

2. Executive Summary

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These are challenging, but exciting times for the agri-food sector food as it embraces the opportunity to contribute toward the goal of reducing carbon emissions. Moving towards net zero carbon will inevitably mean considerable changes in the way that food is produced in the UK. Some of these changes are already underway and some may enhance food safety and quality, as well as aiming to benefit the environment. However, as with any large-scale change in food production methods, there is also the possibility of unintended and unforeseen consequences for feed and food safety. It is important that the FSA has foresight over any emerging risks and adopts a thorough and systematic approach to help identify these.

This study seeks to provide a better understanding of the potential risks to food and animal feed safety contingent on changed food production practices aimed at achieving net zero carbon and highlight areas where vigilance is needed. It was conducted in four phases and involved structured interviews with academic and business experts, a workshop with people with wide-ranging experience of food production and food safety issues, a workshop with civil servants across government departments with net zero carbon and food responsibilities, and a review of relevant papers, books and reports by international and UK agencies.

Many current developments in primary production practices are not driven by carbon reduction *per se*. If carbon reduction targets are supported by such developments, this may sustain or even accelerate their adoption. Thus, any assessment of the possible impact of carbon reduction measures should include the additional impact of those enabling technologies.

Three categories of changes in primary production towards net zero carbon which might have implications for food and animal feed safety were defined: evolution of production systems for specific ends (and markets); novel or major changes to existing production systems; and new products developed in anticipation of consumer/market demands.

Potential food and feed safety risks associated with changing production systems (e.g. vertical farming), new food raw material and ingredients (e.g. novel proteins; insects; cultured meat) and the increasing emphasis on the circular economy were assessed.

This study has not identified any unknown safety hazard to food and feed arising from anticipated changes to achieve net zero carbon, but it has found that the degree and balance of known risks may change. It is possible as new technologies and production systems continue to develop that new hazards could yet emerge.

Eight inter-related conclusions about food and animal feed safety were reached, including:

- moves towards net zero carbon may change the degree and balance of known existing risks where novel technologies are employed;
- new entrants to novel technologies for food production may be unfamiliar with the food safety and other regulations which currently exist;
- existing regulations, codes of practice and guidelines should be sufficient, if fully implemented, to reduce food safety risks to acceptable levels, but there is evidence that not all are rigorously enforced;

- involvement of multiple government departments in the regulation of the UK food system requires collaboration between departments and regular horizon scanning to ensure that rapidly evolving primary production practices do not compromise food safety.

Eight recommendations grouped under three themes are made to the FSA:

Theme 1: Surveillance of emerging technologies and engagement with producers and consumers

- maintains active surveillance of likely areas of production changes in response to net zero carbon policies and encourages food and feed businesses to embed responsibility for food safety into their innovation projects.
- develops guidance that will ensure safe food at the site of production through active engagement with new food-production technologies.
- develops and communicates advice for primary producers and consumers on how to minimise food safety risks when producing or consuming foods that they perceive as contributing towards net zero carbon or sustainability.

Theme 2: Inter-departmental cooperation and regulatory review

- Engages with other government departments to assess the effectiveness of current regulation, enforcement, codes of practice and guidance in assuring future food and feed safety and whether the balance and scope of these assurance mechanisms is appropriate to cope with the changes underway in primary production.
- Ensures that the regulatory framework for animal feed is sufficiently agile to cope with fast-moving changes and any accompanying risks.
- Rapidly establishes whether the current risk analysis and regulatory frameworks in place are able to cope with the novel technologies, ingredients and products which might be used in food.
- Reviews the potential impacts on food safety arising from the use of manure, compost, slurry, sewage sludge and food by-products applied to land to determine whether current regulatory frameworks are fit for purpose.

Theme 3: Research and horizon scanning

- Undertakes a systematic analysis of research gaps to identify where scientific evidence is needed to understand the risks and benefits associated with production and consumption of food and feed in a low carbon economy.

Finally, work already underway in the FSA and by Defra to address some of the potential food and feed safety issues raised in this report is identified.