discussed. It was noted that there has been an increase in advertisement of apps intended to share food rather than it being wasted and that some apps can encourage stockpiling of food near the end of the use by date. The implication of these apps could mean that:

- people get higher quantities than people can reasonably eat
- increased sharing of home prepared food, which could have hygiene concerns.

The FSA is already looking at the changing ways in which food ends up with consumers in a major workstream, the Achieving Business Compliance (ABC) programme. This is a quickly developing area with new players in this space which needs to be kept under review.

It was noted that the FSA has a strong position that any app encouraging consumption of food products past their use by dates would need to be challenged.
There may be potential for apps to incorporate messages on the importance of observing use by dates, encouraged by FSA.

Messages about the apps and use by dates could also be carried on the FSA website.

Use-by-Dates and Best Before Dates:

The use of best before dates (BBD) and use-by dates (UBD) were discussed with key considerations drawn out:

- **the need for clear understanding of the difference between BBD and UDB:** As regarding food safety it is fine to consume food past BBD but not UBD, so there needs to avoidance of consumer misunderstanding between the two. The potential to have both indicators on some food was raisedFSA and Defra's joint Best Practice. Current joint Best Practice is 'Only having one date label on a single product/item (for example, not using 'Display Until' or similar)'. Recent WRAP research focussed on dairy products (to be published this year) indicated that for items with a BBD applied, consumers needed to: notice the date type; understand what BB means; and feel confident to use their judgement, in order to eat for longer after the date. " href="#">(footnote)
- **the role of Food Business Operators in setting use by dates:** FBOs are required to set used by dates based on safety evidence. There may be an incentive to set dates that are overly precautionary. Smaller FBOs largely rely on the evidence and thus the dates set by larger businesses
- **potential divergence between food types:** Some food may have a UBD when it could have BBD, this is determined by the food business. The FSA could provide additional guidance to businesses on the burden of proof required to switch from UBD to BBD, but likely to be harder for smaller businesses to shift. At the same time, it was mentioned that some businesses have started to switch to BBD from UBD to reduce food waste, and smaller FBOs will follow suit so as to not appear less safe than bigger players
- **consumer attitudes to UBSs:** Some consumers are blasé about USB adherence. The older audience are less likely to check UBDs and are less likely to throw away food than younger age groups. The FSA Food and You 2 survey shows 37% of consumers report not always checking UBDs before cooking or preparing food. Eating food past UBDs could be based on consumers' relationship with food, for example, "I've had this food past UBD, and it hasn't done me harm", therefore they'll be more inclined to take the chance next time.

Figure 1 Although most report always checking UBDs, a significant minority (37%) do not always do so

The need to build understanding on the links between UBDs and other intersecting issues such as:

- **prevalence of disease:** There is a great deal of uncertainty and lack of evidence about any direct link between ignoring UBD and disease.
- **consumer income level:** A key barrier to UBD adherence is affordability with those on lower incomes buying reduced products (nearing their UBDs) and can't afford to waste food past UBDs (based on FSA qualitative research). So this behaviour is not solely driven by climate change concerns.
- **food crime:** There is a potential food crime risk for the FSA to be aware of with the potential for suppliers to deliberately divert out of date food back into the human supply chain.
- **links to Packaging:** The materials of food packaging also have a shelf life for their interaction with foods, though it only becomes a concern with extreme longevity after the BBD. Some active packaging does deteriorate quicker but normally this is used with UBD products (meats, fish etc).

The potential implications for the FSA were discussed including:

- the FSA could have an **enhanced role** in raising awareness in businesses and consumers
- the FSA could **build evidence** on potential conservativeness in use by dates
- the FSA **need to know** if concerns about food waste are having a significant influence on the decisions consumers make with respect to consuming food near or beyond the UBD. Then, the extent to which this is driven by the cost of food/affordability and/or concerns about climate change. This would be additional to the data gathered through Food and You, as above
- the potential for **smart packaging** was raised as a useful tool, for example products with thermal sensors on packs or intelligent packaging that changes colour under given conditions, and QR codes on wine. The FSA might need to take a view on these.

Increased use of alternative packaging

The main issue highlighted in this discussion was the use of recycled or alternative packaging materials that are not safe for food contact use. There is likely to be an increased availability and use of recyclable plastic materials driven through policies such Extended Producer Responsibility (EPR), Deposit Return Schemes (DRS) and the Plastics Tax. This will lead to greater uptake of recycled

plastic materials, for food and non-food packaging. Key issues raised were:

- **bio-based materials:** For bio-based/novel materials (including bio-plastics) intended to be used for food contact products, the FSA needs to be aware of what is being developed and placed on the market. There is some concern that businesses may not be fully aware of the different regulations. At the same time, consumers are demanding alternatives to traditional fossil fuel derived plastic for packaging
- **using waste to produce materials:** Chemical safety policy team is seeing a big increase in using food waste for packaging for example straw being converted into an additive for plastic to be used in packaging, and similarly materials such as shells, seeds, and fruit kernels.

