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Advancing food safety: strategic recommendations from the 'ONE – Health, Environment & Society – Conference 2022'

Yann Devos, Edward Bray, Stef Bronzwaer, Barbara Gallani and Bernhard Url

Introduction

Every 3–4 years, the European Food Safety Authority (EFSA) organises an international scientific conference that brings together experts and stakeholders to discuss key food safety topics and share knowledge, data and expertise. The latest edition of the conference entitled 'ONE – Health, Environment & Society – Conference 2022' took place on 21–24 June 2022 in Brussels and online, marking EFSA's 20th anniversary. For the first time, the conference was organised with EFSA's partner agencies – the European Centre for Disease Prevention and Control (ECDC), the European Chemicals

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Agency (ECHA), the European Environment Agency (EEA) and the European Medicines Agency (EMA) – as well as the Joint Research Centre (JRC) of the European Commission, with the ambition to embrace the One Health approach to ensure more integrated, transdisciplinary and collaborative health assessments (Bronzwaer et al., 2021; FAO, UNEP, WHO and WOH, 2022). Over 2,700 participants from academia, public institutions, the private sector and non-governmental organisations, mostly from the European Union (EU), attended and contributed to the conference, either in-person or remotely.

The conference consisted of a series of plenary sessions (#2) and breakout sessions (#17) organised around four thematic tracks (One Life, One Planet, One Society and Many Ways) across three interconnected tiers (food safety, One Health and food system sustainability). These sessions were complemented by side events, a poster exhibition gallery and networking opportunities for both in-person and online participants. The conference included more than 120 talks and over 250 digital posters.

The event was designed to explore how scientific advice on food safety and nutrition will need to develop to respond to new policy targets and societal demands for safe, nutritious and sustainable food. The conference also addressed how institutions that provide scientific advice on public health, environmental protection, food safety and nutrition should work more closely together and increase their preparedness for the challenges presented by a fast-changing world. This Editorial sets out the main recommendations that emerged from the conference to achieve these aims. More details about the outcomes of the conference are reported in Devos et al. (2022).

Strategic recommendations to further advance food safety

The EU food safety regulatory framework provides European consumers with some of the highest food safety standards worldwide (EFSA, 2021). Since 2002, EFSA has been contributing to the safety of food by: providing independent scientific advice to risk managers (the European Commission, the European Parliament and EU Member States) on a wide range of food-related issues; and communicating and engaging on existing and emerging risks in the food and feed chain. EFSA's scientific advice helps to protect consumers, animals, plants and the environment from food-related risks. However, the science, society and policy interface in which EFSA operates is changing faster than ever before (Smith et al., 2021; Garcia-Vello et al., 2022; Uri, 2022). Therefore, the potential impacts of recent developments on food safety and how we can respond were considerations placed at the core of the conference agenda.

In order that we can continue to best protect human, animal, plant and environmental health, and deliver the highest value for society, conference participants encouraged EFSA to: (1) keep up with the latest developments in science and technology, capitalising on data; (2) invest in future preparedness; (3) support the transition towards sustainable food systems; (4) increase relevance to society; (5) team up with food safety actors across the EU and beyond; and (6) apply the One Health approach.

Recommendation 1 – keep up with science and technology, capitalising on data

To remain fit for purpose, food safety assessments will need to keep up with the latest developments in science and technology, and capitalise on new data. We are faced with an exponential growth in data, fast-paced innovation in science and technology, increased complexity of science and technology, and enhanced computing power. These developments present both challenges and opportunities for how to conduct food safety assessments.

At the conference, specific attention was given to Big Data, automation and artificial intelligence (AI), new approach methodologies (NAMs), the assessment of chemical mixtures, the microbiome, and new food and feed sources.

