Food System Strategic Assessment: Executive Summary

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Project code: FS900278
Authors: Food Standards Agency and Camrosh
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Background

This Strategic Assessment has been informed by an extensive expert elicitation exercise as well as a literature review. It is intended to support strategic decision-making and anticipatory policy design. Information up to early March 2023 has been used in this assessment with the majority of expert elicitation carried out during January and February 2023.

The perceived magnitude and timeline of impact for identified issues was found to be overwhelmingly shaped by the currently increased uncertainties of global and UK political issues, such as the war in Ukraine, the roles of Russia and China in global trade, the consequences of Brexit, and the impact of resulting current global and UK economic pressures. Hence, the majority of identified issues presented in this strategic assessment were perceived as challenges to the food system of increasing urgency at this point in time (March 2023) with mostly short- and medium-term impacts (present to two years, and up to five years respectively).

Macro-level strategic perspective on findings

Despite the many challenges the UK food system is facing at present, the current situation also offers opportunities that when recognised early and seized upon with strategic intent, strong leadership and commitment can deliver great benefits helping transform the UK food system. Despite the uncertainties outlined in this report, now can be a pivotal moment for the UK food system to build values and resilience into its structure for the long-term future.

Most of the findings presented in this report have direct relevance for the FSA's remit, however it is also acknowledged that long-term solutions for issues should be aligned with a clear vision for building a better food system for the UK that is producing more sustainable and healthy food in the future. Hence, it is considered that a systemic approach beyond the FSA's remit, requiring collaboration across government departments, will be necessary to achieve this. Only systemic approaches will ensure integration and practical implementation of food system values such as

safety, authenticity, health, sustainability, and equal access for the long-term future.

Key drivers and impacts

The findings of this study are presented using the major drivers of potentially substantial change in UK food system. Drivers will interact and overlap; causal interpretations of issues resulting from those drivers are often highly complex. As a result, predictions of food system outcomes need to be taken with caution, as there is a large degree of inherent uncertainty in predicting change. For ease the issues identified in this study are presented here linked to their main causal driver, but it is acknowledged that in most cases there will be a complex causal relationship across multiple drivers. The following drivers and main related issues were identified in this study:

Driver: UK economic condition

- supply chain volatility and disruption
- household food insecurity
- labour shortages in the food system

Driver: Consumer attitudes

- increased volatility of consumer decision-making

Driver: Commercial drivers

- decreased investment in technology innovation

Driver: Technology Innovation

- improved agricultural production technologies
- digital technologies, AI, and robotics
- alternative sources of protein
- novel food processing technologies
- Gene Editing / Precision Breeding technologies
- insects in food and feed
- improved packaging / alternatives to single use plastic

Driver: Climate change/environmental factors

- increased animal and plant pests

Driver: Brexit and regulatory change

- enforcement issues at the border linked to new import controls
- new trade agreements and their potential impact on the UK food system
- regulatory divergence

It should be highlighted that while some of these issues present mainly risks and negative impacts, there are also real opportunities for the UK food system in addressing them. There are also some acute issues (such as enforcement issues at the border) that are shorter term and likely to be resolvable in the relatively near term, in contrast to more chronic longer term issues where a response is more likely to be adaptation than resolution (for example, increased animal and plant pests as a result of climate change).

Trends and issues impacted by UK economic condition

Supply chain volatility and disruptions

Over the past three years supply chain disruptions and volatility have increased as a result of the Covid-19 pandemic and recent geopolitical events impacting many stakeholders across the food value chain from agriculture to manufacturers, processors and retailers. Experts participating in this study see this as an enduring trend ("the new normal") with substantial impact in the short- to mid-term future. Risks for food safety and standards may arise due to abrupt shortages of inputs, and through sourcing from new suppliers that often requires costly testing and auditing. In particular small and medium enterprises (SMEs) might not have the resources to easily ensure standards are maintained when switching suppliers. This implies that more direct communication with SMEs regarding supply chain risks might be required to support them in addressing potential food safety, authenticity, and allergen related issues when switching suppliers. In addition, it might be necessary to increase enforcement at a time of enforcement staff shortages, which may present challenges.

Household food insecurity

Household food insecurity has increased over the past two years directing consumer choices towards cheaper and potentially less healthy foods. In addition, the use of food banks has increased as part of a longer-term trend in the UK towards more unequal access to food. These issues may have medium- and long-term impacts on health at the population level. At present food banks pose no reported food safety risks, however targeted information for food bank providers and users with regards to potential risks might be helpful for the short- and medium-term future. The FSA has already engaged with food bank providers.

Labour shortages in the food system

Labour shortages have over the past five years increasingly impacted the UK food system at many levels from a lack of seasonal harvesting labour and HGV drivers to abattoir workers and high skilled labour, such as veterinarians, environmental health officers, trading standards officers, meat hygiene inspectors and other food standards enforcement staff. Different risks to the food system can arise at different points where shortages impact maintenance of standards and quality, for example in animal slaughter, delayed meat export certifications and reduced inspection and enforcement capabilities among other areas. However, at present no overall trend toward increasing food safety incidents due to labour shortages was reported.

