

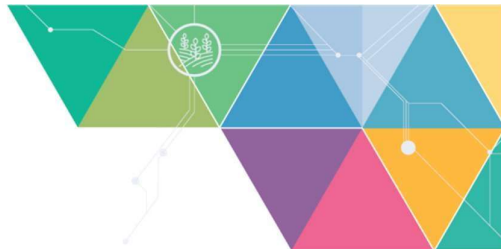
2027 EFSA Strategy Environmental Scans





Table of Contents

| | |
|---|-----------|
| Introduction | 3 |
| Section I - Scanning the Food Safety Environment | 4 |
| Introduction | 5 |
| Chapter 1: The Aim | 5 |
| Chapter 2: The Scan | 7 |
| Chapter 3: The Next Steps | 24 |
| Section II - Changing Context Analysis | 26 |
| Introduction | 27 |
| Overview of the Changing Context Analysis | 27 |
| Work Areas | 29 |
| 1. Biological Risk Assessment..... | 29 |
| 2. Capacity Building, Data, Methodologies & Innovative Tools..... | 36 |
| 3. Chemical Risk Assessment | 46 |
| 4. Cross-Cutting Risk Assessment & New Strategic Measures..... | 59 |
| 5. New Technologies & Products | 69 |
| 6. Risk Communication, Engagement & Social Research | 73 |
| Section III - 2035 Perspective | 78 |
| The Context | 79 |
| The Perspective | 83 |
| Conclusion | 86 |
| Annexes | 87 |
| Annex 1 – Scanning the Food Safety Environment | 87 |
| Annex 2 - Changing Context Analysis | 94 |



Introduction

The 2027 EFSA Strategy Environmental Scans Report is the result of an overarching scan of EFSA's internal and external environment undertaken in the 2018-2020 period. In the public sector, environmental scanning is a technique for identifying prospective policy challenges - and opportunities - that might arise from current and emerging issues and trends. The purpose of the scan is to help management teams make informed decisions by forecasting the impact of changes in EFSA's environment and by answering the following questions; What are the relevant global issues and trends? How do we present these within an EFSA context? What are our strategic priorities to prepare for these future challenges/opportunities?

The 2027 EFSA Strategy Environmental Scans Report consists of **3** sections:

1. **Scanning the Food Safety Environment** (1st Environmental Scan)
2. **Changing Context Analysis** (2nd Environmental Scan)
3. **Perspective 2035**

The report starts with the first Strategic Environmental Scan that EFSA finalized in July 2019, called "**Scanning the Food Safety Environment**". The purpose of this Environmental Scan was to take stock of changes in the EFSA context before embarking on the design of its new strategy using a SWOT analysis.

The second section presents the second Environmental Scan that EFSA performed in 2020 called the "**Changing Context Analysis**". The purpose of the second Environmental Scan was to re-align EFSA's 2027 Strategy plans to the changed external and internal context and to analyse new developments from published EU policy documents e.g. EU Green Deal and the Farm to Fork Strategy. The timing also owes to the outbreak of SARS-COV-2 and to the logistical implications posed by the crisis.

After the first Environmental Scan EFSA developed a "**Perspective 2035**". The purpose of this piece is to summarize the Environmental Scanning exercises and provide a long-term view for viable future strategic directions. The Perspective 2035 analysis was subsequently updated to integrate elements from the 2020 Changing Context Analysis.

The three sections of the report ultimately provide EFSA with a comprehensive list of Expected Operational Results (EORS) that can be used to finalize EFSA's 2027 Strategy document by defining the high-level implementation plan and provide input to internal roadmaps for further technical specifications, prioritization and ambition setting.



Section I - Scanning the Food Safety Environment

EFSA's First Strategic Environmental Scan
July 2019



Introduction

This section describes the results of EFSA’s external and internal environment scanning, which aimed at providing insights for the definition of its next strategy. The objective of this exercise was to identify the critical external challenges and opportunities that the organisation may face in its upcoming future and, analysing its internal strengths and weaknesses, to explore their potential relevance for EFSA and its ecosystem in the medium and longer term. The study is based on the preliminary drivers, scenarios, challenges and policy options identified in the Science for Policy Report (DG-JRC Report) commissioned by the Directorate General for Health and Food Safety (DG SANTE) of the European Commission, together with supplementary and extensive literature reviews, internal staff consultations as well as discussions with stakeholders and institutional partners.

The intent of this section is to present the key findings and outcomes of the analysis, i.e. the consolidated SWOT analysis which includes recommendations to inform EFSA for its future strategic direction of 2021-2027 and beyond.

The document is structured as followed:

Chapter 1: The Aim

*This chapter **outlines the ‘why’**; EFSA’s environmental scan, being used as a key input, to inform EFSA’s Strategic Planning. It also **briefly describes the ‘how’**; the phases, activities, supporting methodologies and tools used.*

Chapter 2: The Scan

*This chapter **presents the ‘what’**; focusing on the consolidated SWOTs containing EFSA’s internal strengths and weaknesses and the external opportunities and challenges, alongside exploratory recommendations for defining the new strategy.*

Chapter 3: The Next Steps

***This chapter describes the overarching exploratory recommendations** and highlights the open questions that need addressing prior to commencing definition of the strategy.*

Chapter 1: The Aim

Why is EFSA scanning its environment?

EFSA is the European decentralised agency for risk assessment related to food and feed safety, animal health and welfare, nutrition, plant protection and plant health. It was set up in 2002 (by Regulation (EC) No 2002/178) and is funded by the European Union as an impartial source of scientific advice and communication on risks associated with the food chain. The advice that EFSA provides to risk managers underpins the laws and regulations of the EU, as well as evolving policy priorities and needs, to protect European consumers from food-related risks – from field and factory to fork, and to foster trust in the food chain.

EFSA’s Strategy 2020 is coming to an end soon; it was structured upon five strategic objectives, which were underpinned by five values, to prepare EFSA for the future and address



EFSA’s operating context, i.e. the challenges and opportunities, strengths and weaknesses relevant at the time of its development between 2015-2016.

Before embarking on the design of a new strategy, scheduled for adoption by the end of 2020 and implementation as of 2021, it is imperative to take stock of changes in EFSA’s context, whether from developments and trends from the wider external environment (socio-political, technological, environmental) or as a result of evolved strengths and weaknesses following the implementation of EFSA’s Strategy 2020.

How did EFSA conduct its environmental scan?

The key steps EFSA took in performing this environmental scan were:

1. Identifying external drivers and creating future scenarios

a. Scanning the environment for holistic representation of future drivers.

Answering: *How is the world evolving?*

b. Creating plausible and contextualized scenarios of what the future holds.

Answering: *What could the food and nutrition landscapes look like?*

2. Performing a SWOT analysis

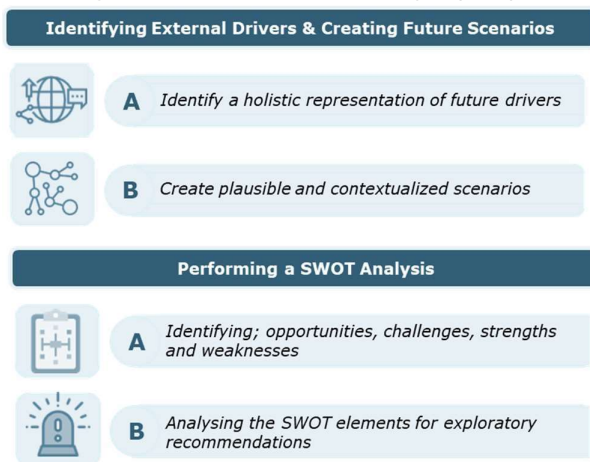
a. Identifying (external) opportunities and challenges and relevant (internal) strengths and weaknesses.

Answering: *What are the potential and the most important issues?*

b. Analysing the SWOT elements to identify exploratory recommendations for strategy definition.

Answering: *What could EFSA explore to address the changing context and better prepare for the future?*

Figure 3: Environmental Scanning Key Steps



The identification of **external drivers** was based on the Joint Research Centre’s (DG-JRC)¹ [Science for Policy Report on 'Delivering on EU Food Safety and Nutrition in 2050 - Future](#)

¹ A special thank you goes out to the JRC and particularly to Anne-Katrin Bock, for their valuable inputs and consultation throughout the initial phase of the scanning process.



challenges and policy preparedness, four focused reports (listed below) and the contributions from participants at the EFSA 2018 Conference. Additional literature² was screened to ensure that any relevant elements were included throughout the process.

The Four Focused Reports:

1. The World Economic [Forum’s Shaping the Future of Global Food Systems Report](#) - A Scenario Analysis by 2050;
2. The European Commission’s [Future of Europe](#) – A 2025 White Paper;
3. The European Commission’s Expert Food Group [Climate Smart and Sustainable Food](#) – A 2030 Agenda;
4. The UN’s [Sustainable Development Goals](#) - 2030 Agenda.

Political, economic, social, technological, environmental and legal contexts (*PESTLE analysis*) and any relative potential short- and long-term shifts were considered as drivers and used to adapt the scenarios developed by DG-JRC to EFSA’s context. **The scenarios** consist of plausible combinations of drivers, constituting a representation of “**what if**”, not future predictions, offering an opportunity for EFSA to envision and plan, given different contexts and shifts. The four scenarios used were also based on the abovementioned DG-JRC report, having been slightly updated by adding further detail at the level of the description of the drivers and trend themes.

The scenarios were used to identify **Opportunities** and **Challenges** (the external environment that can adversely affect EFSA’s performance or achievement of its objectives) and initial ideas for potential ways EFSA might address them.

Two workshops were organised with EFSA staff and external stakeholders to stimulate an interactive approach³. EFSA’s **Strengths** and **Weaknesses** were first identified through desk research via an external mid-term evaluation of the delivery of EFSA 2020 strategy. EFSA “Roadmap” leaders with their teams carried out a self-assessment SWOT analysis against each of EFSA’s Strategic Capabilities & Resources⁴, complementing the identification of ideas addressing external opportunities and challenges. A consolidated SWOT analysis structured against three strategic clusters was produced and validated during a final internal workshop, including a list of **exploratory recommendations** as input to the strategy definition process.

Therefore, EFSA’s Strategic Environmental Scan, aimed to explore, consult, analyse and endorse drivers, future-scenarios, SWOT elements and relative exploratory recommendations. Chapter 3 below describes the final scanning outcome, i.e. the SWOT analysis with exploratory recommendations.

Chapter 2: The Scan

What do the consolidated SWOTs look like?

The **three strategic clusters**, created to finalise the consolidated SWOTs were: Food systems and risk assessment; Knowledge, data, people and funding; and Society and risk communication. Each cluster is presented alongside a descriptive summary of the SWOT content, the relative SWOT elements, and the assessment of their potential relevance for EFSA via exploratory recommendations.

² For a comprehensive understanding of the literature scanned, please refer to the Annex: Desk Analysis

³ For a comprehensive understanding of the workshops, please refer to the Annex: Consultations

⁴ For a comprehensive understanding please refer to the Annex: Strategic Definition Alignment



Fundamentally, answering the following questions:

- **What is out there?**
Presenting the external opportunities and challenges.
- **Where do we stand?**
Presenting the internal strengths and weaknesses.
- **What could we do about it?**
Assessing the relevance of the above and presenting a list of exploratory recommendations.

1. Food systems and risk assessment

Sub-Clusters: *Holistic and Fit-for-Purpose Risk Assessment, Risk-Risk and Risk-Benefit Analysis, New Data and Methods, Preparedness, Nutrition Advice*

The European food safety regulatory framework has delivered to EU consumers one of the safest food systems in the world. Demographic changes, malnutrition and the rise of non-communicable diseases, climate change and the depletion of natural resources (including biodiversity) call for new approaches for safe food. In such approaches, safety assessment goes beyond the traditional risk assessment model of single hazards analysis. At the same time, the United Nations have adopted a transformative agenda for 2030, including 17 different sustainable development goals (SDGs), and the EU has developed its own sustainability agenda (published in January 2019, while DG SANTE’s own sustainability approach is currently in the making) to drive future policies. Food safety concerns are gaining increasing prominence as demonstrated by the establishment in 2018 of a World Food Safety Day.

Emerging challenges and trends

As the global population grows from 7 billion in 2010 to a projected 9.8 billion by 2050, overall food demand is on course to increase by more than 50%, and demand for animal-based foods by nearly 70%. Yet today, hundreds of millions of people remain hungry, agriculture already uses almost half of the world’s arable land. Agriculture and related land-use change generate 25% of annual greenhouse gas emissions⁵. To achieve the SDG targets, it is necessary to significantly transform our production and consumption patterns, producing more with less and reducing waste. The transformation will require the development of alternative food and feed sources (e.g. insects and synthetic meat) and new production technologies (e.g. precision farming) that will need to be assessed for any possible human, animal, plant and environmental risks. New methods for risk assessment and the consideration of risks to the environment that may arise from the re-introduction of food waste into the food chain are also needed.