- *Big Data, automation and AI.* Completing food safety assessments in a timely manner is ever more challenging, as recruiting relevant experts is increasingly demanding, while the experts' physical capacity to identify, search, read, appraise and integrate the exponentially growing amount of data in a structured way is stretched to a breaking point. The use of Big Data, automation and the application of AI could help us to: speed up food safety assessments; improve their quality (e.g. limit human error); enable the discovery of new patterns in the data; and keep pace with the exponential growth of evidence. To achieve this goal, further efforts are required to build trustworthy AI systems.
- *NAMs.* NAMs would enable us to minimise animal testing and transition towards food safety assessments that rely on *in vitro*, *in silico* and *in chemico* approaches. To build confidence in

NAMs and promote their acceptance/uptake in a regulatory context, testing and validation of NAMs through case studies are crucial.

- *Assessment of chemical mixtures.* Currently, the risk assessment of chemicals is mainly based on the assessment of individual chemical substances. In practice, however, humans, animals and the environment are exposed to multiple chemicals from a variety of sources. Enabling the assessment of the combined exposure to multiple chemicals will necessitate the development and implementation of additional approaches.
- *Microbiome.* Research on the microbiome is proceeding at a very fast pace, informing us about the role that the microbiome plays in the health of their host and environment. Since the interactions between microbiomes, chemicals and health are complex, further research tailored to regulatory needs is required. This knowledge will help us to define which microbiome-related data (e.g. endpoints, tests) must be integrated into future food safety assessments.
- *New food and feed sources.* Alternative food and feed sources (e.g. plant-based proteins, edible insects, seaweed, cultured meat, products obtained through synthetic biology or new processing technologies) are emerging with the aim to feed a growing global population, while remaining within planetary boundaries. Such future foods and feeds may be more nutritious and sustainable than some traditional ones, but they may pose challenges for the safety assessment. To keep pace with these developments, we must explore in a proactive manner which safety assessment aspects need adjustment, on a case-by-case basis. Depending on the case, some risk assessment aspects may need additional consideration, while there may be instances where some regulatory data requirements do not apply and the risk assessment could be simplified.

Recommendation 2 – invest in future preparedness

Future challenges must be anticipated to avoid the risk of becoming overtaken by new developments. This necessitates the development and implementation of tools that can identify emerging food safety issues and risks at the global, regional and national levels, so that measures to control, prevent and/or monitor them can be proposed and put in place in a timely manner. At the conference, specific emphasis was put on strengthened foresight, horizon scanning, monitoring/surveillance, hot spot mapping, and greater liaison among existing networks on emerging risks. These were identified as some of the early warning tools that must be further developed and more widely implemented in the context of disease outbreaks, antimicrobial resistance and biological invasions of plant pests. The need to develop new and agile processes for rapid assessments to support policy action when incidents occur was also discussed.

Recommendation 3 – support the transition towards sustainable food systems

Food systems need urgent and significant transformation if they are to meet sustainability targets. To be considered sustainable, food systems will need to operate within planetary boundaries. As part of the European Green Deal, the EU has put forward its Farm to Fork Strategy that sets unprecedented ambitions to make the EU food system more sustainable and resilient. In addition, the EU intends to adopt a legislative framework for sustainable food systems by the end of 2023 that will address the sustainability of both products and processes (e.g. circularity, food loss and waste reduction, promotion of more nutritious and sustainable diets). Consequently, food is now expected to meet the highest standards of nutrition and sustainability, in addition to being safe, accessible and affordable for all.

Safe food is the basis for healthy diets and sustainable food systems. The scope of food safety, in particular regarding its link to nutritional and food sustainability aspects, has been changing over time in line with innovation in science and technology, new policy targets and societal demands. To respond to the latest policy developments, food safety must be understood from a broader perspective, ensuring that nutritional and (environmental) sustainability considerations are taken into account. Consideration of risks and benefits, including possible comparisons with alternative interventions available, may be necessary to ensure the wider context is fully taken into account.

At the conference, specific emphasis was put on how to achieve healthy diets within planetary boundaries, while reducing the environmental impacts of agriculture and food production.

