



HAL
open science

Societal insights in risk communication planning – a structured approach

Domagoj Vrbos, Giorgia Zamariola, Laura Maxim, Giulia Nicolini, Paul Ortega, James Ramsay, Matthias Rasche, Claire Rogers, Luca Schombert, Anthony Smith, et al.

► To cite this version:

Domagoj Vrbos, Giorgia Zamariola, Laura Maxim, Giulia Nicolini, Paul Ortega, et al.. Societal insights in risk communication planning – a structured approach. *Journal of Risk Research*, 2023, 26 (8), pp.841-854. 10.1080/13669877.2023.2197613. hal-04364616

HAL Id: hal-04364616

<https://hal.science/hal-04364616v1>

Submitted on 28 Dec 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License



Societal insights in risk communication planning – a structured approach

Domagoj Vrbos, Giorgia Zamariola, Laura Maxim, Giulia Nicolini, Paul Ortega, James Ramsay, Matthias Rasche, Claire Rogers, Luca Schombert, Anthony Smith & Barbara Gallani

To cite this article: Domagoj Vrbos, Giorgia Zamariola, Laura Maxim, Giulia Nicolini, Paul Ortega, James Ramsay, Matthias Rasche, Claire Rogers, Luca Schombert, Anthony Smith & Barbara Gallani (2023) Societal insights in risk communication planning – a structured approach, *Journal of Risk Research*, 26:8, 841-854, DOI: [10.1080/13669877.2023.2197613](https://doi.org/10.1080/13669877.2023.2197613)

To link to this article: <https://doi.org/10.1080/13669877.2023.2197613>



© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 12 Apr 2023.



[Submit your article to this journal](#)



Article views: 725




[View related articles](#)



[View Crossmark data](#)

Societal insights in risk communication planning – a structured approach

Domagoj Vrbos^a, Giorgia Zamariola^a, Laura Maxim^b , Giulia Nicolini^a, Paul Ortega^a, James Ramsay^a, Matthias Rasche^a, Claire Rogers^a, Luca Schombert^a, Anthony Smith^a and Barbara Gallani^a

^aCommunication and Partnership, European Food Safety Authority (EFSA), Parma, Italy; ^bLaboratoire Interdisciplinaire, Centre National de la Recherche Scientifique (French National Centre for Scientific Research, CNRS), Paris, France

ABSTRACT

The European Food Safety Authority (EFSA) receives hundreds of requests for scientific risk assessments each year and publishes on average over 500 scientific outputs annually. To optimise the planning for its risk communications, the authors developed a two-phase approach for assessing incoming requests that follows the first two stages of the IRGC's Risk Governance Framework—Pre-Assessment (Screening) and Appraisal (Risk Perceptions and Social Concerns Assessment)—and is driven by use of social insights, analytics, and professional knowledge. During the Pre-Assessment phase requests from risk managers are pre-screened and filtered then processed using a checklist divided into sections on the characteristics of risks, knowledge/awareness of them, and the institutional and market context. A decision tree was developed to manage the combinations of factors needed to trigger preparation for future risk communications options. Use of the approach was implemented and refined at EFSA from 2019 to 2021. During the Appraisal phase, societal insights from social research, media analysis and social media listening are compiled to i) map the elements to consider for risk communication and ii) identify the overall sensitivity of the subject matter, taking into account concerns, expectations and risk perceptions. These assessments of risk perception and societal concerns have been developed for sensitive topics and potentially emerging issues with the aim of identifying risks that share similar characteristics, in terms of level of knowledge and risk perception. These two stages provide mechanisms to identify topics and clusters of topics of interest for risk communication and to drive the subsequent development of communication objectives and strategies. This is expected to inform the eventual development of standardised communication responses on topics within specific clusters.

ARTICLE HISTORY

Received 23 January 2023

Accepted 11 March 2023

KEYWORDS

Risk communication; risk perceptions; social concerns; social research

Introduction

The European Food Safety Authority (EFSA) is the scientific risk assessor of the European Union (EU)'s risk analysis system for food safety. Most of EFSA's work is undertaken in response to

CONTACT Giorgia Zamariola  giorgia.zamariola@efsa.europa.eu  Communication and Partnership, European Food Safety Authority (EFSA), Parma, Italy

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

requests for scientific advice from EU risk managers: the European Commission, the European Parliament and EU Member States. EFSA assesses risks associated with the food chain, produces scientific advice and information, and communicates the scientific basis and outcome of its risk assessments to interested parties (e.g. food chain operators, civil society groups, academia) and the general public. Its scientific opinions form the basis of EU policies and legislation on food and feed safety, animal and plant health, and the environment in relation to the food chain (Chatzopoulou 2019).

The requests for advice EFSA receives are numerous and vary in nature due to the complexity both of food production, distribution, and consumption (Deluyker, 2017), and to the diversity of the regulatory frameworks for different areas of the EU food safety system (Wijnands et al. 2008; Chen, Wang, and Song 2015). The requests cover a broad spectrum of sectors—from GMO, pesticides and additives to animal welfare, plant pests and bee health—with more being added with advances in food systems (Devos et al. 2022), and of scientific disciplines, including microbiology, toxicology, veterinary practice, and plant pathology to name a few. The risk communication potential of each request also varies, ranging from sensitive topics with a high public profile such as pesticides, contaminants and food additives, to niche issues followed mainly by interested parties, e.g. feed additives, food enzymes or plant pests (EFSA, 2012).

To optimise its work and use of resources, EFSA needs to scrutinize these requests for scientific advice—referred to internally as ‘mandates’ once accepted by EFSA—to evaluate this risk communication potential, not once but at a series of checkpoints as the risk assessment unfolds. A system has developed over time that conforms, with some modifications (due to the agency’s specific risk assessor/risk communicator roles in EU food safety), to the International Risk Governance Center (IRGC) conceptual framework for understanding risk governance (Florin and Bürkler 2017; Florin and Parker, 2020). The IRGC framework covers the entire risk analysis process and includes various steps and cross-sectional aspects. The IRGC framework is in line with the European Commission Responsible Research and Innovation (RRI), meant as ‘an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, with the aim to foster the design of inclusive and sustainable research and innovation’ (Florin, 2022).

In this paper, we focus on the risk communication-related aspects of the first two stages of the IRGC framework: during ‘Pre-assessment’, which screens and frames the risk, and aims at early warning and planning, and ‘Appraisal’ which is composed of two features, i.e. risk assessment and concern assessment. Since risk communication is the focus of this article, not risk assessment per se, our attention within the Appraisal stage is on ‘concern assessment’, specifically the steps covering risk perceptions and social concerns. This is designed to further elaborate risk perceptions on sensitive topics or clusters of topics to provide targeted risk communication advice. To support the processes contributing to these stages and provide an evidence base, insights from social research, media coverage analysis and social media listening are proportionately collected, analysed and applied at both stages.