Trends and issues impacted by consumer attitudes

Increased volatility of consumer decision-making concerning healthy and sustainable foods, meat reduction, and meat alternatives

While studies show that consumers generally support sustainability and health goals, it is also evident that sustainability aspects of food are not well understood and often based on misconceptions (Which?, 2021). Under current financial pressures consumers prioritise price of food over health and a shift from red meat to more poultry might be motivated by cost rather than health or sustainability concerns (Corbin, 2023). Trends highlighted in the past five years, such as meat reduction and increasing sales of meat alternatives appear to be slowing down at present, not only due to financial pressures on consumers, but also a shifting consumer understanding of meat alternative products and issues around commercial viability on the side of producers. These issues may contribute to a shift in consumer attitudes making earlier predictions about the growth of certain trends appear less certain, and influencing consumer choices will likely be more difficult in the short- to medium-term future.

More persistent and clearer messaging to consumers on what sustainability aspects of food might be required over the short- to medium-term future in combination with a clear sustainability labelling system based on a convincing science base. This might require the UK government to establish the scientific base for a sustainability assessment framework in collaboration with industry stakeholders.

Trends and issues impacted by commercial drivers

Decreasing investment in innovation and technology

Given current economic pressures, experts in the food industry consulted for this study strongly indicated that at present investment into novel technologies and innovation, in particular those with sustainability goals, are postponed for the short- to mid-term future. Commercially risky, technology enabled novel product development is also currently de-prioritised by many food businesses. This particularly affects SMEs, but large corporations are also affected to some extent, as they focus on addressing current input cost issues, supply chain volatility, and regulatory uncertainties due to Brexit. If there is a continued disconnect from innovation particularly in food safety- and standards-related technologies, it might impact the food system in the mid-term but given current uncertainties no reliable predictions can be made of what that impact might be. Nevertheless, currently there are no indications that reduced investments in innovative technologies will create novel risks but reduces the opportunities that some innovations might deliver, particularly in the area of sustainability.

Trends and issues impacted by technology innovation

A number of technology areas were highlighted by experts consulted for this study for the transformative change they could bring to the food system.

Improved agricultural production technologies

Although outside of the regulatory remit of the FSA, improved agricultural production technologies are seen as essential to reduce the negative environmental impact of the global food system, and will have direct impacts on areas within the regulatory remit of the FSA. Many approaches, such as technology enabled (data-driven) precision agriculture, integrated pest management, and regenerative agriculture are not novel but would still require much wider implementation to make significant positive environmental impact.

Should such farming practices become implemented at scale in the mid- to long-term future, new food safety issues might arise from novel pests/contaminants/allergens, for example from using new waste streams for feed or new active substances as pesticides. Monitoring these developments will be necessary to understand any potential emerging risks.

Digital technologies, AI and robotics

It is anticipated that they will be essential for any future transformation of the food system. One aspect of digital innovation with relevance for the FSA is the increasingly networked interaction between consumers and different actors along the food value chain via online sales channels. Increasing numbers of food aggregator platforms pose known and potential food safety and standards risks that are currently not well understood, hard to police and rapidly evolving. With regards to dynamic developments in digital consumer interactions with various actors in the food system, food safety and authenticity issues may arise very rapidly in a dispersed manner requiring novel enforcement tools and improved guidelines for online operators. The FSA has already started considering this trend and is actively engaging with this sector providing guidance

for digital food distribution platform operators (FSA, 2022e; Short et al., 2022a).

Alternative sources of protein

Experts consulted for this study highlighted the importance of plant-based meat substitutes, fermentation-based protein products, and cultured meat. Despite recent large investments in these technologies, and some understood environmental benefits, the long-term potential of these technologies still needs to be proven in wider consumer markets as they are mostly still at a premium price level. Although consumer uptake of such products was increasing over the past five years, current economic pressures and changing attitudes may slow down their growth trajectory in the short- to medium-term future. These products usually require high energy inputs, are considered by many as highly processed foods and their long-term health impacts are currently unknown.

Cultured meat still needs to achieve scale of production, improvements in taste and texture, and an economically viable price point. Sustainability claims and health impacts of cultured meat are at an early stage of understanding. Hence, the real impact of the technology might be still a decade away (Short et al., 2022b).

As some foods produced with alternative proteins fall under the Novel Foods regulation a balanced approach between controlling risks and supporting innovation will be required (European Commission, 2015; UK Government, 2018). The complexity of some production processes will require close collaboration with industry to understand claims made for these products with regards to health and sustainability. To avoid slowing innovation, the science and knowledge base around these technologies needs to be established early while they are emerging to be able to set standards.