- *Diets.* Dietary changes have a key role to play in the transition towards healthier and more sustainable diets that respect planetary boundaries. For example, switching from animal-based

foods to plant-based diets could improve both human and planetary health. This would require the revision of dietary guidelines in relation to the amount and frequency of consumption of different food groups. Clearer dietary guidelines on whole grains, nuts and legumes, and on limiting red and processed meat, will provide health benefits, whereas limiting the consumption of beef and dairy possibly has the greatest potential for ensuring environmental sustainability. Therefore, tailoring dietary guidelines towards health and sustainability targets must be a priority for changing food consumption patterns towards those that put human and environmental health at their core. Moreover, public policies nudging food demand and public investments, such as agricultural subsidies, need to be aligned to pursue health objectives.

- *Environmental risk assessment.* Since the use of pesticides in agriculture and other sectors has been identified as a major cause of biodiversity loss, a reduction in their use and their impacts has become a policy target in the EU. Pesticides can only be authorised if they have no unacceptable effects on the environment. To better protect biodiversity and ecosystems, a goal of EFSA's 2027 strategy is to advance its methodologies for the environmental risk assessment of regulated products falling in its remit, including pesticides, by applying systems-based approaches. This would enable us to deliver environmental risk assessments that are more integrated, realistic and context-dependent.
- *Animal welfare.* There are growing societal demands for animal production systems to be more sustainable, safeguarding both the environment and welfare of animals. Animal welfare represents a public good in itself, and is a sustainability issue, with both intrinsic value (benefit to the animal itself) and instrumental value (benefits of better animal welfare for citizens). Therefore, we must consider animal welfare in sustainability definitions, targets and assessments to better support policymaking.

Recommendation 4 – increase relevance to society

The relationship between science and society has become increasingly complex due to the growing diversity of channels for knowledge exchange and the nature of interactions. This increased diversity broadens the range of scientific and non-scientific actors with whom to engage, and of the issues and concerns that must be addressed. In addition, digitalisation has fundamentally changed how we interact and communicate with the public. Finally, recent amendments to the EU Food Law introduced by the Transparency Regulation have further prompted EFSA to integrate societal expectations for more transparency and openness in its risk assessment processes.

At the conference, special importance was given to how to advance communication and engagement in the field of food safety, and how to adopt social sciences and follow an Open Science approach in the context of regulatory science.

- *Communication and engagement.* There is a need to rethink the way we communicate science. Putting greater efforts into educating the public through one-way communication has not been an effective strategy for ensuring the trustworthiness of science. Instead, efforts must focus more on better listening, and more inclusive and meaningful collaboration. Inclusivity and diversity are important, as they can make food safety assessments more robust (e.g. by extending the pool of knowledge, data and expertise from which we can draw). Therefore, food safety assessments must be opened up to the involvement of new actors and allow the development of new connections. Engagement must continue to be an integral part of the food safety assessment process, but it must be broadened. Given that the impacts of science are not clear until the results and what they mean for food safety are communicated, we must follow an audience-first approach to remain relevant in a digital age.
- *Social sciences.* As the COVID-19 pandemic demonstrated, behavioural insights and understanding of their drivers and social/cultural context are needed to develop impactful public health interventions. Therefore, social sciences are crucial to increase the effectiveness and relevance of food safety interventions.
- *Open Science.* Effective dissemination and sharing of data will be key to further advance food safety assessments and build societal trust. Efforts must focus on making food safety-related scientific knowledge findable, accessible, interoperable and re-usable based on the FAIR principles for scientific data management and stewardship. For open data, open source, open methodology, open peer review, open access and open educational resources to become the default approach, they must be embedded in daily risk assessment practices.

Recommendation 5 – team up with food safety actors across the EU and beyond

Collaboration was a central theme of the conference. Participants encouraged EFSA, without delay, to take concrete steps to move collaboration forward as an essential means to address the growing complexity in science and society. Trustworthy collaboration between food safety actors is to be intensified to address the complexity collectively, and better connect and integrate knowledge, data and expertise across actors and sectors. To unlock the ecosystem's full potential, we must foster an institutional culture in which collaboration is inherently valued. Collaboration should become a strategic objective in itself that is incentivised and rewarded. Therefore, we must further develop the EU's collaborative ecosystem of food safety actors to include not only those that have already indicated their interest in being part of it, but also new partners identified through new sourcing and partnership schemes.