1. ‘Pre-assessment’

Pre-assessment begins with a ‘Pre-screening’ step where specialist mandates of likely low risk communication potential are filtered out from consideration using expert insights of experienced staff (food safety assessors, social scientists, and risk communicators), resulting in a short-list of mandates with risk communication potential. The second more elaborate step in Pre-Assessment is called ‘Mandates assessment’ and gathers more structured insights on citizens’ understanding of the issue, knowledge and perceptions of the topic, and institutional and stakeholder interests related to it. Using a checklist and decision tree, the assessment of each mandate results in one of several recommendations for possible risk communication. Issues identified as highly

sensitive may be prioritized for 'Concern assessment', the in-depth evaluation of perceptions and societal dynamics described in [Section 2](#). below.

a) Pre-screening

The pre-screening step of Pre-assessment allows the filtering and prioritisation of incoming requests (Florin and Bürkler 2017). This screening is carried out by EFSA staff members with relevant expertise and experience in three areas: risk assessment, risk communication, and social sciences. This 'partnership' approach (e.g. Fischhoff 1998) is followed throughout the stages of the identification, planning, execution and evaluation of risk communications. At regular intervals, usually monthly, all incoming requests are pre-screened for potential sensitivity, considering the following criteria: the nature of the topic, the knowledge and perceptions that exist around the topic as well as institutional and stakeholder interests. The efficacy of pre-screening is highly dependent on the experience and interpretative skills of the individuals involved in identifying all the mandates requiring communication support (Otway, 1992). In EFSA's case, a senior scientific officer with a broad view of EFSA's risk assessment activities advises on the nature of the risk, a social scientist on knowledge and perceptions, and a senior communications officer or the head of the communication unit on institutional and stakeholder interest. They deliberate each new mandate drawing on past experience in sensitive areas (e.g. pesticides, food additives) and request additional background information, if necessary, to compile a list of incoming mandates deemed 'potentially sensitive'. This is usually agreed by consensus. Regular interaction between EFSA's communicators and assessors to discuss ongoing work provide a backup mechanism to identify potentially important mandates that slip through pre-screening. The shortlisted mandates pass to the next phase of the Pre-Assessment stage: Mandates assessment.

b) Mandates assessment

The authors developed the *EFSA Checklist for assessing incoming mandates* ([Table 1](#)) for this purpose. The Checklist is composed of 20 criteria divided into three areas: i) nature of the topic; ii) knowledge and perceptions; and iii) institutional and stakeholder interest.

Using a checklist for informing the work of food, health and environment authorities is not a new process, some national authorities in European Union member states and beyond have used checklist-like tools to identify topics that require further attention. The 'Risk perception assessment tool' was included in Appendix 2 of the 'Risk communication applied to food safety Handbook' developed by the Food and Agriculture Organization of the United Nations and the World Health Organization (FAO and WHO, 2016). A commonly referenced example from within the EU is the *Sociological checklist for assessing environmental health risks* (Benamouzig et al. 2014) produced for the French Agency for Food, Environmental and Occupational Health & Safety (ANSES). This latter document, together with the *Guidance for Uncertainty Assessment and Communication - Second Edition* (Petersen et al. 2013) of the Netherlands Environmental Assessment Agency and complemented from the literature on requirements for risk communications planning (e.g. Lofstedt 2010), were used to guide the design of EFSA's Checklist. The questions were drafted by an EFSA social scientist and further refined with extensive consultations among internal stakeholders and trialled on incoming mandates, for example, the clustering into three sections on 'nature of the topic', 'knowledge and perceptions', and 'institutional and stakeholder interest' resulted from this process and helped to facilitate contributions of colleagues whose responsibilities focused on those areas.

A 'mandates assessment forum' (MAF) comprising EFSA staff whose work covers communications, social research, engagement, and scientific cooperation, meets at similar intervals (as in pre-screening) to discuss the potentially sensitive mandates resulting from the previous step. Members of the MAF consider the full set of criteria on the checklist and are encouraged to

Table 1. EFSA Checklist for assessing incoming mandates.

Criterion	Yes/No
Nature of the topic	
1. Is there (potentially) a significant concern for public health and/or does the risk affect specific vulnerable groups (e.g. women, children)?	
2. Is there (potentially) a significant concern for animal health, animal welfare or plant health?	
3. Is the risk man-made (as opposed to naturally-occurring)?	
4. Is the risk emerging/unknown?	
5. Is this the first time EFSA will assess the risk?	
6. Is this an urgent request or a Rapid Outbreak Assessment?	
7. Is this an assessment of a risk that is commonly present in everyday diets or in general a ubiquitous substance?	
8. Does this topic have the potential to communicate the benefits of EFSA's work (highlighting one or more of its values) or the importance of the EU's food safety system?	
Knowledge and perceptions	
9. Has the topic gained significant visibility based on media exposure to date or is it a prominent topic in social media?	
10. Is there a known pre-existing societal concern around this topic?	
11. Are there known disagreements or diverging views on this topic (among scientists, within society groups, between scientists and society)?	
12. Are there known uncertainties related to this topic?	
13. Does this topic have the potential to negatively affect EFSA's reputation (i.e. could EFSA be questioned in terms of conflict of interest or level of transparency etc.)?	
14. Does available social research evidence (e.g. EU Insights, Eurobarometer, other recent studies) highlight the topic as an area of concern?	
Institutional and stakeholder interest	
15. Is this topic of interest, a priority for the European Commission and/or has risk management implications?	
16. Is this topic of interest, a priority for the European Parliament and/or has risk management implications?	
17. Is this topic of interest or concern for Member States' authorities?	
18. Is this topic of interest or concern for the civil society (e.g. consumers, NGOs or other interest organizations)?	
19. Is this topic of interest or concern for the scientific community?	
20. Can the assessment result in policy changes and/or have market impact?	

Source: EFSA, internal document

pre-fill the criteria in their specialist fields to streamline the process, which is constantly evolving. They draw upon insights from various sources, including primary social research, media and social media monitoring, web analytics, and institutional and stakeholder monitoring and dialogue. The mandate assessors mark every criterion that applies to the mandate in question, which can be done on a simple yes/no basis. The process also allows for the collection of further granularities about each criterion (e.g. the background to a scientific divergence, the expected impact on a particular sector, or the interest of one or more EU member states) so that these can be recorded and used to inform successive stages of planning and execution.