Novel food processing technologies

Recent innovations in non-thermal food processing technologies promise alternatives to heat-based antimicrobial food treatment to maintain freshness and natural ingredients, enabling healthier products, and using fewer chemical preservatives. While some of the technologies highlighted in this study have been explored for some time, many are still not suitable for mass production processes, can only be used in combination with other antimicrobial technologies, and are often considerably more complex and expensive than conventional current technologies. Hence, they are at present evolving in niche markets such as for functional foods and supplements.

As these technologies are still emerging, food safety parameters and potential labelling requirements need to be established in collaboration with industry. Current levels of use and the science base behind these technologies need to be explored in order to understand the need for regulatory assessment.

Gene Editing / Precision Breeding technologies

The current state of scientific understanding indicates that there are no novel food safety or health risks to be expected from food and feed products produced with these technologies. To what extent ‘precision bred’ (the term under which gene editing falls in the UK) crops and animals can contribute to a transformation of the food system in the future with regards to increasing pest resistance, water requirements and increased nutritional value is currently not known. After royal assent of the Precision Breeding Act in March 2023, it is expected by experts consulted for this study that it will take at least a decade until any benefits from UK produced precision-bred organisms will be achieved at scale.

As public understanding of the technology is generally low there is an opportunity to shape public debate around the benefits of the technology, and for the provision of information that enables informed consumer choice based on scientific evidence. The difficulty of authenticating food that is precision bred could be a new source of food crime through deliberate mislabelling, which would be extremely difficult to detect by standard sampling methods.

Insects in food and feed

Insects are considered a good source of protein with a much lower environmental footprint than livestock farming. A number of product categories using insects have evolved over the past decade and have significantly increased in the past five years, including processed whole insects, animal feed and pet feed, processed insect powders as an ingredient in various feeds and foods such as snack bars, drinks, or baked goods, including for human consumption. Their use in the UK is currently still mostly prohibited awaiting review of the Novel Foods regulation. Despite much media reporting, the market is currently still small and may take another decade to reach scale to make significant contributions to replacing proteins from livestock farming or feed crop agriculture.

Potential novel risks such as microbial contaminants, bioaccumulation of toxic compounds, or allergens will be assessed as part of the authorisation of novel foods under which most of these products will fall; as such the health impacts for humans and animals after longer-term consumption are currently not known.

Improved packaging / alternatives to single use plastics

Reducing packaging generally and replacing fossil fuel-based single use plastic for food packaging is well supported by consumers and regulators internationally. However, despite considerable investments in recyclable plastics and other materials, many technical issues are currently unresolved and production costs are mostly high preventing commercial viability at scale for alternatives. While many startups and large packaging manufacturers explore novel materials and packaging concepts, their true sustainability metrics are at present not well understood, and a significant shift away from fossil fuel-based materials might be still more than a decade away. The FSA is actively researching this technology area and has commissioned a study into how this industry may evolve.

Trends and issues impacted by climate change / environmental factors

Most trends and issues arising due to climate change are ongoing and long-term. Trends highlighted by experts consulted for this study were increasing levels of animal and plant pests due to globally rising temperatures or an increasing frequency of extreme weather events (Magnano San Lio et al., 2023; Skendži? et al., 2021). Increasing livestock infestations for example with ticks and liver fluke due to warmer winters in combination with rising antimicrobial resistance, as well as potentially increasing zoonotic diseases or aflatoxin and other mycotoxin contamination need to be monitored globally. Relevant data needs to be shared internationally to prevent larger scale outbreaks and to ensure the safety of UK produced and imported goods. Given the global dimension of climate change-induced food safety risks there is likely to be an increased need for closer international monitoring and in the future more enforcement action along supply chains across countries.

Trends and issues impacted by the exit from the EU (Brexit) and regulatory change

The direct impacts of Brexit on the UK food system are becoming increasingly felt and create considerable uncertainty that affects decision making for many stakeholders across the food value chain. Experts consulted for this study highlighted the following areas of concern that are expected to affect food safety and standards as well as trade:

- current limited capacity for enforcement when full border controls with the EU come into force
- that new trade deals should not allow the import of food produced to lower standards that might not reflect the values of the UK food system (for example, with regards to animal welfare standards)
- regulatory divergence between the UK and the EU causing different speeds of innovation, including innovation around novel foods or technologies for enhancing sustainability or health aspects of products
- more limited data sharing with the EU on issues important for food safety, food fraud, ingredients and chemicals.

These factors could require rapid capacity building across the food safety enforcement sector as a result of new border controls at a time of resource limitations and relevant skills shortages. Regulatory divergence will also need to be carefully considered so that where the UK takes advantage of its ability to make more independent decisions about the UK food system, there is still a balance that supports trade with the EU and elsewhere as much as possible. Efforts to maintain consumer trust through targeted messaging might also be required if there is an increasing public perception that imports from countries with lower food standards will reach the UK unchecked.

Despite the considerable challenges the UK is facing in transitioning from the EU regulatory system, many experts consulted for this study think it is important to first create a joined-up, comprehensive and long-term vision for the UK food system with regards to standards, health, and sustainability across stakeholders in government and industry.