A number of implications for future work were identified including:

- the need to examine the regulations for any overlaps in rules and in order to close gaps in the cardboard guidance. Should there be a ‘one-size-fits-all’ regime that covers all packaging materials?
- novel materials are next on the list of annual horizon scanning reports from the Strategic Insights team: this has been a big research gap. Use of novel packaging is to be specifically covered as the toxicology is a grey area. The ACCS could feed into this brief. The evidence review work will involve linking with industry (collecting and processing), and will need to include workshops with practitioners (manufacturers, waste industry).

Increased use of reusable containers

The potential for increased use of reusable containers was discussed and the following issues highlighted:

- inadequate cleaning of reusable containers poses food safety/hygiene risks
- re-use might also pose allergen risks: traces can be left in containers for example, peanuts
- consumers might repurpose packaging not designed or intended to be reusable, causing risk of contamination and illness
- consumers may blame the supermarkets for illness caused by inadequate cleaning, causing a liability issue
- wrong use of plastics is an issue from a chemical migration perspective. For example, using butter or ice cream tubs to microwave food in
- damaged reusable packaging for example, scratches, can harbour harmful bacteria potentially causing illness

- safety issues from novel materials (for example, bamboo composite materials in reusable cups).

There is a need to understand what kind of containers users might default to when going to refill stations. Glass might be an easier material to use safely. However, this is potentially a marginal issue in regards to population scale disease risk. FSA could consider these increased risks of packaging materials as future consumer research.

The consumption of alternative proteins

The workshop highlighted a number of potential concerns around alternative proteins, including:

- new proteins may require changes to **cooking**, for instance to eliminate toxins in kidney beans.
- **FSA processes** needing to account for potential new risks in the whole of food chain (for example, toxicological risk, allergenicity risk, cross contamination).
- a **whole diet approach** to considering impacts could be needed: As nutritional make up of diets may vary and there may be an increase in highly processed foods, resulting in increased consumption of certain additives and/or high salt, fat and sugar intake. Vegan alternatives may have different protein composition.
- t**erminology**: Often replacement product terminology is confusing for consumers, for example, ‘soya milk’ isn’t actually milk. Similarly, people shouldn’t assume cultured meat is identical to "meat classic". For example, calling soya milk "milk" clearly implies that it can be handled the same way, can substitute as an ingredient, etc, however this isn’t always the case. Therefore, there is an authenticity issue with the claim of novel proteins.

There a lot of existing activity going on in this space including consideration of how FSA would regulate, enforce and ensure consumer safety and informed choices. Existing research activity includes:

- an alternative proteins report commissioned by strategic insights, which aims to identify key alternative proteins (including laboratory cultivated meat and dairy), their maturity and market readiness, and potential food risks
- 'Psychologies of food’ research exploring UK public views and experiences around meat and dairy consumption, including key drivers of participants’

chosen dietary approach
- a consumer poll on alternative proteins in December 2021 was undertaken to understand consumer knowledge and perceptions.

Potential implications and considerations for the FSA were raised including:

- horizon scanning in National Food Crime Unit has been pointing towards the same concerns around allergens and authenticity in relation to plants, fungi, insects, bacteria and cell-culture
- there are potential concerns around the white powder proteins, (for example, bean protein), as prices have been rocketing due to shortages caused by crop failures. The potential to bulk this out with lower cost proteins such as soya and wheat must be considerable. Insect protein is also very expensive currently so could provide potential to be bulked out with allergic plant based crops
- concern for the potential for another melamine-type scandal. With many alternative proteins being sold solely on the level of protein present, there is an opportunity to bulk out with non-protein and add a nitrogen rich chemical to fool any testing undertaken
- lots of areas of the FSA are interested, so there is a need to avoid overlap of research to work efficiently
- food additives are present in novel proteins; the FSA needs to ensure that these are authorized for use
- potential avenues for further research include a whole diets approach risk analysis, terminology, and cooking approaches/ what people do in practice
- the FSA could put in place a framework/process for how to manage alternative proteins which brings together various FSA interests, increasing internal coordination (noting the range of interests)
- related to the above point, with businesses taking a lot of responsibility, they may not feel they are getting the guidance and support in broad terms, that they need on this issue.

1. Respondents understood this as being gathered through traditional media, social media or digital tools to help inform food choice and improve knowledge.

2. WRAP advocates ‘Only applying ‘Use By’ where there is a food safety reason to use it. Otherwise, making use of ‘Best Before’ or, in the case of uncut

fresh produce, no date', as in WRAP, FSA and Defra's joint Best Practice. Current joint Best Practice is 'Only having one date label on a single product/item (for example, not using 'Display Until' or similar)'. Recent WRAP research focussed on dairy products (to be published this year) indicated that for items with a BBD applied, consumers needed to: notice the date type; understand what BB means; and feel confident to use their judgement, in order to eat for longer after the date.