Once the checklist is completed, the *Incoming mandates decision tree* (Figure 1) determines the next steps.

The main triggers of the *Incoming mandates decision tree* are the eight criteria that fall under the *Nature of the topic* section. If at least one of the eight criteria applies, the decision tree provides different scenarios that guide the recommendations, ranging from proactive risk communication required to reactive communications, to monitoring of the issue, to no action needed.

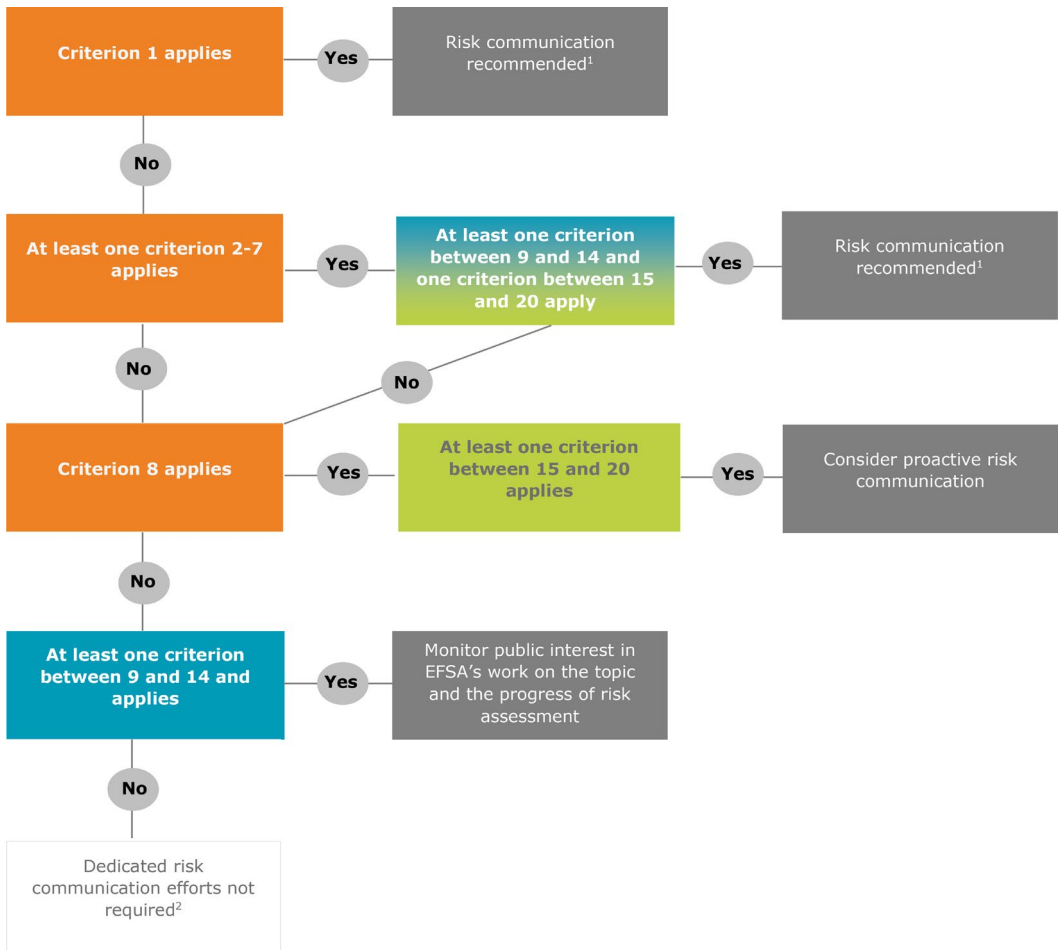


Figure 1. Incoming mandates decision tree.
 Instructions: Complete the checklist, assessing the mandate across all 20 criteria. Then follow the decision tree below, considering ‘**Nature of the topic**’ (criteria 1–8) as the starting point.^{1, 2}

A positive response to criterion 1 ‘Is there (potentially) a significant concern for public health and/or does the risk affect specific vulnerable groups (e.g. women, children)?’ automatically requires proactive risk communication of some kind (Slovic 1987) indicating the primacy of human health considerations. Positive responses to Criteria 2 to 7 require at least one additional trigger both from among Criteria 9 to 14 (*Knowledge and perceptions*) such as social amplification (Kasperson et al. 1988; Pidgeon, Kasperson, and Slovic 2003), and from among Criteria 15 to 20 (*Institutional and stakeholder interests*) such as belonging to a key EU policy initiative, or a known stakeholder topic of interest (Gilmour and Beilin 2007) to be activated. Criterion 8 ‘Does this topic have the potential to communicate the benefits of EFSA’s work (highlighting one or more of its values) or the importance of the EU’s food safety system?’ allows for proactive communication on topics that contribute towards confidence-building in institutions and in the actors in EU food safety risk analysis more broadly (EFSA et al. 2021) even when no or only low risks are identified. Even if none of the initial eight criteria apply, risk communication actions, including monitoring, may be required in case of combinations of both existing *Knowledge and perceptions* and the *Institutional and stakeholder interests* on the topic.

If risk communication is recommended and subsequently agreed upon by the management overseeing EFSA’s risk communication, the mandate is included in EFSA’s Communication Calendar.

This is not a legally binding recommendation, per se, as ultimately the management is responsible for planning and execution decisions and may decide no communication is needed, for example, as further information emerges. The MAF deliberations having been recorded by social scientists are retained and the mandate is assigned to communications officers responsible for different areas (e.g. food additives, animal health and welfare) for monitoring and discussion with risk assessor counterparts. They gradually build a Communication Handling Plan which integrates the outputs of the incoming mandate (checklist) assessment and provides a template to set communications objectives (see below, Section 2c), identify target audiences, inform the choice of communication tools and channels and decide on the communication clearance process.

The authors developed an online tool to automate the decision-tree and allow for integration of data streams, e.g. social media listening, media analysis, web metrics, and EFSA databases. Use of the approach was implemented and refined at EFSA from 2019 to 2021 to become an integral part of communications planning across the lifecycle. As with most change to working practices, the rate and efficacy with which the process and tool have been embedded in EFSA's communications planning process varied based on several factors: individual skills and needs, including frequency of use. The planning team provided in-house training and ongoing support to colleagues to ensure continuous improvement in this respect.