Development of scientific methodologies and tools offer new data sources for risk assessment and opportunities to further refine them while successfully applying the 3Rs principle (Replacement, Refinement, and Reduction) as alternatives to animal testing.

Worldwide obesity has nearly tripled since 1975. Malnutrition is currently the highest risk factor for public health in Europe. To achieve sustainable consumption and reduce malnutrition, a change in dietary patterns is necessary for the future.

And antimicrobial resistance in humans and animals continues to be one of the biggest threats to human health faced by the global community.

⁵ Synthesis report: Creating a Sustainable Food Future, World Resources Institute, December 2018



What is out there?

Challenges and Opportunities

Holistic and Fit-for-Purpose Risk Assessment

- Call for an integrated approach to contribute to the Sustainable Development Goals and Health priorities;
- Produce more with less and reduce waste;
- Re-introduction of food waste and environment hazards in the food chain;
- New alternative food and feed sources (e.g. insects and synthetic meat);
- New food and feed production technologies (e.g. precision farming);
- Need to prioritise questions for risk assessment (workload and complexity) and perform hazard ranking;
- **Increased exposure to chemicals at different stages of the food chain.**

Risk-Risk and Risk-Benefit Analysis

- Need to integrate nutrition, health, environment and sustainability aspects in risk assessment;
- **Expectation to integrate risk assessment and risk-benefit analysis.**

New Data and Methods

- Application of 3Rs principle in food and feed risk assessment;
- Systematic risk assessment for chemical mixtures;
- Integrating new types of data in chemical and biological hazard assessment;
- Taking account of human variability and personalisation needs;
- Increase in food allergies and other auto-immune diseases.

Preparedness

- Increase in antimicrobial resistance in humans and animals;
- Increased complexity and impact of food and feed incidents resulting from contamination and/or fraud.

Nutrition Advice

- Changing dietary and consumption patterns;
- Personalised nutrition trends.

EFSA in 2019

EFSA has, in less than 20 years, gained an international reputation as a leading authority in food and feed risk assessment (RA). Its staff and access to large networks of Member State experts are its main assets – it is therefore important to take full advantage of this interdisciplinary richness and increase engagement with the research community (public and private) to keep pace with technological developments.



The development and implementation of methodologies and tools for RA need to continue ensuring an end-to-end scientific process that is fit-for-purpose, considers all relevant data and addresses societal concerns.

Cooperation is often hindered by non-existent or cumbersome processes for joint drafting, adoption and publication of RA with other EU and Member State agencies as well as limited resources for partnering at EU and international level. This is coupled with a lack of harmonised terminology and concepts across different RA sectors, variable availability and accessibility of data for RA or even insufficient awareness of open access tools and platforms.

EFSA has a good track record on responsiveness to incidents but insufficient access to real-time data and lack of horizon scanning and early warning systems are weaknesses to be addressed.

Where do we stand?

Strengths and Weaknesses

Holistic and Fit-for-Purpose Risk Assessment

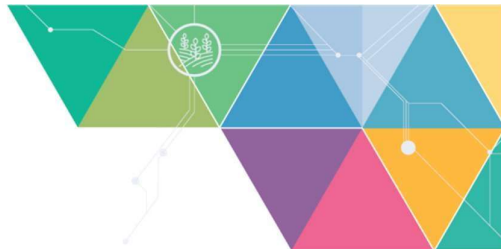
- Internationally recognised quality of risk assessment performed by EFSA;
- Process for joint drafting, adoption and publication of RA with other EU and Member States agencies internal standards and implementation begun;
- EFSA staff possess in-depth scientific and regulatory expertise but have difficulty in keeping pace with technological developments;
- Scientific expertise and data available in existing panels and networks but insufficient focus on establishing interdisciplinary approaches;
- Lack of harmonised terminology and concepts across different RA sectors;
- Limited resources for collaboration with Member States and international collaboration in new RA approaches;
- Limited ways of addressing the challenge of a heterogeneous regulatory framework.

Risk-Risk and Risk-Benefit Analysis

- Risk characterisation outcomes for regulated products are focused on approval criteria;
- Insufficient agility of RA (methodologies are further limited by regulatory requirements);

New Data and Methods

- EFSA has developed most of the methodologies set-out in EFSA's 2020 Strategy – with differing levels of guidance development and implementation;
- New RA tools implemented: FAIM 2.0, FEIM and FACE;
- Variable availability and accessibility of data for RA;
- Insufficient resources for proactive self-tasking;
- Insufficient awareness among assessors of open access tools and platforms;
- EFSA carried out a pilot for the automation of applications via the MATRIX project. MATRIX would improve the availability of documentation relevant to EFSA scientific outputs. However, a gap analysis found that the overall implementation needs to be reviewed.



- Insufficient capabilities in biological, chemical and ecological predictive modelling, bioinformatics (WGS, Next Generation Sequencing), computational toxicology (QSAR and read across) and analysis of omics data;
- RA not considering the entire microbiota present.
- Limited use of evidence from epidemiological studies in chemical risk assessment;
- Insufficient clarity of scientific opinions and the scientific process behind ongoing challenges on timeliness (RA not 100% reproducible).

Preparedness

- Good responsiveness to incidents but insufficient access to real time data;
- Horizon scanning and early warning systems not available;
- Insufficient data and tools to support traceability investigations in case of food and feed incidents;
- Limited system-view on food systems.

Nutrition Advice

- Current limits of EFSA Regulatory framework in the field of nutrition advice.

Emerging Futures

The EFSA 2020 Strategy focus on widening EFSA's evidence base and preparing for future RA challenges has delivered important developments on how food and feed RA is delivered in the EU. The revisions to the General Food Law, and the requirement for proactive publication of data and full traceability of RAs will push EFSA to continue its transformation into an Open Science organisation.

Scientific developments and access to large sets of digital information offer EFSA the opportunity to assess food safety risks no longer as isolated events but as factors of complex systems that represent the world we live on. Food safety is a fundamental component of food security and health, but preservation of natural resources and sustainability of systems cannot be a trade-off, instead needs to be integrated in RA.

The transition towards a more holistic "one health/one environment" RA which integrates nutrition, health, environment and sustainability aspects is a challenge that needs careful consideration. However, EFSA's focus on fit-for-purpose RA must remain a priority, with an obligation to provide the best science available in the timeframe available to support the development and implementation of policies. This is naturally to be done in strong partnerships with the risk managers and assessors at the EU and Member State level as well as with international organisations.

Providing advice on alternatives, such as risk comparisons and risk-benefit analysis by developing joint assessments with EU and Member State organisations with relevant responsibilities, can contribute to better policy advice and ultimately more clarity for the wider public. It is important to identify who should be involved in providing the expertise to provide the advice on these options.

To implement new methodologies and access new data in food feed safety RA, EFSA must continue to invest in harvesting data and information to stay abreast of evolving scientific methodologies and research and develop adequate RA methodologies to assess new sources of potential food/feed risks such as new production technologies.



Investing in future preparedness by further developing methodologies to identify emerging risks at global level, and proposing prevention strategies that ensure the safety and sustainability of food systems is important; but also in conjunction, developing new/agile processes for urgent/rapid RAs that can support policy action when incidents occur. EFSA needs to ensure that scientific and technological developments contribute to the development of regulatory RA.

EFSA can contribute to dietary guidelines aimed at addressing diet-related chronic metabolic diseases and provide advice on how to drive behavioural changes in dietary habits moving from a “Farm to Fork” to a “One Health Approach”. EFSA’s role and responsibilities in this change need to be defined clearly, including how to integrate different target population groups in its dietary exposure assessments.

To face the future challenges and ensure its leading role in food and feed safety RA EFSA will need to consider:

- How to transition towards more holistic, “one health/one environment” RAs which integrate nutrition, health, environment and sustainability aspects?
- Who should be involved in providing the expertise to advise on options, risk comparisons and risk-benefit analysis through the joint assessments?
- How to ensure that scientific and technological developments contribute to the development of regulatory RA?
- What could be EFSA’s role regarding nutrition advice?

What could we do about it?

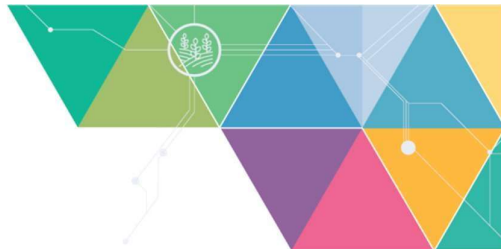
Potential Recommendations

Holistic and Fit-for-Purpose Risk Assessment

- Develop approaches that facilitate holistic assessments, which integrate RAs across multiple stressors, geo-graphical/temporal scales and policies/legal frames;
- Develop/access interdisciplinary expertise to ensure non-fragmented RA for food-related topics in EU with the EC and Member States and international partners;
- Provide advice on current indicators being used to assess SDG progress with regards to food safety (SDG 3 Good health and well-being/SDG 12 Responsible production and consumption/SDG13-Climate action/SDG 14-15 life below water and on land) and support inclusion of food safety concerns into post-2030 international goals;
- Invest in future preparedness by further developing methodologies to identify emerging risks at global level and propose prevention strategies that ensure safety and sustainability of food systems;
- Ensure fit-for-purpose RA, making use of best science and addressing societal demands;
- Enhance workload prioritisation with DG SANTE and align understanding on framing of questions as well as expectations on scientific advice;
- Advocate the use of problem formulation to identify relevant and reliable information for RA.

Risk-Risk and Risk-Benefit Analysis

- Integrate risk-risk and risk-benefit analysis in the RA process by cooperating with EU and Member State organisations responsible for related and/or overlapping issues.



New Data and Methods

- Continue EFSA's transformation into an Open Science organisation; proactively publish non-confidential evidence and its appraisal used for scientific assessments in structured, searchable and downloadable formats, applied methods, models, assumptions and uncertainties;
- Make the evolution of scientific outputs traceable by linking it to scoping and planning documents, data collection and selection, method selection and opinion formulation;
- Implement the use of new methodologies and data in food/feed safety RA (biological, chemical and ecological predictive modelling, computational toxicology, and bioinformatics biomonitoring and omics data);
- Continue investing in harvesting data and information to stay abreast of evolving scientific methodologies and research in toxicology, epidemiology, exposure sciences and data sciences;
- Gain better insights from industry on new technologies and products;
- Develop adequate RA methodologies to assess new food/feed sources and production technologies.

Preparedness

- Develop new/agile processes for urgent/rapid RA, including automation for data analysis, lean standard report formats allowing automatic updating, and enhancing data availability across all EU Member States.

Nutrition Advice

- Contribute to develop dietary guidelines to address diet-related chronic metabolic diseases by considering specific foods and diets in addition to single nutrients and what changes are required to drive behavioural changes in dietary habits;
- Develop capacity (staff and knowledge) to address future requests on personal nutrition;
- Expand RA scope to include additional target groups, e.g. those with allergies and auto-immune diseases.

2. Knowledge, Data, People and Funding

Sub-Clusters: *Governance, Funding and Cooperation, People and Expertise; Data, Innovation and Technology*

Seventeen years following its establishment as a key actor in the European food safety regulatory framework, EFSA is embracing the updating of the General Food Law. This was brought about as a result of the evolving environment in which EFSA operates, the changing expectations of its customers and stakeholders, and the accumulation of lessons learnt through the delivery of its tasks. This review, based on a European Commission proposal, following a comprehensive fitness check and citizens' initiative requesting greater transparency, strengthens EFSA's role and its sustainability by bringing important changes to its *modus operandi* and governance, accompanied by a funding review.

Emerging Challenges and Trends



This reform comes amid numerous political developments at global and European levels, which are expected to have an influence on EFSA's role, in the medium and long term. Shifts in political priorities, such as to security, defence and migration, and other developments, such as Brexit, can have an important impact on EFSA, e.g. by influencing the availability of resources. But perhaps the most impactful will be the increasing focus of the EU Institutions to contribute to attainment of the UN sustainable development goals (SDGs), which requires greater collaboration within and between sectors. Such collaboration requires organisations and Member States to work together across traditional, institutional and professional boundaries, leveraging pooled resources and assets (competencies, knowledge, data, methods), with a clear focus on delivering cross-cutting outcomes. The lack of harmonisation in food safety standards at global level and the high costs related to the generation of new knowledge for the diverse areas of EFSA's remit, point to increasing opportunities provided by the Food 2030 research agenda. This underlines the need for strong partnerships with sister EU Agencies / Institutions and EU Member States, as well as further synergies with international actors. Policy developments are taking place even faster through changes linked to new technologies, scientific knowledge, expertise and the exponential growth in the availability of data and information. All of these are continuously disrupting EFSA's processes and ways of working. How can we keep up with innovation when public service organisations struggle to keep pace with the advancement of data and exposure sciences in a world spinning at internet speed?