3. Respondents understood this as being gathered through traditional media, social media or digital tools to help inform food choice and improve knowledge.

4. WRAP advocates 'Only applying 'Use By' where there is a food safety reason to use it. Otherwise, making use of 'Best Before' or, in the case of uncut fresh produce, no date', as in WRAP, FSA and Defra's joint Best Practice. Current joint Best Practice is 'Only having one date label on a single product/item (for example, not using 'Display Until' or similar)'. Recent WRAP research focussed on dairy products (to be published this year) indicated that for items with a BBD applied, consumers needed to: notice the date type; understand what BB means; and feel confident to use their judgement, in order to eat for longer after the date.

Conclusions

The Chair sums up some of the key questions that require further exploration within the Food Standards Agency.

In this project

The Chair summed up some of the key questions for further exploration within FSA:

Food Waste and Best Before/Use By dates: How do we help companies to get the dates right, and consumers to observes the dates in the right way?

Food Sharing Apps: How to incorporate FSA messages into those apps?

Re-use of containers: How do we ensure messaging on the part of retailers on suitable containers to use, and the importance of cleaning and keeping well maintained, especially if handled mostly by consumers?

Novel/recycling packaging materials: How do we plug the gaps in coverage of safety regulations, and ensure that the system is ready for a proliferation and increase in volume of novel and recycled materials?

Novel proteins: How do we ensure that we understand enough about the production standards for these foods, and their role in overall diet and nutrition? We will need to seek partners for this kind of enquiry, including OHID. We might also need an overarching framework of oversight with FSA, as so many parts of the organisation are involved, and it will be important not to duplicate effort or leave gaps.

Cross-cutting theme: In all these areas we are expecting businesses to take a lot of responsibility, but it is not clear that they have sufficient guidance or FSA has sufficient contact with them to understand how well they are responding. It would be helpful to have channels to understand businesses' expectation, and discuss FSA's expectations of the businesses. Partners such as WRAP, through voluntary agreements such as the Courtauld Commitment, may be able to help establish such channels.

Annex A: Evidence sources identified through expert engagement

List of references and evidence sources identified through expert engagement.

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In this project

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Annex B: Workshop agenda

The workshop took place over Microsoft Teams between 10am and 1pm on 18th May 2021, the agenda is explained in this section.

In this project

In this project

10:00-10:15 Welcome and Intros – Ipsos UK (Ruth Townend)

Challenge at hand – ACSS (Julie Hill)

10:15-10:40 - Current thinking and relevant research - overviews: Session 1 (Ipsos UK facilitate)

Food, behaviour and climate change- Feedback loops, the need for a long view, and misinformation (Dr. Christian Reynolds, City)
Food safety and consumer behaviour in response to climate change (Professor Lynne Frewer, Newcastle)

Questions and answers

10:40-11:10 - Current thinking and relevant research – focus areas: Session 2 (Ipsos UK facilitate)

Relating production to consumption, and back again: an integrative approach (Dr Jonathan Beacham and Professor David Evans, University of Bristol)
Consumer packaging choices and the need for regulation of sustainable packaging for food safety (Antony Lord Smithers SME Ltd)
The role of edibility and food culture in transitioning to alternative proteins/meat alternatives (Professor Michael Goodman, University of Reading)

Questions and answers

Suggested Q&A topics:

What do you think the consequences of this might be for the FSA in terms of the 3 priority areas?
What do you think are the key things to illicit expert view on and pick up in jam board discussions?

11:10-11:20 - Break

11:20-11:30 – Mapping climate change relevant behaviours against FSA priority areas (Dr Rebecca Gillespie, FSA).

11:30-11:55 – Jamboard contributions: trends (Ruth Townend, Ipsos UK)

Jamboards for each of the 4 behaviour types asking attendees to comment on potential trends of climate change relevant behaviours (both those noted in the map and those we may have missed) and prevalence (flagging any supporting evidence)

11:55-12:20 – Jamboard contributions: impact on FSA 3 priority areas (Ruth Townend, Ipsos UK)

Revisiting the Jamboards for each of the 4 behaviour types asking attendees to comment on potential impacts (flagging any supporting evidence), using a Boston

matrix approach to identify high/low priorities.

12:20-12:35 - Break

12:35-13:20 – Jamboard feedback and summary (Julie Hill, ACSS)

Flag key points from the 4 behaviour types, with a focus on impact on FSA priority areas
10 mins on each (5 min feedback / 5 min discussion/comment). 5 min contingency

13:20-13:30 – Thanks and close (Ruth Townsend, Ipsos UK)