The checklist should be considered as a tool for aiding EFSA's work. However, no pre-set mechanism can fully provide for informed decision-making (Lofstedt 2010; FAO and WHO 2016). The indicative assessment resulting from the use of the tool requires further contextualization as risk assessments progress, allowing inclusion of considerations that may not have been initially factored in, for example, those not explicitly covered by the checklist (EFSA, 2012; EFSA et al. 2021). These considerations include alignment with the overarching organisational strategy, availability of resources for a given communication activity, and the number of tasks to be completed within a constrained timeline. Final decisions on risk communication and engagement activities, factoring in Pre-assessment recommendations and additional considerations, is taken by management functions in EFSA's communications department in consultation with the management of the relevant risk assessment department.

Finally, as different mandates require different amounts of time for completion, with some running across multiple calendar years, the assessment of any mandate may be revisited throughout the process, in liaison with the scientific risk assessors and based on the progress of the risk assessment, particularly when safety concerns or health concerns are likely to form part of the conclusions. Potentially sensitive mandates can also benefit from engagement with institutional partners and stakeholders, as well as the wider public (EFSA, 2021). This can happen regardless of the final risk communication decision and the associated decisions may also be facilitated using the checklist.

2. 'Appraisal' – understanding risk perception

Within the IRGC conceptual framework, 'Concern assessment' relates to the values and socio-emotional issues associated with the risks or, in other words, risk perception. The need to take into account risk perception of all interested parties in risk analysis is of crucial importance as shown by social research findings (see EFSA et al. 2021 for a review) and as clearly stated in the Regulation (EU) 2019/1381 of the European Parliament and of the Council of 20 June 2019 on the transparency and sustainability of the EU risk assessment in the food chain ('Transparency Regulation')³. This latter is the result of a paradigm shift characterised by a global socio-political call for participation of stakeholders and civil society in institutional decision-making. Public engagement and stakeholder participation ensure transparency, increase legitimacy, and contribute to the inclusion of different forms of knowledge, thus contributing to the quality of the decision-making (Schweizer 2021).

According to the IRGC framework, the concern assessment should examine i) stakeholders' opinions, values, and concerns about the risk; ii) cognitive heuristics and biases that play a role; iii) potential constraints; iv) social reaction to the risk; v) role of institutions and media in tackling public concern; vi) possible controversies and conflicts (Florin and Bürkler, 2017). The framework also highlights that the concern assessment phase entails the identification and analysis of the issues that individuals or society as a whole link to a certain risk, conducted by experts of social sciences (Klinke and Renn, 2012; Klinke, 2021). To this aim, social sciences methodology is used, i.e. survey methods, focus groups, or structured hearings with stakeholders. Within this framework, EFSA focuses on gathering data on risk perceptions and social concerns, while the socio-economic impacts are assessed as part of the risk management (the remit of the European Commission and EU member states).

Following this approach, EFSA is in the process of profiling various food safety topics. These are selected based on EFSA's priority topics for communication and engagement (e.g. animal welfare), the level of topic sensitivity and concern (e.g. glyphosate, chemicals in food, food additives), the need to provide social research data to support scientific assessment or engagement (e.g. new genomic techniques), or based on rising public interest in the topic (e.g. alternative proteins).

The goal of these social research insights is to:

1. provide a mapping of the elements that would need to be considered for risk communication, according to available knowledge and past experience;
2. identify overall sensitivity of the subject matter, taking into account concerns, expectations and risk perceptions.

These specific assessments of risk perception and social concerns consist of three main parts. First, social research data on public risk perceptions on the topic: this includes primary data, e.g. Eurobarometer or surveys conducted by EFSA, and secondary data, i.e. peer-reviewed papers or grey literature (research conducted by peer organisations or EU member state national bodies). Second, an overview of the media highlights and the social media discourse on the topic in the past year to identify, among others, interest, sentiment and audience. Third, the final part is dedicated to drawing conclusions from the analysis and provide advice and recommendations for risk communication on that specific topic. The three parts are further explained below.

a) Social research data

In a risk communication characterised by the 'Behavioural insight model' (Kasza et al. 2022), understanding risk perception and consumer behaviour has become an integral part of the risk analysis process. Therefore, this part of the assessment includes research on public perception, in terms of awareness of the issue, self-reported knowledge and objective knowledge, risk perception, attitudes, and behavioural intentions. Where available, primary research is used, i.e. EFSA Eurobarometer on Food Safety in the EU (EFSA, 2019, 2022) or results from 'flash polls' recently added to EFSA's social research toolbox. The latter are shorter surveys that allow the collection of representative EU data on a specific emerging food safety topic more rapidly (taking only about 10 days), improving both the responsiveness and the capacity to assess public perceptions. This tool was inspired by the work of the German Federal Institute for Risk Assessment (BfR, Bundesinstitut für Risikobewertung) during the Covid-19 pandemic: a survey-series called the 'BfR-Corona-Monitor', randomly selected 500 people, representing the German population and interviewed them by telephone every week (BfR, 2020) to monitor trends. The first EFSA flash poll was conducted in November 2021.⁴

In addition to primary research, secondary research from other relevant Eurobarometer surveys or studies conducted by peer organisations in EU member states is included, for example the

BfR Special Consumer Monitor on Additives in Food (BfR, 2021) was included in the profile on food additives. Finally, literature searches are performed using keywords such as 'topic AND public/risk perception' to identify relevant studies from the peer review literature. Depending on the topic, the number of included studies can vary from about a minimum of 10 to a maximum of 30. The main findings from the studies are extracted and presented in a table in the annex of the risk perception assessment. The results that complement the evidence of the primary data are included to provide additional insights from peer-reviewed literature. When all the information is compiled and available, a map of how the hazard and the socio-cultural context are perceived is drawn, based on the framework for profiling risks described in the scientific report of EFSA on Technical assistance in the field of risk communication (EFSA et al. 2021). This assessment is based on binary scales going from low perceived risk to high perceived risk, e.g. a (perceived) natural substance triggers lower risk perception than a (perceived) man-made substance.

b) Public discourse

The EFSA Social Science Roadmap 2027 (EFSA, 2022) stresses the need to map online discourses in real-time to understand public perception. Therefore, this part of the assessment provides information on the media and social media discourse in relation to the topic. The media analysis is conducted by extracting the key events from the past year available in the media highlights collected by EFSA's media specialists. The social media analysis is performed using a social media listening tool⁵. The latter allows the creation of topic searches using different keywords chosen by the user and monitoring the social media discourse in real time or historically. Data on social platforms Twitter and Facebook are mostly used for real time monitoring, while Twitter data is mostly used for historic data due to the higher availability (Facebook data can only be retrieved for the past month). The following information is included in the analysis:

- Timeline – information on the evolution of the discourse in the past year, showing when the topic triggered mentions, in terms of number of posts, engagement and impressions. Information on the sentiment (positive, negative or neutral) is also included.
- Peak moments – a focus on the dates with highest volume and the posts that attracted the most engagement in the period covered.
- Comparison with other topics – to place the topic in context, a comparison in terms of posts, engagement, sentiment, and number of unique authors posting about that topic is provided. The topic under assessment is compared with two other food safety topics to show the relative importance on social media.
- Hashtags – a treemap chart provides information on the hashtags that are most used by users when talking about the topic, therefore aiding the understanding of related topics and concepts people associate with the topic under examination.