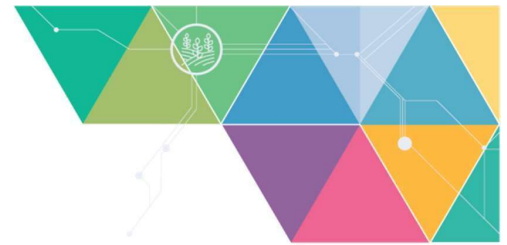
Attracting the right expertise for EU RA is expected to become even more challenging in the face of increasing competitiveness from the private sector, the increased sharing of knowledge generated outside the EU, including in emerging economies, and the imbalances in the availability of scientific RA capacity within the EU and internationally. Also, the ever-increasing mobility of people and knowledge, facilitated by digital technologies, presents unique opportunities to exploit both scientific expertise and any available "cognitive surplus" from "non-formal experts", i.e. people's time, energy, creativity, and generosity that leads to productivity, creation, and sharing.

The volume of data produced in the world is growing rapidly, from 33 zettabytes in 2018 to an expected 175 zettabytes in 2025¹. Furthermore, the way in which data is stored and processed will change dramatically over the coming 5 years. Today 80% of the processing and analysis of data takes place in data centres and centralised computing facilities, and 20% in smart connected objects (...)². By 2025 these proportions are likely to be inverted³. At the same time, there is an increasing amount of data from different sources (surveillance and controls, biomonitoring) that remain under-exploited in view of the lack of connectivity. Moreover, big data would be extremely valuable for EFSA if methods, competencies and tools were in place to harness and harvest this new data. While EFSA is already exploring approaches to manage and exploit big data sets, such as in whole genome sequencing, the scope and acceleration of the volume of data relevant to its RA remit has grown so large and complex that both new tools and new approaches are urgently needed to take advantage of them. Advances in computation capability and in biology and biotechnology (NGS⁶, CRISPR⁷), will shift 21st-century RA methods toward empirical whole plant or whole organism modelling to complement (or replace) traditional rational epistemological approaches to scientific RA. Cognitive analytics such as machine learning and natural language processing can discover patterns and relationships in information from millions of texts, books, online articles and

¹ IDC, 2018 report

² [European Strategy](#)

³ Gartner, 2017



other sources (e.g. social media), harvesting information that could take researchers (humans) decades to discover, retrieve and digest. These issues increase the relevance of managing transparency in the face of data ownership by Member States, confidentiality claims of applicants and overall conflicting provisions in existing legislation both at national and European level.

⁶ Next-generation Sequencing

⁷ Clustered Regularly Interspaced Short Palindromic Repeats



What is out there?

Challenges and Opportunities

Governance, Funding and Cooperation

- Sustainable development goals and the need for holistic approaches;
- Opportunity for sharing and pooling services and resources by cluster of Agencies (One Health approach);
- EU political developments and priorities influencing EFSA; opportunity of 178/2002 revision for budget and tasks, uncertainty from Brexit and large policy priorities;
- Food 2030 research agenda priorities in regulatory science and potential funding imbalances among the different areas of EFSA remit;
- **Global food safety standards and related RA methods not harmonised;**
- **Speed of change and continuous disruption vis-à-vis our processes: knowledge, information, people and technology.**

People and Expertise

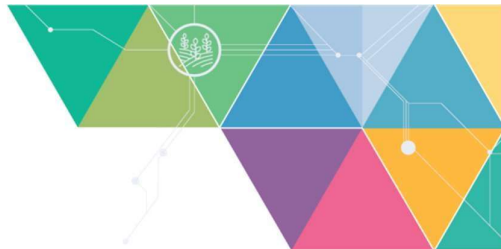
- Using technology to exploit the "cognitive surplus";
- **Potential loss of expertise in the EU and different levels of scientific RA capacity and expertise within the EU and internationally.**

Data, Innovation and Technology

- Data is increasingly available from different and new sources, use of big data and the potential of the "internet of things" (e.g. data from surveillance [official controls and nutri-vigilance], biomonitoring/biosensors, alternative data sources such as travel data);
- Potential of Artificial Intelligence and machine learning for RA;
- Regulation of data confidentiality, protection, privacy and intellectual property rights.

EFSA in 2019

The legislative framework has an impact on EFSA's capacity to adequately plan and allocate its resources. This is partly due to limited interactions between the EU institutions during the legislative process, as well as EFSA's total dependence financially on the EU budget. EFSA has taken important steps in recent years to counteract its limited resources and constrained ability to coordinate RA activities within the EU and internationally. It has forged shared strategies and shared services with its EU Sister Agencies, sought to build and share capacity with Member States and influence together the EU research agenda, and to ensure that resources are directed to the most added-value activities, based on mature performance-based frameworks. In doing so, it has developed new and impactful cooperation and outsourcing mechanisms (e.g. partnering and tasking grants), although there is still scope to better share work across the various Member States and EU partners according to their roles. EFSA's Strategy 2020 addresses the challenges of cooperation, collaboration and knowledge management through collaborative digital platforms that help to further standardise and automate routine tasks of the agency. These new digital collaboration platforms may increase efficiency and enhance cooperation, but do not exploit the new opportunities for maximising the access, use and sharing of available knowledge, expertise, information and data. Moreover, this poses the question on EFSA's role and preparedness in a wider ecosystem of distributed knowledge, both on the technological as well as the cultural dimension, such as with regards



to being too “inward looking” in a world which is becoming more inter-dependent, and also being too “rigid” with regards to adopting new technologies and innovation.

Even though EFSA’s current scientific production process ensures a sound level of multidisciplinary expertise, guaranteeing the involvement of Member State national authorities and experts in EFSA outputs, this system has important limitations impacting the organisation’s sustainability. Key issues include the availability of and attractiveness to “independent” regulatory science expertise and capacity in the Member States, and the low level of attractiveness for young scientists – and thereby the “latest expert knowledge”. EFSA has made important steps in analysing its expert base, developing an “attractiveness package” and a new talent sourcing strategy based on competences, while the measures included in the revision of the General Food Law addresses many facets of the challenges EFSA is facing.

The EFSA website, Journal, and Scientific Data Warehouse, are EFSA’s main “shop window” for stakeholders of the information EFSA publishes. While important strides have been made in the further structuring and opening of EFSA’s data enabling transparency and re-use, there have been considerable delays in the implementation of an e-submission approach to ensure the availability of structured data in the regulated products area; likewise, recent surveys indicate a limited awareness of EFSA’s open data platforms by potential users. Further limitations in fully exploiting and re-using the available data is insufficient data “literacy” in key areas at EFSA (what is available, what is needed, how it is used) combined with an underpowered computational capacity. Today more than half of the data needed and used in RA is not collected in the traditional data collection modes. While EFSA has started addressing this evolving challenge, much more needs to be done to address the speed with which raw data, big data, and multi-disciplinary data is needed in the RA processes. The EFSA 2020 strategy maintains a focus on innovation, collaboration, and on specific topics in big data, but this does not necessarily guarantee relevance for RA by 2027. Under all scenarios, EFSA’s current data collection and dissemination approach, constrained by the regulation and by agreements or lack thereof between Member States, will eventually undermine the relevance of its scientific output. Hence, EFSA is already cooperating with EU Sister Agencies and Member States in the quest to explore possible uses of artificial intelligence and machine learning. As EFSA achieves its strategic milestones, however, it is discovering that methodological and organisational capabilities are as equally important as the scientific and technological tools available (or in development). Data connection and semantic interoperability, for example, will require a significantly more coordinated approach between European institutions for the harmonisation of data management and modelling methods. A potentially more directive and coordinated approach from the EC may also be needed so that large data, open data, and their relevant methods are stitched together in increasingly multi-disciplinary approaches between entities that have until now operated vertically.

Where do we stand?

Strengths and Weaknesses

Governance, Funding and Cooperation

- **First steps in strengthened partnership with EU Sister Agencies, DG-JRC and EUAN towards common strategies and shared services; success stories with ECDC and ECHA;**
- **Agreed approach with Member States and EU Sister Agencies on influencing Research Agenda;**



- New cooperation/outsourcing mechanisms strengthening capacity building and preparedness (partnering and tasking grants) in place;
- EFSA at a crossroads, dwelling within its "identity": its evolving role, production model, and ambitions as a "knowledge hub" for methods, data and food safety RA science;
- EFSA's strengthened performance-based management system, in close cooperation with SANTE, EU Agencies and Institutions, increasingly supporting resource planning, negotiation and prioritisation;
- Limited scope to coordinate RA activities within the EU and internationally;
- Limited resources for R&D (knowledge generation) and innovation;
- EU Agencies' weak influence on multiannual financial framework and budgetary negotiations;
- EFSA's full dependence on EU budget, no own funding;
- Participation and engagement of Art. 36 list organisations in EFSA grants and procurements, not fully optimised/under-utilised;
- Inward looking culture, "hugging" of data, people and formulas, not open enough to new technologies and innovation. Key values of independence and excellence "misused" creating barriers to agility and innovation.

People and Expertise

- Solid but limited basis of domain and RA/regulatory science expertise, with different gaps among Member States (e.g. pesticides area); limited intelligence on the needed interdisciplinary competences;
- Lack of EU-coordinated strategies and unclear approach on capacity-building at European level; New processes to source, plan and manage competences and talents under development;
- Low competition among experts compared to the private sector, limited access to international expertise due to independence constraints, limited access to "new/young" expertise due to turnover rate and contractual options, and under-developed mobility and exchange programmes.

Data, Innovation and Technology

- EFSA is progressing towards an EU food safety RA hub on data, methodologies, tools and knowledge (scientific Data Warehouse, Knowledge Junction, EFSA Journal), but with limited awareness outside EFSA;
- EFSA in the lead in cooperation with EU Sister Agencies and Member States on the quest to exploring possible uses of artificial intelligence and machine learning;
- Insufficient data literacy in key areas, with weak computational capacity for full exploitation and re-use;
- First steps in interoperability but need for improved/wider data attractiveness, connectivity and access for data exchange/openness.

Emerging Futures

Looking to the future, EFSA would most certainly benefit from stepping-up co-creation with the European Commission, EU Sister Agencies, Member States and key international actors; spanning common governance mechanisms and shared strategies, all the way to shared resources and services. This enhanced collaboration could include advocating for the use of new funding mechanisms, e.g. levies, fees and charges, even if the latter may require further changes to the General Food Law and widespread reforms. Moreover, building on the recent



revision of the General Food Law, and taking advantage of new types of grants and optimised Art. 36 modalities, Member States could take on scientific tasks of an exploratory nature or routine tasks that have well-established methodologies and guidelines, including common RA priorities. Beyond the 178 review, EFSA could explore further process optimisation to address its current limitations and to support future legislative reviews, e.g. in the area of pesticides and the two-step review by Member States and EFSA. In this arena, strengthening the role and influence of regulatory science bodies along the various stages of the research cycle, together with Member States, EU Sister Agencies, DG-JRC, DG Research, and risk managers, could ensure a coordinated approach in R&D funding and optimise results and knowledge dissemination for regulated science purposes. This could be further accelerated via co-developing a (virtual) Research Platform supporting the wider research community and co-organising events to bring funders and scientific community together, fostering European Partnerships and consortium formation. Overall, it is worth exploring the extent to which EFSA can aim towards a role of a “knowledge hub”, i.e. leading and directly investing in preparedness for data analytics, new/harmonised methods and capacity building vs. that of a “knowledge broker”, thereby investing indirectly by building strong alliances on the above at the EU and global levels.

EFSA should exploit fully the new provisions of the revised General Food Law to increase the attractiveness for experts, e.g. by increasing the level of indemnities allocated to experts and/or to their employers and strengthen its sourcing model by increasing preparatory work done by Member States. EFSA could complement these by optimising the use of a wider international pool of expertise, e.g. by exploiting the available “cognitive surplus”, by tapping into non-formal experts (crowdsourcing) using global innovation platforms and implementing new methodological approaches for control of bias. Additional options could be explored in the longer term with DG SANTE, such as redefining the roles, responsibilities and competencies of staff, panel experts, Member States within the panel and pesticides systems. Beyond attractiveness, EFSA could further improve on the active scouting for additional and desirable competencies, anticipating emerging trends and risks that require different skills (developments in data require for example new roles such as data curators or bio-informaticians). To ensure the timely availability of critical competencies as they evolve the development and implementation of common/joint strategies with Member States, EU Sister Agencies and the European Commission, would be crucial. A joint investment in RA capacity building and knowledge acquisition and exchange via a digital interconnected virtual network of academic institutions and public sector bodies in the form of an “Academy”, could be one way forward.

The revision of the General Food Law has provided EFSA with a boost in its efforts to make available in a transparent way structured data in the regulated products area. Beyond this, EFSA could invest in strengthening data connectivity and interoperability, and by exploring in parallel centralised access management systems (i.e. “hub” concept) and real time distributed information systems (i.e. “broker” or “marketplace”). Addressing growing volumes of data via cognitive analytics and artificial intelligence will require significant efforts and funds, which underlines the importance of alliances with EU Sister Agencies, Member States, and international partners.



What could we do about it?