Recommendation 6 – apply the one health approach

The European Green Deal highlights many areas that will require an interinstitutional and transdisciplinary way of working if its ambitions are to be realised. While EFSA and its partner agencies provide scientific advice on public health, environmental protection, food safety and nutrition, this advice must be integrated to address the challenges of tomorrow.

The One Health approach, which stands for an integrated and systemic approach to health, provides a new way of working to connect and integrate knowledge, data and expertise across a wide range of disciplines, sectors and actors (as outlined in recommendation 5, above). Application of the One Health approach will enable health assessments to be delivered that frame an issue holistically, integrate diverse data, transcend regulatory silos, and recognise the inextricable link between the health of humans, animals, plants and their shared environment. In doing so, our health assessments could better support the transition to safe, nutritious and sustainable food (Figure 1).

The implementation of the One Health approach will require new skills and education in systems science, with an emphasis on science translation and integration, and commitment to work together. Operating at the nexus of four One Health domains (i.e. human, animal, plant and environmental health), and relying on collaboration to assist in solving complex health issues, EFSA and its partner agencies collectively can provide the greatest value for society by delivering more integrated and transdisciplinary advice to risk managers including policymakers. In recent years, they have successfully applied the One Health approach in the areas of zoonoses, antimicrobial resistance and bee health, and have started to extend this to other areas such as environmental risk assessment.

An important concrete outcome of the conference is that EFSA and its partner agencies have committed to establish a cross-agency One Health task force to discern how best to work together to move transdisciplinary research and scientific advice on One Health issues forward. This will enable us to further develop cross-agency relationships, exchange on experiences gained and attain optimal health outcomes.

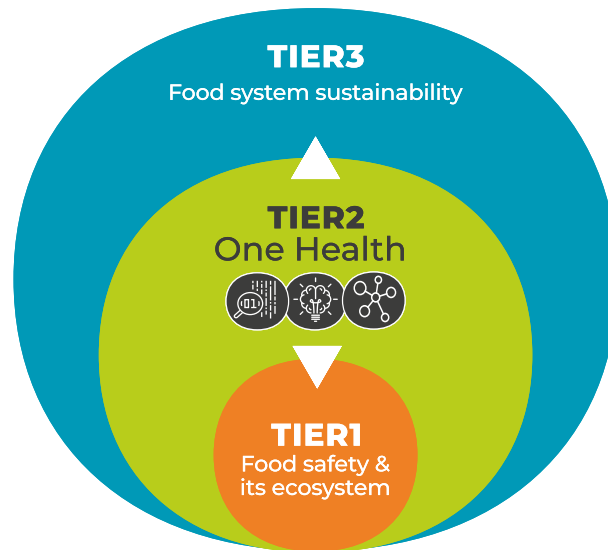


Figure 1: The One Health approach serving as a steppingstone between food safety and food system sustainability. Reprinted from Devos et al. (2022)

Conclusion

The main recommendations for advancing food safety that emerged from the 'ONE – Health, Environment & Society – Conference 2022' build on the strategic goals of EFSA's 2027 Strategy (EFSA, 2021). They confirm that the strategic directions taken by EFSA will enable it to continue delivering fit for purpose food safety assessments that protect human, animal, plant and environmental health, while contributing to sustainable development goals.

Further reading

The proceedings of the conference, which are available at <https://doi.org/10.1016/j.tifs.2022.09.014>, have been published as a conference report article in the international peer-reviewed journal *Trends in Food Science & Technology* (see Devos et al., 2022). The full programme of the conference, speaker and poster abstracts, presentations/slides, video recordings and interviews with leading experts, including representatives of our partner agencies and JRC, are publicly available at the conference website (<https://www.one2022.eu/>) and/or EFSA's YouTube channel (<https://www.youtube.com/c/EFSAchannel/videos>).

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