The social media listening tool includes functionalities dedicated to audience analysis. This allows segmentation of unique authors in clusters according to their similarities. The clusters are created automatically by the tool, however these can be re-named manually, for example, according to the country of origin and their interests. For each segment, the characteristics are provided, i.e. the influencers these people follow, their age, gender, country and interests. As pointed out in a viewpoint paper by Delmastro and Zollo (2021), it is worth highlighting that the social media analysis is used as one source of information to be complemented with other social research data sources, as social media data is affected by a sample selection bias, i.e. it corresponds to an underrepresentation of the population. Additionally, it is important to point out that the analysis conducted in the realm of public authorities like EFSA is aimed at investigating the behaviour of the population at aggregate (vs. individual) level and it is governed by the General Data Protection Regulation (GDPR). In this framework, this kind of information

is useful for contributing to the tailoring of communication strategies, addressing citizens' needs and concerns on food safety.

c) Risk communication advice

The final part of the assessment presents advice for risk communication and engagement based on the data collated during the first two parts. Three main recommendations are drawn, focusing on the following aspects.

- Audience and Content – detailed audience segmentation and insights on how to communicate the (potential) risk, which areas to focus on and the language to use adapted to the audience.
- Timing – insights on when to communicate the message in the risk analysis process and integration in risk communication planning.
- Coordination – tips on actors to involve in the communication, either from other EU institutions, member states, and/or stakeholders.

The risk perceptions and social concerns assessment is developed in a Microsoft PowerPoint format to make the information more visual and easily accessible for all EFSA staff, both working in risk assessment and risk communication.

Once the topic profiling is finalised, value of concern is calculated. This is done by positioning the topic on a two-axes graph with Knowledge on the x-axis and Risk perception on the y-axis. 'Knowledge' includes four types of information gathered through the assessment: 1) self-reported awareness; 2) self-reported knowledge; 3) objective knowledge; 4) social media volume. Based on the findings of the assessment, a value of -1 (low), 0 (medium), or +1 (high) is assigned through expert judgment to each type of information. For the social media volume, the tool used by EFSA for social media listening provides the exact number of posts on a given period, therefore that number is used to categorise the volume as low, medium or high. The resulting average of the assigned numbers provides a measure of the knowledge about the topic. The same system is applied for 'Risk perception' which includes four types of information as well: 1) self-reported concern; 2) self-reported importance; 3) self-reported interest; 4) social media sentiment. Mirroring the process explained above for 'Knowledge', a value of -1 (low), 0 (medium), or +1 (high) is assigned to each type of information. For the sentiment, the tool used by EFSA for social media listening provides the information of the sentiment on a given period, which can be green (positive), orange (neutral) or red (negative).

The intersection between Knowledge and Risk perception results in a four-quadrants system, as shown in [Figure 2](#).

This method facilitates a transparent and systematic way of measuring the level of knowledge and risk perception for each topic.

As shown earlier for the checklist, the final aim of this process is to support risk communication and engagement. The assessment of several specific topics will result in providing insights on issues that share similar characteristics, in terms of level of knowledge and risk perception. This will in turn help to categorise the similar patterns and identify a risk communication and engagement plan adapted to the specific knowledge-perception quadrant. The final objective is to build a central database of risk perception assessments that could be categorised in clusters (see for instance that developed for risk management by Renn and Klinke, 2004) strengthening EFSA's evidence-based approach to communication, as outlined in the editorial on 'Future directions for risk communications at EFSA' (Smith et al. 2021).

EFSA has piloted assessments on a number of topics, including those of the EFSA scientific panel on 'Food additives and flavourings'. To provide a concrete example of how the model would be applied, [Figure 3](#) shows where the topic of food additives is placed based on the

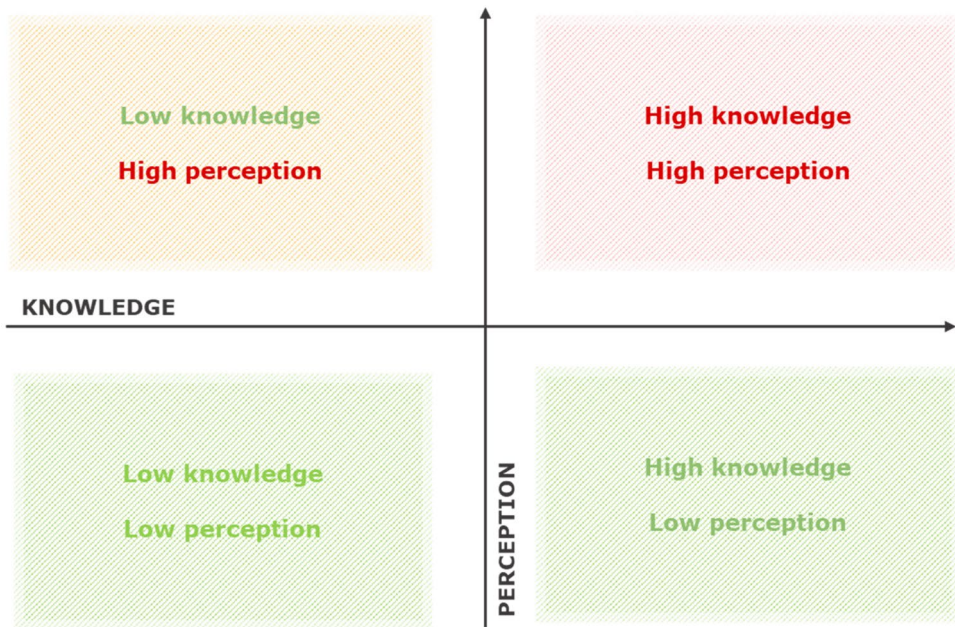


Figure 2. Model for risk perceptions and social concerns assessment based on a two-axes paradigm measuring knowledge and perception of a food-related topic.