In summary, for EFSA to advance successfully in the management of knowledge and its constituents the new strategy should be clear on:

- How ambitiously should EFSA steer towards integrated strategies, work-programmes, joint-funding, shared services and research programmes for the one health approach? With whom (EU Agencies, Member States, International)?
- What potential “new/strengthened” roles of EFSA to explore in the knowledge management paradigm, “hub” (centralised, leading) vs broker/networker (decentralised, participating)? And in which areas: expertise and capacity building, data, methodologies?
- Should EFSA explore a dual operating model, with a focus on peer-review and knowledge production on the one hand, and knowledge management and exploitation on the other?
- Which priority towards exploring crowdsourcing and additional ways of avoiding bias to increase EFSA’s pool of expertise?
- Should EFSA investigate opportunities for new *modus operandii* (and related sourcing models) for the panel and pesticides models, via separation of preparatory work and peer review? i) Within the constraints of the revised General Food Law legislation and ii) Subject to future regulatory reviews?
- What priority should be given to exploring and investing on big data, cognitive analytics and artificial intelligence, given the uncertain and lengthy return on investment?
- Which type of partnerships/cooperation models to seek and with whom?
- Which capacity-building strategies? Within and outside Europe?

Governance, Funding and Cooperation

- Coordinated governance, strategies, work-programmes and provision of shared services with EC (SANTE, ENV, AGRI, RTD), ENVI Agencies and JRC and a strengthened harmonisation of RA methods internationally;
- Closer partnership with Member States and better coordination to address joint EU food safety priorities;
- Advocacy in close cooperation with SANTE (at European Commission and Parliament levels) i) about the sustainability and self-financing of the food safety model (e.g. levies, charge-back mechanisms) and ii) for adequate funding and enhanced workload prioritisation, underpinned by process efficiencies and mature performance-based frameworks;
- Strengthen the role and influence of regulatory science bodies along the various stages of the EU/Member States research cycle, together with EU Sister Agencies, DG-JRC, Member States and DG Research, ensuring a coordinated approach in R&D funding and results dissemination for regulated science purposes;
- Support the wider research community through a (virtual) Research Platform fostering European Partnerships and Consortium formation;
- Clarify EFSA's role, expectations, ambitions as a Knowledge Organisation/Hub (which products/services? what functions?) within the "One Health/One Environment"



ecosystem, in the short (General Food Law revision) and longer terms; explore potential to evolve beyond "independent" to "inter-dependent" via participatory RA;

- Use new processes, organisational design and technology addressing the General Food Law revision to become a more agile organisation while ensuring continuity in quality of products and services; explore with the EC, Member States and EU Sister Agencies further process optimisation to address current limitations and to support legislative reviews, e.g. in the area of pesticides.

People and Expertise

- Develop and implement with Member States, EU Sister Agencies and EC distinct strategies for building and sharing the RA vs domain expert competences and capacity;
- Increase the pool of expertise contributing to EFSA's work and exploit "cognitive surplus";
- Optimise the use of a wider international pool of expertise by implementing methodologies for control of bias, use of pre-defined protocols, separating the RA and review functions.

Data, Innovation and Technology

- Further develop interoperability with all actors in EFSA's ecosystem (health, environment) ensuring relevant knowledge is captured, accessed and used when and as needed; explore a dual strategy via a centralised access management system vs real time/event driven distributed information systems;
- Co-explore and co-fund with EU Sister Agencies and Member States, and across different sectors, tools to tackle growing volumes of data and cognitive analytics.

3. Society and Risk Communication

Sub-Clusters: *Communication, Engagement*

Emerging Challenges and Trends

Trends such as the rise of populism and national sentiment in the EU, coupled with the democratisation of information in a highly interconnected, global environment, are combining to affect the trust of citizens in institutions and the expectations that society places on regulatory science. Within the EU, food safety information needs vary significantly depending on socio-economic factors and geography. And food safety is just one piece of the puzzle – it influences consumer choices together with food quality, origin, taste, nutrient content, environmental impact, and price. As the revisions to the General Food Law indicate, more attention will be given to provide coherent, consistent and clear messages about food-related risks. This reinforces risk communication as a core part of the risk analysis paradigm, with its relevance arguably set to increase within today's information ecosystem.

At the same time, the call for transparency and openness places emphasis on the need for increased dialogue with society as part of risk analysis. Appropriate engagement strategies in RA and communication must take into account the positions of different stakeholders and ensure a balanced representation of all interested parties. There must be clarity and transparency on the process and the elements which stakeholders' contributions can inform in the risk analysis while safeguarding EFSA's scientific independence. Increasingly globalised markets speak to the importance of international cooperation in RA in the future and EFSA may



also need to adjust the way it interacts with the private sector to keep up with the pace of change and innovation in food production.

What is out there?

Challenges and Opportunities

Communication

- Interconnected, global information ecosystem (high amount and speed of available information);
- Proliferation and dissemination of false information;
- EU citizens have diverse food safety information needs;
- Food safety information needs to be complemented with other drivers of consumer choices (nutrition, health considerations, environmental impact, prices etc.),
- Consumers potentially taking more food safety responsibility;
- Potential of international cooperation in the area of risk communication and social science;
- Demand for timely service and cutting-edge technology use in regulatory science, creating an expectation gap.

Engagement

- Increasing expectations for transparency and engagement, coupled with General Food Law review provision for an Open EFSA;
- Dialogue with society needs to be part of the risk analysis process, while maintaining independence of science and RA and identifying/addressing potential bias.
- Globalised markets and innovation prompting more interaction with private sector and emerging countries;
- Rise of populism and nationalist sentiments and declining trust in institutions.

EFSA in 2019

As noted in the external evaluation of EFSA's Strategy 2020, the Authority is recognised for the quality of its scientific outputs and communication materials. The improvement of the editorial quality of scientific outputs was facilitated, *inter alia*, by migrating the EFSA Journal to a dedicated professional platform (Wiley online library). EFSA has also reviewed its approach to external relations by consolidating all competencies in the areas of communications, customer, stakeholder and media relations. Through the Communication Experts Network (CEN) EFSA proactively seeks communication synergies with Member States' authorities to strengthen consistency of information on food and feed safety. This approach ensures that messages are not provided in isolation, but provide a broader context that is meaningful to consumers and that explain the scientific basis for risk management measures. However, working with a model that relies on multipliers for the dissemination of its messages, and producing material that is not specifically targeted to EFSA's various audiences, will present challenges if the broader aim is to ensure more coordination in risk communications in the future. The fact that the existing network of food safety risk communicators in Europe, semi-formal in nature, includes actors with different levels of experience, approaches, and



roles and responsibilities adds further complexity in this respect. EFSA has already begun to address this challenge, integrating the discipline of social research into its communications to provide a better understanding of the information needs of those with whom it communicates. The recent publication of the “Guidance on communication of uncertainty in scientific assessments” by EFSA was guided by a working group which included social scientists in an effort to improve risk communication by taking account of evidence on the way people can best understand messages on uncertainties.

Social research insights may also have a positive spill-over effect for science, for example in determining how and when EFSA should engage with society during the RA process. The current stakeholder engagement approach provides a flexible and inclusive platform. However, the assumption that a pool of stakeholders working at EU level is representative of society at large is to be reviewed. Alternative or strengthened mechanisms to engage with consumers, food and feed businesses, the academic community and other interested parties may be required and should address some of the current weaknesses – such as the fact that stakeholders are not part of mandate framing or that the awareness of private-sector driven innovations occurs solely at application stage.

Where do we stand?

Strengths and Weaknesses

Communication

- Recognised quality of scientific outputs and communication materials;
- Established network of risk communicators in Member States and cooperation with Pre-Accession countries (semi-formal nature);
- Serving multiple audiences, sometimes through a one-size-fits-all approach, with four-language policy, relying on multipliers for message dissemination;
- Progressive build-up of social science expertise;
- Differences in experience, approach, roles and responsibilities between different risk communication actors;
- **Lack of systematic approach to managing fake news.**

Engagement

- Concerns regarding lack of transparency and independence of EFSA;
- Established stakeholder engagement approach (inclusive, targeted, and flexible);
- **Pool of stakeholders not always representative;**
- **Framing of mandates excludes stakeholders;**
- **Limited engagement with EU public at large;**
- **Relative low awareness of the EU food safety system; EFSA not always recognised as first point of reference for food safety;**
- **Awareness of private-sector driven innovations occurs at application stage.**

Emerging Futures

EFSA will be consulted in the development of the General Plan for Risk Communication, required under the revised General Food Law, which provides a strong incentive to enact change in the way it engages with society and communicates about food-related risks. There are several options that may be considered for improvement. For example, a more systematic use of joint campaigns with risk managers and other EU agencies may improve consistency or



messages and coordination on certain high-profile topics. There may also be value in cooperating with risk managers to present a single, non-fragmented source at EU level of food-related information, combining food safety facts with information on other factors that determine consumer choice such as nutrition or health considerations.

Developing a “society watch” to better understand risk perceptions would likely help EFSA produce more effective communication materials for its target audiences. To implement a more tailored approach in an efficient manner, the needs of different audiences and the required communication need to be considered. Capacity-building activities could help harmonise methods and standards among practitioners involved in risk communications on food, addressing weaknesses in the current system, as well as providing tools for use within existing education programmes on how to critically assess scientific information.

EFSA should continue to develop methods to strengthen engagement with stakeholders (civil society, industry, academia) starting from the framing of the questions and continuing throughout the process in forms of consultations, hearings, etc. Enhanced engagement could also focus on broadening the outreach – for example with consumer organisations at a national level or the academic community, or with specific sectors of the food and feed industry to ensure that EFSA anticipates upcoming innovation in advance and is ready when the time comes with appropriate scientific methodologies.

In summary, for EFSA to successfully advance in the areas of risk communication and engagement, the new strategy should be clear on:

- How to integrate food safety data with information on other factors affecting consumer choices?
- What priority should be assigned to communicating with different target audiences?
- How best to engage with EU public at large?

What could we do about it?

Potential Recommendations

Communication

- Participate in developing the “General plan for risk communication” as per revised General Food Law and design joint campaigns with wider outreach (with EC, Member States, EU agencies);
- Strengthen the risk communication network in the EU through capacity building activities;
- Set up jointly with the EC, Member States and other EU Agencies a non-fragmented EU source of information for food-related topics including food safety, nutrition, health and environmental impacts, food quality, traceability and prices;
- Set up a society watch to monitor risk perceptions, in collaboration with social science expertise in EC, Member States, EU Agencies and international organisations. Advocate for social research within EU research agenda. Invest in foresight activities to understand the future science communication landscape;
- Use evidence from social science to improve RA communication, including development of different products adapted to targeted audiences on high-profile/sensitive topics (with EC, Member States and EU Agencies);
- Scrutinise existing communication channels and products and invest in use of the latest technologies. Explore options for multi-language approach with EU Sister Agencies;



- Develop existing capabilities to provide tools that can be used by educators to enable citizens to evaluate scientific information critically (with EC, Member States and EU Agencies).

Engagement

- Develop methods to enhance engagement with stakeholders (civil society, industry, academia) starting from the framing of the question and continuing throughout the process in the form of consultations, hearings, etc.;
- Look to establish networks with consumer organisations at national level and widen the pool of stakeholders from academia;
- Review the approach for interaction with applicants and invest in engagement mechanisms where EFSA can gain better and more advanced awareness of private-sector driven innovations.

Chapter 3: The Next Steps

What are the recommendations and open questions to be addressed?

This foresight analysis of EFSA’s operating environment identified a number of drivers that simultaneously impact the food safety landscape from a variety of angles, e.g. environmental, technological, societal, political. Applying the SWOT approach across the different capabilities and resources of EFSA, resulted in the identification of several key insights on the organisation as a whole, which may be used in many ways for the streamlined preparation of the Strategy 2021-2027.

To facilitate this process, the options of “What could we do about it” presented in this chapter could drive the thinking as EFSA moves into the next step – the definition of strategic directions for its new strategy. In addition, some overarching questions have emerged to prompt discussions during this process.

These include:

- **In a new paradigm of RA which integrates nutrition, health, environment and sustainability aspects...**
To what extent should EFSA engage, build alliances, in the assessment of risks, benefits, impacts and options?
- **To be more efficient and better prepared...**
To what extent should EFSA invest in:
 - I. *New approaches and methodologies?*
 - II. *Big data analytics and artificial intelligence?*
 - III. *Crowdsourcing and widening its expertise base?*
 - IV. *Capacity-building and knowledge sharing?*



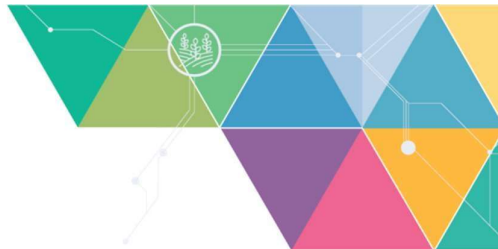
- In the context of the revised General Food Law requirement to develop a General Plan on Risk Communication...
To what extent should EFSA engage and communicate with different target audiences and exploit social science insights?

