DISSEMINATION
EUFIC HOLiFOOD

HOLiFOOD: a holistic approach to food safety in Europe

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Foodborne illnesses pose a serious threat to public health in Europe, causing an estimated 23 million cases of illness and 5000 deaths annually (World Health Organization, 2019). The European Union's Rapid Alert System for Food and Feed (RASFF) records over 3000 food safety alerts each year, highlighting the widespread risks of contamination in key food categories such as nuts, fruits, vegetables and poultry products (European Commission, no date).

Unsafe or contaminated food not only endangers human health but also creates a cycle of disease and malnutrition, disproportionately affecting vulnerable populations, including infants, young children, the pregnant, the elderly and those with weakened immune systems. Ensuring food safety is essential—not just for protecting public health but also for fostering economic stability, environmental sustainability and long-term societal well-being.

Entering the HOLiFOOD vision: enhancing food safety in a changing world

This vision serves as the cornerstone of the HOLiFOOD project. Funded by the European Commission, HOLiFOOD seeks to modernise and enhance food safety risk analysis across Europe, addressing emerging challenges with a forward-thinking approach. By integrating artificial intelligence (AI), big data and stakeholder engagement, HOLiFOOD aims to revolutionise food safety risk assessment and management, ensuring a more proactive and adaptive system. Its holistic approach recognises that food safety is deeply intertwined with economic, social and environmental factors, addressing food contamination risks and the broader conditions in which food is produced. A key focus of the project is enhancing food safety identification and assessment in three critical supply chains—maize, lentils and poultry—selected for their significant production volumes, economic impact, employment contributions and vulnerability to contamination in the EU.

Early warning and emerging risk prediction

At the heart of HOLiFOOD's innovation is its use of **AI and big data** to enhance early warning and emerging risk prediction systems. These technologies will automatically extract data relevant to drivers for emerging food safety risks (economic, societal and environmental, including climate change) from publicly available sources and integrate these data into AI prediction models for existing and emerging food safety risks, ensuring a proactive rather than reactive response.

Targeted and non-targeted detection of existing and emerging hazards

HOLiFOOD also addresses the need for rapid and reliable methods to predict, detect and characterise both existing and emerging food safety hazards. It does so by developing and validating methods and devices for the identification and characterisation of existing and (re-) emerging chemical and biological hazards, and aims to anticipate and possibly mitigate or prevent their impacts.

Holistic risk assessment for regulation

Emerging consumer practices, transition to sustainable food systems, climate change effects, agri-food innovation, and population growth are all drivers

that require a **holistic risk assessment** to foster solutions that maximise co-benefits for the environment, health, society and economy. That's why HOLiFOOD's researchers adopted a **co-creation process** with different stakeholders and focused on **three food supply chains**. The assessment will cover the whole food system and include various levels of granularity and complexity to mitigate food safety risks at both intermediate time (years) and longer time scales (decades), with the level of knowledge at a given time.

Data and knowledge-sharing infrastructures

The results of the early warning and emerging risk prediction work, the data and tools developed to identify and characterise existing and re-emerging food hazards, and the outcomes from the holistic risk assessment will flow into a unified infrastructure aiming to support decision-making in food safety management. This **electronic data and knowledge-sharing platform** will also align and harmonise existing work that is carried out by both public and private stakeholders. It will particularly focus on creating a shared registry of data sources and datasets that may be used for early identification of emerging food safety risks, and for holistic and proactive food safety management, by connecting existing ones and extending them further. It will also develop a unique registry of predictive models that have been particularly developed and trained to predict risks associated with specific supply chains or ingredients.

Co-design and citizen science

To bridge the gap between research and practice, ensuring HOLiFOOD's innovations are effective and widely applicable, HOLiFOOD established a **multi-actor engagement approach**, incorporating perspectives from policymakers, food producers, industry experts and consumers. For the first time, the development of novel technologies and processes will integrate state-of-the-art coproduction methodologies applied to food safety questions. Thanks to this method, called **Living Lab**, stakeholders will actively participate in designing and testing food safety management tools, ensuring their practical applicability and alignment with real-world needs. The Living Labs function at both a vertical level, addressing specific topics and a horizontal level, facilitating cross-learning through workshops that generate recommendations, action plans and strategic insights.

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Science to society and policy

A major component of HOLiFOOD is the integration of its findings into feeding regulatory frameworks, ensuring that innovations translate into improved governance and policy-making. A combination of methods will be applied to ensure that all societal stakeholders, including the general public, can use the results of HOLiFOOD. In particular, within HOLiFOOD, scientific findings will be translated into policy and practice by engaging end-users. The project will map key food system actors, assess emerging risks and prioritise crucial risk indicators using expert foresight. Moreover, citizen science methods, including social media analysis, surveys and focus groups, will inform and test risk communication strategies across four countries.

Conclusion

A safer future for European food systems

HOLiFOOD represents a critical step forward in the evolution of food safety risk analysis and management. By leveraging cutting-edge technologies and fostering collaborative governance, the project will help create a more secure, sustainable and resilient food system for Europe.

Through its holistic approach, HOLiFOOD is not just responding to today's food safety challenges—it is building a framework that anticipates and adapts to the food safety risks of tomorrow. By integrating scientific innovation with policy and stakeholder engagement, the project is setting a new standard for food safety governance, ensuring a healthier and more sustainable future for all.

References

European Commission (n.d.) '*Rapid Alert System for Food and Feed (RASFF)*'. Available at: https://food.ec.europa.eu/food-safety/rasff_en (Accessed: 18 March 2025).

World Health Organization (2019) '*23 million people falling ill from unsafe food each year in Europe is just the tip of the iceberg*'. Available at: https://www.who.int/news/item/05-06-2019-23-million-people-falling-ill-from-unsafe-food-each-year-in-europe-is-just-the-tip-of-the-iceberg (Accessed: 18 March 2025).

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PROJECT SUMMARY

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PROJECT PARTNERS

The project's consortium is comprised of 17 organisations from ten European countries, whose multidisciplinary expertise and knowledge in the field will help deliver the methods and tools needed to support policymakers and food actors in making effective decisions affecting food systems in the context of a rapidly changing global environment bringing about new and re-emerging food risks.

PROJECT LEAD

The project is headed by Ine van der Fels-Klerx of Wageningen University & Research, a university and research centre in the Netherlands that focuses specifically on the theme of healthy food and living environment.

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