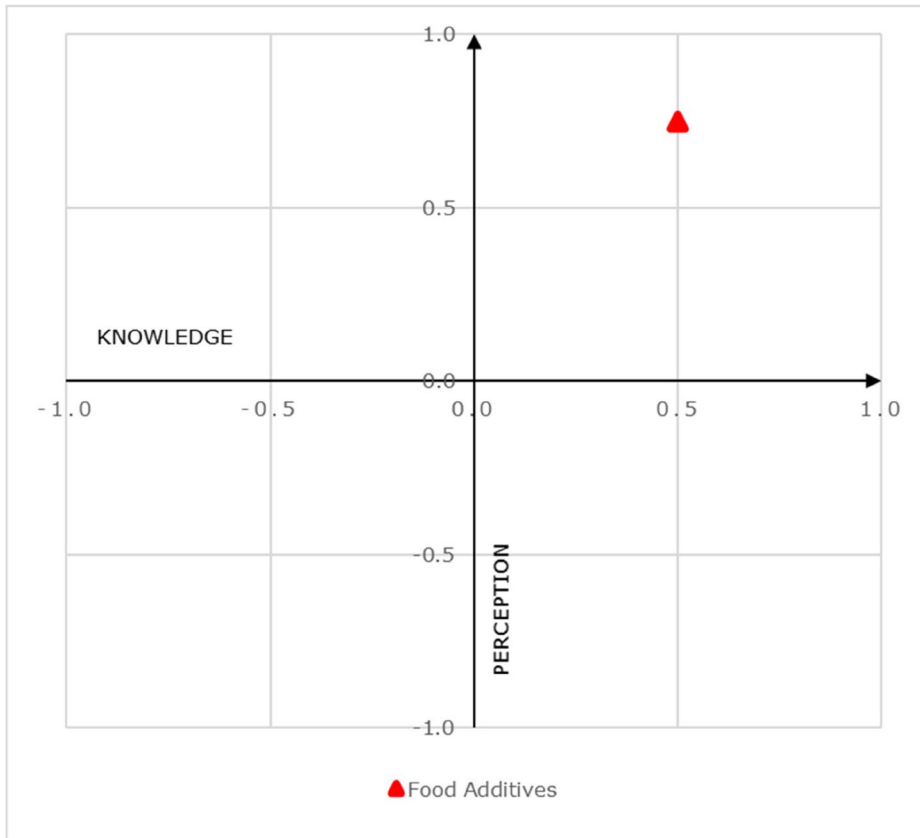


Figure 3. The graph shows how the model is applied in practice based on the example of food additives.

analysis. Social research data stemming from the Eurobarometer on Food Safety in the EU (EFSA, 2022), the above mentioned BfR Special Consumer Monitor on Additives in Food (BfR, 2021), and 14 peer-reviewed papers identified in the literature showed that self-reported awareness, self-reported knowledge and objective knowledge of food additives in general are high among citizens (some exceptions being the low awareness reported for titanium dioxide with only 20% aware). Therefore, these were assigned a value on +1. On the contrary, social media volume was low compared to other food safety topics (e.g. 5.03 K of posts on food additives vs 41.3 K posts on food contact materials over 1-year period). For this reason, the value assigned in this case was -1. The same social research data sources revealed high self-reported concern, importance and interest on food additives, thus resulting in the assignment of a value of +1. To provide an example, data from the 2022 Eurobarometer on Food Safety in the EU report that food additives is the third highest concern among respondents. Lastly, the social media tool evaluated the sentiment around the topic as neutral, thus a value of 0 was assigned. Based on the assessment, this topic would, therefore, belong to the high-knowledge and high-risk perception quadrant, with a score of +0.5 in knowledge and a score of +0.75 in risk perception.

For each quadrant, specific communication objectives are identified. Specifically, EFSA aims to achieve four main recurrent objectives which guide the whole communication planning process, from pre-assessment to risk perception and social concerns assessment. These are in line with the established framework for organising and characterising the functions of different risk communications in the food safety area (Renn, 2009), and are also referred to by the EFSA scientific report 'Technical assistance in the field of risk communication' (EFSA et al. 2021). They are, as follow:

Enlightenment objective is about enhancing the individual's understanding and knowledge of risks. In EFSA's context, this includes awareness raising or presentation of risk assessment findings, e.g. the work on novel foods,⁶ or various topic-specific content developed under the EU Choose Safe Food campaign.⁷

Confidence-building objective aims to establish or re-build trustful relationships between sender and receiver. This, in EFSA's case, refers to communication to stakeholders or applicants (e.g. through Open EFSA update⁸); promotion of engagement opportunities (see EFSA's "Engagement Toolkit - Methods, tips and best practices to design effective participatory processes" which includes a catalogue of target identification methodologies and engagement formats) or communication to the public at large intended to demonstrate the trustworthiness of EFSA's work (e.g. the focus of EU Choose Safe Food campaign on "science behind EU food safety").

Risk-reduction objective is about changing attitudes and/or behaviours to causes or types of risk. This includes EFSA's advice on how to prevent or reduce risk, e.g. African Swine Fever campaign⁹ tips for farmers and future plant health campaign on import of plants from outside the EU¹⁰.

Cooperative-decision-making objective is at play when EFSA is part of resolving existing or potential conflicts between stakeholders related to potential and perceived risks. This includes communication on sensitive or controversial topics, where there is a public debate on EFSA's conclusions or risk management decisions that will be based on those (e.g. bisphenol A—a substance used in food contact materials— and animal welfare). At least one of these four objectives should guide EFSA's external communication to its target audiences. More than one objective may apply, i.e. EFSA may be raising awareness (enlightenment) while also providing some tips on how to reduce exposure to a certain risk (risk reduction). The pilot phase of this framework will further help in identifying which specific communication objectives to adopt for each quadrant. For instance, for high knowledge and high perception food safety topics, applying all four objectives to the communication would be beneficial, whereas for low knowledge and low perception topics, applying Enlightenment and Confidence-building objectives would suffice.

As a practical example, the recent EFSA communication on the outcome of the scientific assessment of the food additive titanium dioxide (E171)¹¹ adopted an Enlightenment objective.

This was pursued as social research indicated that awareness and knowledge of additives in general is high, however for this specific food additive is very low (BfR, 2021).

As shown in this section, the appraisal phase aims at informing risk communication through an evidence-based approach to identify the most appropriate objective for a specific food safety topic. The final goal is to provide communications that follow the overarching five rules for evidence communication suggested by Blastland et al. (2020), namely: 1) Inform, not persuade; 2) Offer balance, not false balance; 3) Disclose uncertainties; 4) State evidence quality; 5) Inoculate against misinformation. These will be the key of EFSA's future risk communication, as highlighted in the outcomes of the recent ONE – Health, Environment & Society – Conference 2022 (Devos et al. 2022).