This section was presented to EFSA's Management Board in June 2019 to initiate the discussion on the findings and elicit views that could further help in developing a strategy that adequately prepared EFSA for and shaped the food safety environment of the next decade.



Section II - Changing Context Analysis

EFSA's Second Strategic Environmental Scan
November 2020



Introduction

Why perform a Changing Context Analysis?

After the discussion of the draft Strategy 2027 document by EFSA's Management Board (MB) in March 2020, EFSA and its MB decided to postpone the planned adoption of the Strategy 2027 for one year, due to the following reasons:

1. The current SARS-COV-2 outbreak, and its implications to the EU, which may affect the definition of 2027 strategic objectives.
2. The logistic limitations posed by the outbreak, which impede a structured involvement of all relevant stakeholders in the finalization of the EFSA 2027 Strategy and its implementation plans.

EFSA has continued to work on the Strategy definition process focusing on the assessment of how the changing context will impact the EU's policy, operational and financial environment and therefore EFSA's 2027 Strategy. The postponement of the Strategy Definition Process has provided EFSA with the opportunity to review the environmental scan undertaken in 2019.

The **Changing Context Analysis** objectives are:

1. Assess impacts of the SARS-COV-2 outbreak on the 2027 draft strategic and operational objectives;
2. Plan EFSA's contribution to the European Green Deal and other policy documents;
3. Plan EFSA's contribution to the new Commission's priorities for an EU innovation ecosystem and an EU health data space;
4. Align further with partners (and set common strategic aspirations);
5. Align with potential organizational changes linked to the implementation of the Transparency Regulation requirements.

Overview of the Changing Context Analysis

The Changing Context Analysis carried out a proximity mapping to identify the work areas mainly impacted by the new policy developments and the related opportunities or challenges for EFSA to address in the future, alongside EFSA's partners and within the context of the EFSA 2027 Strategy.

The Changing Context Analysis is a second Environmental Scan where new opportunities and challenges were identified for each work area and theme: therefore, the opportunities and challenges that were previously taken into consideration will not be included below as they have already been captured in the 2027 Strategy.

A literature review of several recent documents (both external and internal to EFSA) describing current and future policy and society landscapes (see Figure 1) were identified:

- **6 Work Areas** relevant to EFSA;
- **27 Themes**;
- **209 Opportunities and Challenges** (O&Cs) which could potentially be addressed through EFSA's work, where appropriate.



Why is it important to perform a Work Area analysis?

Performing a Work Area Analysis is important to understand whether the Strategic Objectives (SOs) of the EFSA 2027 Strategy will be impacted; how and whether there is the need to make changes to the draft Strategic Objectives.

What do the policy, external and internal documents call for?

The policy, external and internal documents are the starting point for the analysis. An overview of the overall document hierarchy can be found in figure 1 below. A Literature Review was not performed for all documents in the hierarchy presented. A brief description of each document is included in the annex.

A Literature Review was performed on 9 documents, the:

1. [EU Biodiversity Strategy for 2030](#): with measures to protect our fragile ecosystem.
2. [Farm to Fork Strategy](#): accelerating our transition to a sustainable food system.
3. [Sustainable Agriculture in the EU](#) through the [Common Agricultural Policy \(CAP\)](#).
4. [Sustainable industry](#) to ensure more sustainable and environmentally respectful production cycles, largely interlinked with the [EU Chemical Strategy](#).
5. Next Normal, Staff Survey post-covid, Science of Risk Communication



Figure 1: Document Hierarchy

Who was consulted in the process?

The draft and final consolidated chapter were prepared by the EFSA 2027 Strategy core team and extended to ENCO and the ED senior advisors. The Management Team was consulted and asked for inputs throughout the whole process, to approve the final version of the consolidated section.

Internal actors⁸ were consulted to:

⁸ See annex for full list of actors



- Analyze the list of Work Areas, themes and O&Cs and fine-tune them further.
- Indicate whether the O&Cs are potentially outside EFSA's Founding Regulation and whether they would need new or stronger partnerships.
- Define Expected Operational Results.

Work Areas

Below you will find **6** impacted work areas identified across the initial literature reviews performed:

1. Biological Risk Assessment;
2. Capacity Building, Data, Methodologies & Artificial Intelligence;
3. Chemical Risk Assessment;
4. Cross-Cutting Risk Assessment & New Strategic Measures;
5. New Technologies & Product;
6. Risk Communication, Engagement & Social Research.

The work areas were selected in line with the EFSA 2027 Strategy and to cover:

- EFSA core business activities;
- New areas of work/exploration;
- New partnerships/forms of engagement.

Each work area presents an overview based on what is expected from the European Commission, global policies and internal and external documents highlighting several relevant future themes to that work area. Both the themes and work areas present a clustering of the Literature Reviews performed in this exercise and the relevant concepts among the documents.

Under each theme, there is also a list of the O&Cs identified across the various documents. Additional information was then derived from various internal consultations to address whether the O&Cs are outside EFSA's Founding Regulation, whether they would require new or stronger partnerships (with who and how) and a list of Expected Operational Results was provided to address them.



1. Biological Risk Assessment

The Biological Risk Assessment Work Area presents **3** themes:

- **Animal Health / Welfare**
- **Microbiological Assessment / Zoonoses**
- **Plant Health**

As for **Animal Health/Welfare**, the EC will revise the **animal welfare legislation**, including on **transport** and **slaughter of animals**, to align it with the latest scientific evidence, broaden its scope, make it easier to enforce and ultimately ensure a higher level of animal welfare, taking into account interactions with other domains EFSA is working on and



other related EU policies (agri-food chain rules, environmental legislation and single market for food, feed and products thereof).

The Commission is also undertaking a review of the EU promotion programme for **agricultural products** to enhance its contribution to **sustainable production and consumption**. The review should focus on how the EU can use its promotion programme to support the most **sustainable, carbon-efficient** methods of **livestock production** (also through the usage of biotechnology). This would include the assessment of Animal's health as well via the assessment and the characterisation of the **animal's microbiome** and the **role of feed** on the animal's health and welfare: the role of nutritional quality and digestibility of animal feed may influence the gut microbiome. In this regard, OIE acknowledged animal health and welfare as two cornerstones for the global transition to sustainable, responsible and efficient livestock production models. An effect on the **immune response** may be expected related to **protein** quality/digestibility and availability of some **micronutrients**. Lastly, the EC will take several steps to crack down on **illegal wildlife trade**. This trade contributes to the **depletion or extinction** of entire species, is the world's fourth most lucrative black market and is thought to be one of the factors behind the emergence of **zoonotic diseases**. It is a human, economic and environmental duty to dismantle it and consider options for animal welfare labelling to better transmit value through the food chain.

For prevention and preparedness against **emerging animal diseases** (including vector-borne diseases), there is a continuous need explore the knowledge and new technologies (horizon scanning, citizen data, social science, etc.) currently used to make these data (from various sources such as MSs, reports, media, etc.) interpretable into meaningful information in a quick way to support **risk assessment** and to support measures to be taken to improve the ongoing **surveillance** and early warning systems against health threats.

As for **Microbiological Assessment/Zoonosis**, a straightforward link was not identified through the initial literature review, however, the theme was highlighted as very important during the MT discussion on 9/9/20. The aspirations for EFSA in this field are:

- The application of an integrated farm to fork RA approach for **microbiological hazards** that takes into consideration diverse farming and food production systems, including environmental factors, and based on a "One Health" approach.
- Evaluation of the impact of **international trade, human movements, circular economy** and **climate change** on the microbiological risks leading to the globalisation of food-borne diseases.
- Integration of **molecular data** (genomics, transcriptomics, proteomics and metabolomics) from enhanced surveillance schemes in microbial risk assessment (MRA), leading to more precise MRA and consequently more targeted risk management.
- Investigation of **microbial communities** and their interactions, metagenomics fingerprints and risk profiling, ecosystem characterisation, resistance and bacterial communities, influence of the environment in the microbial interactions.

The topic is embedded in the food systems re-thinking and farm to fork strategy discussions as the control of food intoxications is causing the largest burden of diseases in the EU population mainly due to viral intoxications and AMR.

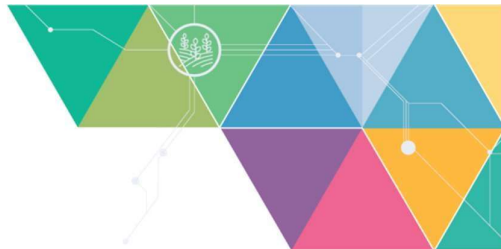


As for **Plant Health**, the EC has adopted rules to reinforce **vigilance** on **plant imports** and **surveillance** on Union territory. The sustainability challenge calls for measures to protect plants better from **emerging pests** and **diseases**, and for **innovation**. For prevention and preparedness against emerging pests and disease, innovation will be key for risk assessment, early detection and smart surveillance. For control of plant pests and diseases, the sustainability challenge calls for researching and strongly increasing application in farms and environment of biological control, integrated and smart pest and disease management and plant breeding for resistance to biotic and abiotic stresses.

1a. Opportunities and Challenges

Table 1: Biological Risk Assessment Breakdown

| Theme | Source | Opportunities & Challenges |
|------------------------------|-----------------------|--|
| Animal Health/Welfare | Farm to Fork | Opportunity for EFSA to provide advice during the revision of the new animal welfare legislation |
| Animal Health/Welfare | Farm to Fork | Long term opportunity for EFSA to provide advice on risk assessment for alternative (sustainable) methods of livestock production; covering classic safety as well as novel – environmental- factors |
| Animal Health/Welfare | Internal Contribution | Opportunity for EFSA to conduct joint and fast risk assessments by providing tools and output that translate data into information useful for RA. |
| Animal Health/Welfare | Farm to Fork | Opportunity for EFSA to further disseminate its reports on zoonotic diseases, to eventually support targeting of risk management steps |
| Animal Health/Welfare | Internal Contribution | Exploit the potential that crowdsourcing has based on social media analytics to report sentiment and actually reported wildlife trade. |
| Animal Health/Welfare | Farm to Fork | Opportunity for a new EC mandate on the welfare of fish on husbandry and transport to complement previous work on stunning and killing |
| Animal Health/Welfare | Internal Contribution | Opportunity to provide advice on risk assessment of illegal wildlife trade and related labelling. |



| Theme | Source | Opportunities & Challenges |
|--|-----------------------|---|
| Plant Health | Farm to Fork | Opportunity to highlight EFSA's contribution and work on plant health, which has become a key cornerstone for EU plant health preparedness and responsiveness to new plant pests, and to continue the plant health awareness-raising campaign started in 2020 with the International Year of Plant Health (IYPH) |
| Plant Health | Farm to Fork | Opportunity for EFSA (no EU legislation so far available in this area) to extend its work to the risk assessment for the EU of invertebrate biological control agents (BCA). With the push to farm and fork sustainability and the consequent changes in pesticides active ingredients availability, the application of invertebrate BCAs for control of plant pests will become a key component of smart and integrated pest management in EU agriculture and environment. However, there is currently no EU legislation available on the assessment and authorisation of invertebrate BCAs for control of plant pests at EU level and such processes are done by each MS following the national laws and the international guidelines. EFSA PLH Panel already conducted one plant health risk-benefit analysis for an invertebrate BCA and also provided recommendations for the risk assessment process of BCAs. |
| Plant Health | Internal Contribution | Opportunity for EFSA to influence DG Research programmes promoting the use of smart agriculture/earth observation data/climate data to better predict the impact on plant health and disease spread |
| Plant Health | Research Needs | Deliver tools to identify vulnerable systems for food production, susceptible to (multiple) pest and pathogens |
| Plant Health | Farm to Fork | Opportunity to explore innovative techniques, including biotechnology, to promote plant health by reducing the dependency on pesticides (the Commission is carrying out a study which will look at the potential of new genomic techniques to improve sustainability along the food supply chain) |
| Microbiological Assessment / Zoonosis | Internal Contribution | One of the major topics of F2F, Refit pesticides legislation is to increase the number of low-risk substances of which microorganisms are a major group. This would be an important opportunity for all the REPRO areas of EFSA linked to microbiological assessment. |
| Microbiological Assessment / Zoonosis | Internal Contribution | Long term opportunity for EFSA to provide advice on integrated/holistic microbiological risk assessment in the context of diverse farming and food production systems and based on a "One Health" approach. |
| Microbiological Assessment / Zoonosis | Internal Contribution | Opportunity to integrate WGS into surveillance programs (including AMR) and implement operational systems for sharing interoperable/comparable WGS data among the different partners in the food chain, ensuring WGS' consolidation on a common HPAC data lake and computational capability. |



| Theme | Source | Opportunities & Challenges |
|--|-----------------------|--|
| Microbiological Assessment / Zoonosis | Internal Contribution | Evaluation of the impact of international trade, human movements, circular economy and climate change on the microbiological risks leading to the globalisation of food-borne diseases. |
| Microbiological Assessment / Zoonosis | Internal Contribution | Integration of molecular data (genomics, transcriptomics, proteomics and metabolomics) from enhanced surveillance schemes in microbial risk assessment (MRA), leading to more precise MRA and consequently more targeted risk management. |
| Microbiological Assessment / Zoonosis | Internal Contribution | The application of an integrated farm to fork RA approach for microbiological hazards that takes into consideration diverse farming and food production systems, including environmental factors, and based on a "One Health" approach. |
| Microbiological Assessment / Zoonosis | Internal Contribution | Investigation of microbial communities and their interactions, metagenomics fingerprints and risk profiling, ecosystem characterization, resistance and bacterial communities, influence of the environment in the microbial interactions. |

1b. Legal framework implications (i.e. within/outside FR and sectoral legislation):

For **Animal Health and Welfare**:

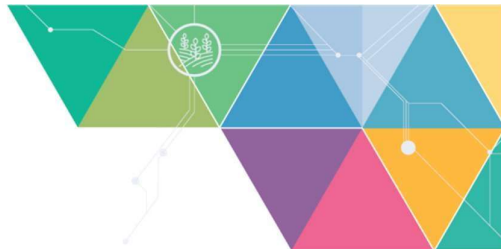
- The long-term opportunity for EFSA to provide advice on risk assessment for alternative (sustainable) methods of livestock production is *potentially/partly outside EFSA's Founding Regulation (FR)*;
- Contribution to the Fitness Check of the EC to evaluate the EU legislation applicable to the protection of the welfare of farmed animals.

For **Plant Health**:

- The opportunity for EFSA (not directly in the current remit) to extend its work on pest surveillance to the seeds is *potentially outside the Founding Regulation (FR)*;
- The opportunity for EFSA to extend its work to the risk assessment of Invertebrate Biological Control Agents, depending on the development of a new EU framework in the future;
- The opportunity for EFSA to address global changes scenarios, including climate change, in its quantitative pest risk assessment;
- The opportunity for EFSA to foster innovative techniques (such as image analysis in smart surveillance and text mining and machine learning in horizon scanning) to better support EU preparedness).

For **Microbiological Assessment/Zoonosis**:

- The long-term opportunity for EFSA to provide advice on integrated microbial risk assessment/holistic microbiological risk assessment is *fully within the FR*.



1c. Expected Results (considering what needs to be addressed and how to be addressed):

For **Animal Health and Welfare**

- Provided advice during the revision of the new animal welfare legislation;
- Further disseminated EFSA reports on zoonotic diseases, to eventually support targeting of risk management steps;
- Exploited social media analytics to report sentiment regarding actually reported wildlife trade;
- Enhanced partnerships and explore new ones with EU partners in the area of animal health and welfare: Veterinary authorities in 28 MSs, EC (DG Research, DG Santé, BTSF training), EFSA networks on data collection, EFSA's AHAW network, EU network of the veterinary reference laboratories, COPA COGECA, GFTADs, EMA, ECDC, Federation of Veterinarians (EU);
- Enhanced partnerships and explore new ones with International partners in the area of animal health and welfare: OIE, FAO, USDA, CFAI;
- Provided advice during the development of regulation for the labelling of alternative (sustainable) methods of livestock production alone or partnering with others in the area of animal health and welfare;
- Improved animal health data (to improve the fast collection (real-time) and translate data into information for RA) and welfare (new challenge – create a central database on welfare indicators (Animal-based measures)) in collaboration with EU MSs, OIE and EC;
- Provided advice regarding welfare of fish on husbandry and transport that reduces the carbon waste, complementing previous EFSA work on stunning and killing of animals to prepare for this with horizon scanning with the main stakeholders and proposing research programmes on husbandry that reduces the carbon waste;
- Provided advice to risk managers on risk assessment of illegal wildlife trade and related labelling.

For **Plant Health:**

- Delivered tools to identify vulnerable systems for food production, susceptible to (multiple) pest and pathogens;
- Enhanced partnerships and explore new ones with EU partners in the area of plant health: DG SANTE, DG RTD, DG ENVI, JRC, EEA, national agencies, Chief Plant Health Officers, National Plant Protection Organisations, EURLs;
- Enhanced partnerships and explore new ones with International partners in the area of plant health: FAO, IPPC, EPPO and other regional plant protection organisations, plant health bodies of partner/third countries such as USDA APHIS, CFIA, NZ MPI, etc.;
- Enhanced partnerships and explore new ones with stakeholders in the area of plant health: farmers and cooperatives; plants and plant products processing industry (e.g. fruit and vegetables, cereals, potato etc.); flowers, ornamentals sectors; plant nursery and plant seed sectors; forestry and wood industry; importers, traders and retailers' sectors;



- Explored fit for purpose and quantitative plant health risk assessment addressing global change scenarios to support EU food security, environment and agriculture sustainability;
- Set up an EU framework for assessment and authorisation of invertebrate biological control agents of plant pests that supports Farm to Fork sustainability;
- Fostered cooperation and innovation in horizon scanning (text mining and machine learning) to contribute to EU plant health preparedness;
- Explored innovative methodologies (from image analysis to statistical and risk-based survey planning) to further support EU smart surveillance of plant pests,

For **Microbiological Assessment/Zoonoses**:

- Provided advice on integrated/holistic microbiological risk assessment in the context of diverse farming and food production systems and based on a “One Health” approach;
- Examined the impact of international trade, human movements, circular economy and climate change on the microbiological risks leading to the globalisation of food-borne diseases;
- Explore the use as pesticides of low-risk substances of which microorganisms are a major group;
- Integrated molecular data (genomics, transcriptomics, proteomics and metabolomics) from enhanced surveillance schemes in microbial risk assessment (MRA), leading to more precise MRA and consequently more targeted risk management;
- Enhanced partnerships and explored new ones with EU partners in the area of Zoonoses: DG SANTE, DG RTD, DG ENVI, JRC, EMA, ECDC, EEA, national agencies, EURLs (Salmonella, STEC, Listeria, Campylobacter, foodborne viruses, TSE, AMR);
- Enhanced partnerships and explore new ones with global partners in the area of Zoonoses: WHO-FAO-CODEX, OIE, FDA, CFAI...;
- Enhanced partnerships and explore new ones with stakeholders in the area of meat/fish/egg/milk industry (production and processing), fruits and vegetables processing industry, rendering industry, farmers, veterinarians;
- Explored the role of WGS (changes in the genome over time and in space along with an epidemic) to follow and predict better the evolution (support measures during surveillance) for import risk assessment and spread of highly contagious diseases (Category A listed diseases);
- Improved food monitoring zoonoses data collection. This should be achieved in close collaboration with MSs. Identification of key indicators (food matrices) to be targeted, selection of methodologies to be used and planning of sampling (‘sample-based’ data collection that would allow linking the zoonoses data collection with the WGS data collection);
- Developed new approach in risk assessments which would be based on the entire food microbiome. Advanced predictive-microbiology models: microbiota profiling to predict the presence and behaviour of spoilage and pathogenic microorganisms in food. Prediction of behaviour of ecosystems. Considering information on the dynamics of microbial communities in the food product, the processing environment and the human microbiota upon infection, it has the potential to fine-tune the actual microbial risk assessments;
- Promoted deeper investigation in the area of foodborne outbreaks on the potential causes efforts to find the key factors triggering the illness and Identification and ranking of critical factors as a basis of effective control (risk management) options.



2. Capacity Building, Data, Methodologies & Innovative Tools

The Capacity Building, Data, Methodologies & Innovative Tools Work Area presents **4** themes:

- **Innovative Tools**
- **Capacity Building**
- **Data Selection, Access & Sharing**
- **Risk Assessment Methodologies**

As for **Innovative Tools**, the EC foresees **intensified cooperation** with society for risk assessment using **Artificial Intelligence** (primarily focused on machine learning) by real-time analysis of **big data** (incl. Internet of Things) to promote overall **efficiency** and **effectiveness** in the RA, communications and engagement processes. Furthermore, enabling the transition to a sustainable food chain will need to address **innovative interventions** such as precision farming, the use of artificial intelligence and blockchain, in line with the approach taken by the US FDA.

For what concerns **Capacity Building**, the EC will focus its **international cooperation** on **food research** and **innovation**. The EU will also support the global transition to **sustainable agri-food systems**. Through its external policies, the EU will pursue the development of **Green Partnerships** on sustainable food systems with all its partners in bilateral, regional and multilateral fora. This will include cooperation with **Africa**, neighbours and other partners and will have regard to distinct challenges in different parts of the world. Lastly, **common cores of expertise** will continue to be needed under different regulatory frameworks that fall under the remit of different agencies or other RA actors. Support **development programmes** to widen EFSA's expertise of Organisations in the Food and Health area and provide a **hands-on experience** both at a national and international level.

Speaking of **Data Selection, Access & Sharing**, the common European agriculture data space will enhance the **competitive sustainability** of EU agriculture through the processing and analysis of **production, land use, environmental** and **other data including Internet of Things capture**, allowing the precise and tailored application of production approaches at farm level and the monitoring of the performance of the sector, as well as supporting the carbon farming initiative. Secure distributed **data system connections** will enable dynamic data access to supplement or replace data collection. **Scientific data** for chemical substances are summarized in **OECD** harmonized templates and increasingly used in digital **IT formats** (e.g. IUCLID, FSCAP or SSD): further enhancements are foreseen in this area for the future.



Duplication of efforts may also occur in data generation because of the lack of awareness of what information is available and where and how the existing data can be accessed and used, therefore **further cooperation** is vital for future efforts (including also the implementation of EFSA Data Capital Governance with connection to EU-wide common data space development). Lastly, the EC will propose legislation to convert its Farm Accountancy Data Network into the **Farm Sustainability Data Network** to also collect data on the Farm to Fork and Biodiversity Strategies’ targets and other sustainability indicators. The network will enable the **benchmarking** of farm performance against regional, national or sectoral averages. Through tailored advisory services, it will provide **feedback** and guidance to farmers and link their experience to the European Innovation Partnership and research projects. This will improve the **sustainability** of participating farmers, including their incomes.

As for **Risk Assessment Methodologies**, they are the "recipes" of scientific assessments. Methodologies guide scientists through the scientific process by providing a **step-by-step framework** and further holistic approaches for the future need to be implemented in a partnered approach. Methodologies are also the basis for capacity building and the creation of a shared risk assessment culture across countries and jurisdictions, and thereby the production of harmonised and coherent risk assessment. This can be developed and enhanced through interoperability, common data space, digital ecosystem platforms and the value of pattern identification by AI which could enable prompts and alerts for unanticipated relationships (whether correlated or causative) for exploration. For transparency and harmonization, methodologies should be documented (“toolbox”) in a way, that reproducibility of results and applicability for future topics are guaranteed.

2a. Opportunities and Challenges

Table 2: Capacity Building, Data, Methodologies & Innovative Tools Learning Breakdown

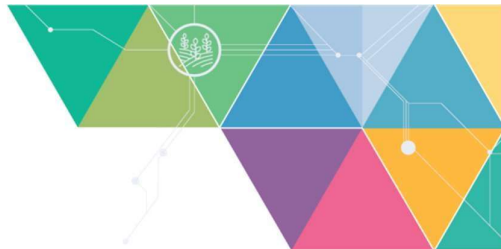
| Theme | Source | Opportunities & Challenges |
|--------------------------|-----------------------|---|
| Innovative Tools | Research Needs | Intensified cooperation with wider society and value provided by society for risk assessment using Artificial Intelligence (primarily focused on machine learning) by real-time analysis of big data (incl. Internet of Things), covered by wider efforts included under ART and IMP (including e.g. Dissemination Portal). |
| Innovative Tools | Internal Contribution | Opportunity to exploit AI applications in the context of comms and engagement, eg identify and tackle fake news, SoMe listening and engagement with online communities |
| Innovative Tools | Research Needs | Facilitate the paradigm shift in terms of gathering/accessing new data and re-engineering/making better use of available ones, covered by wider efforts included under ART and IMP (including e.g. Dissemination Portal). |
| Innovative Tools | Research Needs | Use crowdsourcing, operate real-time monitoring and signal alerts with help of appropriate big data analytical platforms to assess the effectiveness of interventions |
| Innovative Tools | Research Needs | Increased efficiency (in terms of time and human resources) in the data-to-evidence process (search, appraise, integrate) |
| Capacity Building | Farm to Fork | Opportunity for EFSA to promote the joint development of a capacity-building programme benefiting the key actors/facilitators of a food safety ecosystem e.g. sister |