Conclusion

The authors developed the two-phase approach for assessing incoming requests with the objective of optimising the planning of its risk communications. This shift in working practices was made possible by creating and strengthening a dedicated social science function, with comprehensive research and analysis skills and competences, within EFSA's communication department. While the agency had previously conducted social research to inform its communications and used external experts to advise on risk communication strategies and best practice, only by investing in in-house social science capacities within a bespoke operational framework (e.g. EFSA, 2022), was it possible to develop, implement and maintain these processes in its communications working practices. This function is now well embedded in many of EFSA's day-to-day operations, not only in risk communication but also in corporate planning and reporting and, tentatively, even in some areas of risk assessment (e.g. EFSA Scientific Committee et al. 2021). Overall, and at the time of writing, these new processes have helped to structure and formalise a previously ad hoc planning process and give it a strong evidence base. They provide mechanisms to harness the available insights from across EFSA and beyond—not only using social science approaches but also tapping into other specialist knowledge such as institutional relations—in way that recognises the value of these inputs and strengthens the decision-making process in realising communication and engagement objectives.

Another important feature is their scalability, which allows continuous improvement and a measured broadening of scope to support EFSA's evolving risk communication needs. Further integration of social media listening and media analysis insights may help to automate—with appropriate oversight—some aspects of the communications planning process, e.g. estimating the sensitivity/reputational risk of issues, setting of objectives, resource planning and management. Last but not least, while these tools were developed primarily for handling 'business as usual', some spillover effects have emerged, such as contributing to strategies and objective setting of campaigns and in providing support to risk managers at the European Commission and risk assessor partners in EU Member States in their own planning and operations.

Notes

1. Follow-up required with Scientific Unit for familiarisation with the mandate and planning of risk communication activities. This may result in deployment of one or more tools from EFSA's communication toolkit.
2. Staff are encouraged, however, to promote EFSA outputs such as those they are involved in, via social media to reach niche audiences and build peer-to-peer networks.
3. Regulation (EU) 2019/1381 of the European Parliament and of the Council of 20 June 2019 on the transparency and sustainability of the EU risk assessment in the food chain and amending Regulations (EC) No 178/2002, (EC) No 1829/2003, (EC) No 1831/2003, (EC) No 2065/2003, (EC) No 1935/2004, (EC) No 1331/2008, (EC) No 1107/2009, (EU) 2015/2283 and Directive 2001/18/EC. OJ L 231, 6.9.2019, p. 1, to be found at: <https://eur-lex.europa.eu/legalcontent/EN/TXT/PPF/?urUCELLEX:32019R1381&from=EN>

4. This survey provides insights in terms of Europeans' concerns regarding food, and interest in several food safety topics and Europeans' knowledge and perception of new genomic techniques (NGTs), including awareness of NGTs, which NGT-related information evokes most interest, perceived effects on the environment, health, etc. of the application of NGTs to food, among others. Survey data is available on Zenodo at the following link: <https://zenodo.org/record/7081944#.Y75vPXbMLD7>
5. <https://www.efsa.europa.eu/sites/default/files/documents/legal/dp/dp-COM5.pdf>
6. <https://www.efsa.europa.eu/en/topics/topic/novel-food>
7. <https://campaigns.efsa.europa.eu/EUChooseSafeFood/#/>
8. <https://open.efsa.europa.eu/>
9. <https://multimedia.efsa.europa.eu/asf/#/>
10. <https://open.efsa.europa.eu/questions/EFSA-Q-2022-00437>
11. <https://www.efsa.europa.eu/en/news/titanium-dioxide-e171-no-longer-considered-safe-when-used-food-additive>

Disclosure statement

The positions and opinions presented in this article are those of the authors alone and do not necessarily represent the views/any official position or scientific works of EFSA. To know about the views or scientific outputs of EFSA, please consult its website under <http://www.efsa.europa.eu>

ORCID

Laura Maxim  <http://orcid.org/0000-0001-9641-6649>

References

- Benamouzig, Daniel, Olivier Borraz, Jean-Noël Jouzel, and Danielle Salomon. 2014. "A Sociological Checklist for Assessing Environmental Health Risks." *European Journal of Risk Regulation* 5 (1): 36–45. doi:10.1017/S1867299X00002932.
- BfR (Bundesinstitut für Risikobewertung) [German Federal Institute for Risk Assessment]. 2020. "Corona-monitor." https://www.bfr.bund.de/de/bfr_corona_monitor-244782.html
- BfR (Bundesinstitut für Risikobewertung) [German Federal Institute for Risk Assessment]. 2021. "Consumer Monitor 2021 | Special Additives in Food." <https://www.bfr.bund.de/cm/364/bfr-consumer-monitor-2021-special-additives-in-food.pdf>
- Blastland, Michael, Alexandra L. J. Freeman, Sander van der Linden, Theresa M. Marteau, and David Spiegelhalter. 2020. "Five Rules for Evidence Communication." *Nature* 587 (7834): 362–364. doi:10.1038/d41586-020-03189-1.
- Chatzopoulou, Sevasti. 2019. The Food Policy of the European Union. Oxford Research Encyclopedia of Politics (2019). doi:10.1093/acrefore/9780190228637.013.595.
- Chen, Kevin, Xin-xin Wang, and Hai-ying Song. 2015. "Food Safety Regulatory Systems in Europe and China: A Study of How co-Regulation Can Improve Regulatory Effectiveness." *Journal of Integrative Agriculture* 14 (11): 2203–2217. doi:10.1016/S2095-3119(15)61113-3.
- Delmastro, Marco, and Fabiana Zollo. 2021. "Social Monitoring for Food Policy and Research: Directions and Implications." *Food Policy* 105: 102147. doi:10.1016/j.foodpol.2021.102147.
- Deluyker, Hubert. 2017. "Is Scientific Assessment a Scientific Discipline?" *EFSA Journal. European Food Safety Authority* 15 (11): e15111: 51. doi:10.2903/j.efsa.2017.e15111.
- Devos, Yann, Maria Arena, Sean Ashe, Max Blanck, Edward Bray, Alessandro Broglia, Stef Bronzwaer, et al. 2022. "Addressing the Need for Safe, Nutritious and Sustainable Food: Outcomes of the "ONE–Health, Environment & Society–Conference 2022." *Trends in Food Science & Technology* 129: 164–178. doi:10.1016/j.tifs.2022.09.014.
- EFSA Scientific Committee, More, Simon, Vasileios Bampidis, Diane Benford, Claude Bragard, Thorhallur Halldorsson, Antonio Hernández-Jerez, Susanne Hougaard Bennekou, et al. 2021. "A Systems-Based Approach to the Environmental Risk Assessment of Multiple Stressors in Honey Bees." *EFSA journal. European Food Safety Authority* 19 (5): e06607. doi:10.2903/j.efsa.2021.6607.
- European Food Safety Authority (EFSA) and European Commission 2019. "Food safety in the EU". *Special Eurobarometer*. https://www.efsa.europa.eu/sites/default/files/corporate_publications/files/Eurobarometer2019_Food-safety-in-the-EU_Full-report.pdf
- European Food Safety Authority (EFSA) and European Commission. 2022. "Food safety in the EU". *Special Eurobarometer*. https://www.efsa.europa.eu/sites/default/files/2022-09/EB97.2-food-safety-in-the-EU_report.pdf