| Theme | Source | Opportunities & Challenges |
|--------------------------|--|--|
| | | agencies, relevant national agencies and Art. 36 organizations, communication specialists in member states |
| Capacity Building | Internal Contribution | Opportunity to foster the relationship between knowledge management and capacity development, considering the role of “EFSA Academy” and the possibilities of a broader platform for EU capacity building for food safety. |
| Capacity Building | EU Biodiversity | Opportunity to further develop our (internal capacity building) work on microbiomes and their links to plant health, soil health, food safety, etc. |
| Capacity Building | Internal Contribution | Opportunity of large AI and computational capacity building, harmonisation and co-investment within HPAC |
| Capacity Building | Farm to Fork | Opportunity for EFSA to highlight its readiness to contribute to the development of food safety capacity with African Union |
| Capacity Building | Internal Contribution | Opportunity to architect a global OneHealth community designed to facilitate collaborative RA and RC, support RM decision-making and enable collaborative AI-based predictive analytics and traceability. |
| Capacity Building | EU Chemicals Strategy/One Substance - One Assessment | Common cores of expertise will continue to be needed under different regulatory frameworks that fall under the remit of different agencies or other RA actors; for instance, on specific toxicological end-points or mechanisms like genotoxicity, reproductive toxicity or endocrine disruption. It is critical for the smooth functioning of an overall harmonized RA framework that these expert groups are calibrated with each other. |
| Capacity Building | Internal Contribution | Opportunity to design interoperability into the processes of all the EU agencies involved in the development of common ontologies and dynamic connectedness to support the sharing of knowledge and analytical methods. |
| Capacity Building | DG Sante 3rd Inter-Agency Meeting | Equip and task EFSA and the JRC to comprehensively monitor global media (including social media) on food safety emergencies and intervene fast by providing science-based information to challenge misinformation. |
| Capacity Building | Internal Contribution | Equip and task EFSA and other HPAC agencies to effectively monitor all knowledge streams, not only Social. Need more accessible alerts and notifications within EU MANCP plan execution as an example – sporadic occurrences in individual countries may not be easily identified as connected but AI pattern identification across big data can direct expert consideration through event-driven architecture we are already building as part of ART. |
| Capacity Building | DG Sante 3rd Inter-Agency Meeting | EFSA to reinforce its role in crisis training of MS for risk assessment/communication (including an expansion of the BTSF scheme). |
| Capacity Building | DG Sante 3rd Inter-Agency Meeting | Create the legal basis for and task EFSA to establish crisis preparedness and response networks with Member States for the plant-, animal- and food-related diseases. Encourage (task) EU agencies to have one shared focal point per Member State. |
| Capacity Building | Farm to Fork | Opportunity to join forces with other organisations towards a more holistic approach on the assessment of pesticides and harmonisation of methodologies/greater coordination role |



| Theme | Source | Opportunities & Challenges |
|---|--|---|
| Capacity Building | Research Needs | Increased EU capacity for Agri-Food Technology impact assessment to anticipate impacts of food safety interventions |
| Capacity Building | SAPEA | Opportunity to continue work on intelligent food contact materials and biodegradable materials. Innovative technologies (nanotechnology) involved as well |
| Capacity Building | Research Needs | The mobility nature of the capacity building programme will ensure familiarity with different disciplines, for experts to acquire transdisciplinary expertise |
| Capacity Building | Research Needs | Ability to assess the safety and human and the environmental impact of technologies such as nanomaterials and synthetic biology |
| Capacity Building | Research Needs | Training programmes will widen the scientist's knowledge and provide hands-on experience in risk assessment and communication |
| Capacity Building | Internal Contribution | Opportunity to implement/modify an EFSA academy concept in terms of how education is to be implemented. |
| Data Selection, Access & Sharing | DG Sante 3rd Inter-Agency Meeting | Reinforce monitoring for plant and animal disease through syndromic surveillance and sentinel surveillance. |
| Data Selection, Access & Sharing | Farm to Fork | Opportunity for EFSA to explore possibilities to reuse these data in epidemiology research or research in specific work areas |
| Data Selection, Access & Sharing | DG Sante 3rd Inter-Agency Meeting | Strengthen access for EFSA to MS data in real-time and task EFSA to build capacity to constantly and systematically monitor data to detect signals of potential imminent crises (plant and animal health). |
| Data Selection, Access & Sharing | Research Needs | Establishment of a Research Platform on EFSA website, available for the wider food safety research community, aiming to support projects ideas, promote consortia formation. Opportunities for scientists to find food safety research funding. |
| Data Selection, Access & Sharing | DG Sante 3rd Inter-Agency Meeting | Collection of relevant data from food and feed inspections and collaboration between the Directorate F Health and Food Audits and Analysis and EFSA should be reinforced where appropriate . |
| Data Selection, Access & Sharing | DG Sante 3rd Inter-Agency Meeting | To support the foodborne outbreak investigation and AMR Monitoring, develop systems to allow immediate use of Whole Genome Sequencing data. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | IUCLID should be developed and made available as a central place to collect, store and provide access to all chemicals-related hazard data and classifications. An additional supporting element to achieving this would be if testing facilities carrying out regulatory studies would include the outcome in IUCLID format and attach the reports to it across regulation and applicants searches for all studies on certain substance or metabolite to be implemented. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | Ensure that all relevant evidence (e.g. peer-reviewed academic studies) is available and accessible for the assessment and decision-making processes. Proprietary industry data should be properly declared and registered and made available to relevant authorities. At the initiative of the European Parliament under the scheme of "Pilot projects and preparatory actions (PP/PA)", the Commission |



| Theme | Source | Opportunities & Challenges |
|---|---|---|
| | | (DG ENV) is carrying out a feasibility study on a common open platform on chemical safety data which looks at various use cases and will clarify the best options |
| Data Selection, Access & Sharing | SANTE HPAC – Project Portfolio and EFSA A14EU Roadmap | Increase data science and AI investment and capability in order to resolve complex large-data dependent problems in food safety. |
| Data Selection, Access & Sharing | Internal Contribution | Prioritise DG-SANTE/DIGIT/CNCT cross-domain data lake and shared computational capability to support significantly increased RA capability across environmental, disease and chemical domains |
| Data Selection, Access & Sharing | Internal Contribution | IPCHEM should be included in the section on data access and sharing. The opportunity is to make it the single point of access for and visualisation of European data on chemicals in food, feed and the environment |
| Data Selection, Access & Sharing | DG Sante 3rd Inter-Agency Meeting | EFSA to identify areas where data gaps exist related to rapid risk assessment for crisis response and to proactively put in place approaches for dealing with such data gaps (e.g. read-across methods, expert elicitation, uncertainty analysis, artificial intelligence etc.) |
| Data Selection, Access & Sharing | DG Sante 3rd Inter-Agency Meeting | Stronger coordination with EU reference laboratories is seen as a key part of the reinforcement of data production/collection, with EFSA providing oversight and coordination for those in the food safety area. Create a legal basis and task EFSA to steer / coordinate Food- and Animal Disease-related EU reference laboratories. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | Scientific data for chemical substances is summarised in OECD harmonised templates and increasingly used digital IT formats (e.g. IUCLID, FSCAP or SSD) |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | There's a general development towards open data and more specifically to develop the OECD chemicals knowledge base that would bring together international sources of standard as well as alternative data. Ultimately, this will bring benefits to all parties. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | Standardised IT formats and submission systems are not yet used across all legislations which is inefficient, can hamper data exchange and potentially even hide inconsistencies for authorities. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | Differences in data selection rules and practices exist (e.g. on how to take into account peer-reviewed academic studies) in different agencies and committees. Besides, different approaches towards input provided by third parties can play a role. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | There's no consistency in the extent to which all data used in the assessments are open for stakeholders and hence allow public scrutiny. Likewise, different approaches are used on how stakeholders can follow and/or participate in the deliberations of the scientific committees. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | In the future, it could be envisaged that the proposed common EU coordination registry would also link to the data supporting the original application as well as any other data collected in previous regulatory processes. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | A more comprehensive approach across the EU chemicals legislation, including through an open data policy and better |



| Theme | Source | Opportunities & Challenges |
|---|--|--|
| | | use of smart technologies, could improve the overall efficiency of the EU legal framework for chemicals. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | According to the principles of the Regulation (EC) 2019/1381 on the transparency and sustainability of the EU risk assessment in the food chain, it is stated that when EFSA is requested to provide a scientific output, it should know all studies performed by an applicant to support an application under Union law. To that end, Regulation (EC) 2019/1381 foresees that, when business operators commission or carry out studies to apply, they notify those studies to EFSA. The obligation to notify such studies also applies to the laboratories and other testing facilities carrying them out. Information about the notified studies is made public. This principle of mandatory notification of commissioned studies could be extended to other legislative frameworks. |
| Data Selection, Access & Sharing | EU Chemicals Strategy/One Substance - One Assessment | All scientific data and information supporting requests for authorizations or approvals under Union law, as well as other requests for scientific output, will be made publicly available in a proactive manner and be easily accessible as early as possible in the risk assessment process. This transparency principle could also be extended to other legislative frameworks. |
| Data Selection, Access & Sharing | Research Needs | Benefits of using blockchain technology along the food chain, including for supply chain monitoring and potential prevention of food fraud |
| Risk Assessment Methodologies | Research Needs | Develop and apply methodologies for the combined effects of risks and benefits into one overall assessment, using the same denominator (e.g. Disability Adjusted Life Years, cost-of-illness) |
| Risk Assessment Methodologies | Research Needs | Develop and apply methodologies for communicating on and informing risk managers on risk-benefit assessments, cost-benefit assessments, risk-risk comparisons and risk ranking endeavours |
| Risk Assessment Methodologies | Research Needs | Incorporate risk-benefits in the socio-economic analysis of alternative and sustainable production systems |
| Risk Assessment Methodologies | Research Needs | To integrate knowledge generated by the new technologies into risk assessment and regulatory processes |
| Risk Assessment Methodologies | Research Needs | Using standardised and validated analytical and sequencing methodologies and tailored tools to use Whole Genome Sequencing (WGS) analysis for risk assessment purposes |
| Risk Assessment Methodologies | Research Needs | Develop and apply cost-benefit assessment methodologies to assess costs associated with preventing risks and/or establishing benefits |
| Risk Assessment Methodologies | Internal Contribution | Consider the investments and capabilities and opportunities provided by an HPAC algorithm and data and computation platform for new methodologies |
| Risk Assessment Methodologies | EU Chemicals Strategy/One Substance - One Assessment | As part of EFSA's future chemical risk assessment strategy, the integration of new approach methodologies (NAMs) into the risk assessment paradigm, once internationally harmonized and accepted, will be a target of the new EFSA Strategy 2027. These include novel in-silico, in vitro and physiologically based modelling tools. Similarly, ECHA has in its strategic objectives a key focus on promoting alternatives |

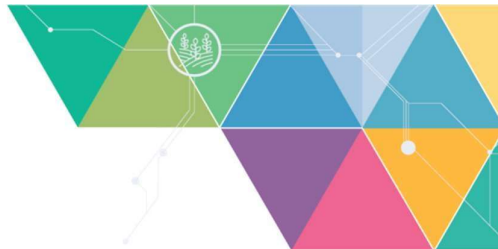


| Theme | Source | Opportunities & Challenges |
|--------------------------------------|--|--|
| | | to the testing of vertebrate animals (such as NAMs) in line with the underlying principles of the REACH regulation. Besides, a complementary initiative under the European Partnership on Chemical Risk Assessment (PARC) may be able to address regulatory research gaps from the chemical's strategy . |
| Risk Assessment Methodologies | EU Chemicals Strategy/One Substance - One Assessment | The transparency principle should cover also the methodological part of the risk assessments. In particular, for selected substances or group of substances covered under different regulatory frameworks, an upfront strategic planning or protocol, should be prepared, defining a priori the evidence needs and the approach for collecting, appraising and analysing data, for hazard identification, hazard characterisation and exposure assessment. The current EFSA and ECHA guidance documents cover these aspects in general but these may be possibilities for further development and harmonisation, in particular for developing critical appraisal tools for different kind of studies/data requirements. This will enhance the openness and transparency and the "regulatory usability" of the assessments. |
| Risk Assessment Methodologies | Internal Contribution | Consider the value of a data-driven risk management agenda. Predictive analytics across One Health domain could drive risk exploration priorities. |
| Risk Assessment Methodologies | EU Chemicals Strategy/One Substance - One Assessment | In general, data requirements need to be updated in a systematic and concerted way across different legislations to ensure risk assessments and risk management decisions are being made based on the latest scientific knowledge and technology. This includes, for example, applying new or revised chemical test methods and guidelines whenever these are considered appropriate for use in a regulatory context and the need to transition methodologies to data, computation and algorithmic assessment vs. procedural human oriented methodologies that are difficult to trace to source data. |
| Risk Assessment Methodologies | EU Chemicals Strategy/One Substance - One Assessment | The use of different methodologies for hazard identification/characterisation and exposure assessment will impact the "regulatory usability" of the risk assessments. Development of common methodologies and guidance on the hazard assessment, read-across, weight of evidence, exposure assessment, uncertainties, cumulative risk assessment, as well as the sharing of knowledge and expertise, need to be further promoted as it will facilitate the "mutual recognition" principle between agencies and the Member States and hence will avoid duplication of work and potential divergencies. |

2b. Legal framework implications (i.e. within/outside FR and sectoral legislation):

For **Capacity Building**:

- The Opportunity for EFSA to highlight its readiness to contribute to the development of food safety capacity with African Union is *potentially considered a stretch*;



- The Opportunity for EFSA to reinforce its role in crisis training of MS for risk assessment/communication is within EFSA remit;
- The Opportunity to create the legal basis for and task EFSA to establish crisis preparedness and response networks with Member States for the plant-, animal- and food-related diseases is within EFSA remit.
- The opportunity to encourage (task) EU agencies to have one shared focal point per Member State is outside EFSA remit;
- The opportunity of strengthened in-house bioinformatic capabilities *is inside FR*;
- Data literacy *is inside FR*;

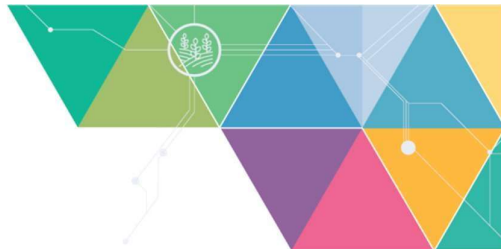
2c. Expected Results (considering what needs to be addressed and how to be addressed):

For **Innovative Tools**, in terms of:

- Exploited AI applications in the context of comms and engagement, e.g. identify and tackle fake news, SoMe listening and engagement with online communities;
- Increased efficiency (in terms of time and human resources) in the data-to-evidence process (search, appraise, integrate);
- Intensified cooperation with wider society and value provided by society for risk assessment using Artificial Intelligence;
- Facilitated the paradigm shift in terms of gathering/accessing new data and re-engineering/making better use of available ones, including considerations of an HPAC data lake, in collaboration with HPAC actors and MSs;
- Used crowdsourcing, operating real-time monitoring and signalling alerts.