- European Food Safety Authority (EFSA), Maxim, Laura, Mario Mazzocchi, Stephan Van den Broucke, Fabiana Zollo, Tobin Robinson, Claire Rogers, Domagoj Vrbos, Giorgia Zamariola, and Anthony Smith. 2021. "Technical Assistance in the Field of Risk Communication." *EFSA Journal. European Food Safety Authority* 19 (4): e06574. doi:10.2903/j.efsa.2021.6574.
- European Food Safety Authority (EFSA). 2012. updated in 2017. "When Food is Cooking Up a Storm - Proven Recipes for Risk Communications". <https://op.europa.eu/en/publication-detail/-/publication/654b67b4-57bf-11e7-a5ca-01aa75ed71a1/>
- European Food Safety Authority (EFSA). 2021. ". Engagement Toolkit - Methods, Tips and Best Practices to Design Effective Participatory Processes." EFSA Supporting publications. <https://www.efsa.europa.eu/sites/default/files/documents/engagement-toolkit.pdf>
- European Food Safety Authority (EFSA). 2022. ". Implementation of the EFSA Social Science Roadmap - An update in support of EFSA Strategy 2027." <https://www.efsa.europa.eu/sites/default/files/event/mb-20211216/C16.Social-Science-Roadmap-9.mb211216-i5.pdf>
- Fischhoff, Baruch. 1998. "Communicate unto Others...." *Reliability Engineering & System Safety* 59 (1): 63–72. doi:10.1016/S0951-8320(97)00120-8.
- Florin, Marie-Valentine. 2022. "Risk Governance and 'Responsible Research and Innovation' Can Be Mutually Supportive." *Journal of Risk Research* 25 (8): 976–990. doi:10.1080/13669877.2019.1646311.
- Florin, Marie-Valentine, and Stephanie Danielle Parker. 2020. *Involving Stakeholders in the Risk Governance Process*. No. REP_WORK. Lausanne, Switzerland: EPFL International Risk Governance Center.
- Florin, Marie-Valentine, and Marcel Thomas Bürkler. 2017. *Introduction to the IRGC Risk Governance Framework*. No. REP_WORK. EPFL.
- Food and Agriculture Organization (FAO) and World Health Organization (WHO). 2016. "Risk Communication Applied to Food Safety: Handbook." <http://www.fao.org/3/a-i5863e.pdf>
- Gilmour, Jane, and Ruth Beilin. 2007. "Stakeholder Mapping for Effective Risk Assessment and Communication." Australian Centre of Excellence for Risk Analysis, report 0609.
- Kasperson, Roger E, Ortwin Renn, Paul Slovic, Halina S. Brown, Jacque Emel, Robert Goble, Jeanne X. Kasperson, and Samuel Ratick. 1988. "The Social Amplification of Risk: A Conceptual Framework." *Risk Analysis* 8 (2): 177–187. doi: 10.1111/j.1539-6924.1988.tb01168.x.
- Kasza, Gyula, Eszter Csenki, Dávid Szakos, and Tekla Izsó. 2022. "The Evolution of Food Safety Risk Communication: Models and Trends in the Past and the Future." *Food Control*. 138: 109025. doi:10.1016/j.foodcont.2022.109025.
- Klinke, Andreas. 2021. "Public Understanding of Risk and Risk Governance." *Journal of Risk Research* 24 (1): 2–13. doi:10.1080/13669877.2020.1750464.
- Klinke, Andreas, and Ortwin Renn. 2012. "Adaptive and Integrative Governance on Risk and Uncertainty." *Journal of Risk Research* 15 (3): 273–292. doi:10.1080/13669877.2011.636838.
- Lofstedt, Ragnar E. 2010. "Risk Communication Guidelines for Europe: A Modest Proposition." *Journal of Risk Research* 13 (1): 87–109. doi:10.1080/13669870903126176.
- Otway, Harry. 1992. "Public Wisdom, Expert Fallibility: Toward a Contextual Theory of Risk." In *Social Theories of Risk*, edited by S. Krinsky and D. Golding, 215–228. Westport, Connecticut, United States: Praeger.
- Petersen, Arthur C., Peter H. M. Janssen, Jeroen P. van der Sluijs, James S. Risbey, Jerome R. Ravetz, J. Arjan Wardekker, and Hannah Martinson Hughes. 2013. *Guidance for Uncertainty Assessment and Communication*. 2nd ed. The Hague, The Netherlands: PBL Publishers.
- Pidgeon, Nick, Roger E. Kasperson, and Paul Slovic, eds. 2003. *The social amplification of risk*. Cambridge University Press.
- Renn, Ortwin. 2009. "Communication about Food Safety." In *Food Safety Governance*, edited by Ortwin Renn and Marion Dreyer, 121–141. Berlin, Heidelberg: Springer.
- Renn, Ortwin, and Andreas Klinke. 2004. "Systemic Risks: A New Challenge for Risk Management." *EMBO Reports* 5 (S1): S41–S46. doi:10.1038/sj.embor.7400227.
- Schweizer, Pia-Johanna. 2021. "Systemic Risks—Concepts and Challenges for Risk Governance." *Journal of Risk Research* 24 (1): 78–93. doi:10.1080/13669877.2019.1687574.
- Slovic, Paul. 1987. "Perception of Risk" *Science* 236 (4799): 280–285. doi: 10.1126/science.3563507. 3563507
- Smith, Anthony, Domagoj Vrbos, Jacopo Alabiso, Arthur Healy, James Ramsay, and Barbara Gallani. 2021. "Future Directions for Risk Communications at EFSA." *EFSA Journal. European Food Safety Authority* 19 (2): e190201. doi:10.2903/j.efsa.2021.e190201.
- Wijnands, Jo. H. M., Harry J. Bremmers, Bernd M. J. van der Meulen, and Krijn J. Poppe. 2008. "An Economic and Legal Assessment of the EU Food Industry's Competitiveness." *Agribusiness* 24 (4): 417–439. doi:10.1002/agr.20167.