For **Capacity Building**, in terms of:

- Ensured familiarity with different disciplines, for experts to acquire transdisciplinary expertise through the mobility nature of the capacity building programme;
- Promoted the joint development of a capacity-building programme benefiting the key actors/facilitators of a food safety ecosystem e.g. sister agencies, relevant national agencies and Art. 36 organizations, communication specialists in member states;
- Fostered the relationship between knowledge management and capacity development, considering the role of "EFSA Academy" and the possibilities of a broader platform for EU capacity building for food safety;
- Explored large AI and computational capacity building, harmonisation and co-investment within HPAC;
- Designed interoperability into the processes of all the EU agencies involved in the development of common ontologies and dynamic connectedness to support the sharing of knowledge and analytical methods;
- Improved the work on intelligent food contact materials and biodegradable materials. Innovative technologies (nanotechnology) involved as well;
- Increased EU capacity for Agri-Food Technology impact assessment to anticipate impacts of food safety interventions in a partnering approach;
- Improved the ability to assess the safety and human and the environmental impact of technologies such as nanomaterials and synthetic biology;
- Further developed internal capacity on microbiomes and their links to plant health, soil health, food safety, etc in partnership with JRC;



- Contributed to readiness to contribute to the development of food safety capacity in collaboration with African Union;
- A global OneHealth community is designed and developed to facilitate collaborative RA and RC, support RM decision-making and enable collaborative AI-based predictive analytics and traceability;
- Developed common training programmes for common core of expertise, which continued to be needed under different regulatory frameworks, in partnerships with ECHA;
- Promoted cross-participation of experts in expert groups across RA bodies
- Prepare EFSA for the future task together with JRC to comprehensively monitor global media (including social media) on food safety emergencies and intervene fast by providing science-based information to challenge misinformation;
- Prepare EFSA for the future task together with other HPAC agencies, to effectively monitor all knowledge streams, not only Social: need more accessible alerts and notifications within EU MANCP plan execution as an example – sporadic occurrences in individual countries may not be easily identified as connected but AI pattern identification across big data can direct expert consideration through event-driven architecture we are already building as part of ART;
- Reinforced EFSA role in crisis training for risk assessment/communication in partnership with CEN Network (including an expansion of the BTSF scheme);
- Established crisis preparedness and response networks with DG SANTE and Health Security Committee across Member States;
- Prepare EFSA to join forces with other organisations towards a more holistic approach on the assessment of pesticides and harmonisation of methodologies/greater coordination role;
- Enhance partnerships and explore new ones with all sister agencies and MSs in the terms of capacity building activities;
- Designed training programmes for scientists to widen their knowledge and provide hands-on experience in risk assessment and communication;
- Implemented/modified an EFSA academy concept in terms of how education in EFSA is to be implemented.

For **Data Selection, Access & Sharing**, in terms of:

- Reinforced monitoring for plant and animal disease through syndromic surveillance and sentinel surveillance;
- Explored the possibilities to reuse the data in epidemiology research or research in specific work areas;
- Strengthened access for EFSA to MS data in real-time and task EFSA to build capacity to constantly and systematically monitor data to detect signals of potential imminent crises (plant and animal health);
- Established a Research Platform on EFSA website, available for the wider food safety research community, aiming to support projects ideas, promote consortia formation. Opportunities for scientists to find food safety research funding;
- Reinforced the collection of relevant data from food and feed inspections and the collaboration between the Directorate F Health and Food Audits and Analysis and EFSA;
- Supported the foodborne outbreak investigation and AMR Monitoring, and developed systems to allow immediate use of Whole Genome Sequencing data;



- Developed and made available IUCLID as a central place to collect, store and provide access to all chemicals-related hazard data and classifications. An additional supporting element to achieving this would be if testing facilities carrying out regulatory studies would include the outcome in IUCLID format and attach the reports to it across regulation and applicants searches for all studies on certain substance or metabolite to be implemented;
- Ensured all relevant evidence (e.g. peer-reviewed academic studies) is available and accessible for the assessment and decision-making processes. Proprietary industry data should be properly declared and registered and made available to relevant authorities. At the initiative of the European Parliament under the scheme of "Pilot projects and preparatory actions (PP/PA)", the Commission (DG ENV) is carrying out a feasibility study on a common open platform on chemical safety data which looks at various use cases and will clarify the best options;
- Increased data science and AI investment and capability in order to resolve complex large-data dependent problems in food safety;
- Prioritized DG-SANTE/DIGIT/CNCT cross-domain data lake and shared computational capability to support significantly increased RA capability across environmental, disease and chemical domains;
- IPCHEM became the single point of access for and visualization of European data on chemicals in food, feed and the environment;
- Identified areas where data gaps exist related to rapid risk assessment for crisis response and proactively put in place approaches for dealing with such data gaps (e.g. read-across methods, expert elicitation, uncertainty analysis, artificial intelligence etc.);
- Improved coordination with EU reference laboratories reinforcing of data production/collection and providing oversight and coordination for those in the food safety area. Once created a legal basis, EFSA steers / coordinates Food- and Animal Disease-related EU reference laboratories;
- Used Scientific data for chemical substances, in collaboration with ECHA, EMA and OECD;
- Focused on a general development towards open data to develop the OECD chemicals knowledge base;
- Used standardised IT formats and submission systems;
- Harmonised data selection rules and practices (e.g. on how to take into account peer-reviewed academic studies) in different agencies and committees. Besides, different approaches towards input provided by third parties can play a role;
- Defined criteria for the extent to which all data used in the assessments are open for stakeholders and hence allow public scrutiny. Likewise, harmonised approaches are defined on how stakeholders can follow and/or participate in the deliberations of the scientific committees;
- Promoted a common EU coordination registry linking data;
- Set up a more comprehensive approach across the EU chemicals legislation through an open data policy and better use of smart technologies;
- Proposed extension of the "notification of studies" concept to other legislative frameworks;
- Made publicly available all scientific data and information supporting requests for authorizations or approvals under Union law;
- Explored the benefits of using blockchain technology along the food chain, including for supply chain monitoring and potential prevention of food fraud



For **Risk Assessment Methodologies**, in terms of:

- Developed and applied methodologies for the combined effects of risks and benefits into one overall assessment, using the same denominator (e.g. Disability Adjusted Life Years, cost-of-illness);
- Developed and applied methodologies for communicating on and informing risk managers on risk-benefit assessments, cost-benefit assessments, risk-risk comparisons and risk ranking endeavours;
- Incorporated risk-benefits in the socio-economic analysis of alternative and sustainable production systems;
- Integrated knowledge generated by the new technologies into methodologies and guidance;
- Used standardised and validated analytical and sequencing methodologies and tailored tools to use Whole Genome Sequencing (WGS) analysis for risk assessment purposes
- Developed and applied cost-benefit assessment methodologies to assess costs associated with preventing risks and/or establishing benefits;
- Examined the investments and capabilities and opportunities provided by an HPAC algorithm and data and computation platform for new methodologies;
- Integrated new approach methodologies (NAMS) into the risk assessment paradigm
- Applied transparency principles covering also the methodological part of the risk assessments;
- Explore/enhance the use of predictive analytics across One Health domain that could drive risk exploration priorities supporting a data-driven risk management agenda;
- Ensured methodology architected to allow for data, AI or algorithm platforms use by shifting from human to machine-enabled methodological approaches and computation;
- Developed searchable and comparable repository of risk assessment methodologies for hazard identification/characterisation and exposure assessment combined exposure to multiple chemicals.



3. Chemical Risk Assessment

The Chemical Risk Assessment Work Area presents **5** themes:

- **Chemical Risk Assessment Process**
- **Environmental RA**
- **Chemical Exposure Assessment & Risk Characterisation**
- **Hazard assessment (incl. hazard identification, dose-response analyses and classification)**
- **Soil**
- **Pesticides**



For the **Chemical Risk Assessment Process**, delineation of tasks and competencies is often clear but there are areas of **potential overlap**: this means that the same substance can be assessed by different bodies, depending on which **legislation** applies, with **different requirements** and **objectives**, possibly using **different data**, different methodologies and potentially leading to (perceived) diverging opinions. **Better governance** of the process and the division of tasks between different RA actors will reduce cases of overlapping and possibly inconsistent assessments.

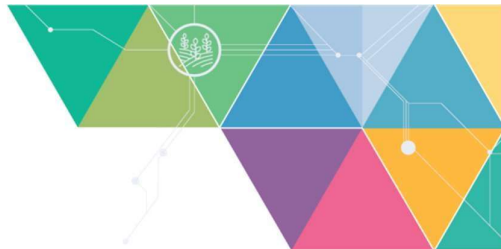
EFSA's pre-market **Environmental Risk Assessments (ERA)** of regulated substances/compounds or products aim to protect the environment. While the EU has made substantial progress on achieving environmental protection with the exiting ERA paradigm, **biodiversity** is adversely impacted by pesticides, biocides, pharmaceuticals, other hazardous chemicals, urban and industrial wastewater, and other waste including litter and plastics. Farmland birds and insects, particularly pollinators, are key indicators of the health of agroecosystems and are vital for agricultural production and food security. Their alarming decline must be reversed. Moreover, as part of the Commission's Zero Pollution Ambition for a **toxic-free environment**, a new **EU Chemicals Strategy for Sustainability** will be put forward along with a Zero Pollution Action Plan for Air, Water and Soil. Moreover, **pollution** is a key driver of biodiversity loss and harms our health and environment. While the EU has a solid legal framework in place to reduce pollution, greater efforts are still required.

In the various food sector areas, several **tools to support Chemical Exposure Assessment & Risk Characterisation** have been developed and used (e.g. Pesticide Residue Intake Model -PRIMO, Food Additives Intake Model -FAIM, Feed Additives Consumer Exposure calculator - FACE, Rapid Assessment of Contaminant Exposure - RACE). **Harmonisation** of exposure assessment tools (such as CHESAR, EUSES in ECHA) has begun and could be further explored. The EU chemicals strategy and OSOA call for avoiding **fragmentation, duplication** and **overlaps** across chemical risk assessment, and identify opportunities for expanded and better-informed assessments across the various regulatory areas.

As for **Hazard assessment (incl. hazard identification, dose-response analyses and classification)**, there is a need for **EU wide harmonisation**. The hazard classification of chemicals is performed centrally (in ECHA) in line with UN GHS standards, but there are certain **non-formalized processes** such as different EU bodies assessing hazard information and drawing conclusions on hazard endpoints, which is inefficient and may be diverging.

It is important to recognize that in frameworks like Biocidal Products Regulation -BPR- and PPP there are **"fixed" timelines** (approval and renewal) where hazard characterization must be established, in contrast to REACH and CLP.

As for **Soil**, the Commission will update the EU Soil Thematic Strategy (COM (2006) 231) in 2021. The Zero Pollution Action Plan for Air, Water and Soil that the Commission will also look at these issues while **soil sealing** and **rehabilitation of contaminated brownfields** will be addressed in the upcoming Strategy for a Sustainable Built Environment. Horizon Europe will also aim to develop solutions for **restoring soil health** and **functions**. Significant progress is also needed on identifying contaminated soil sites, restoring degraded



soils, defining the conditions for their good ecological status, introducing restoration objectives, and improving the monitoring of soil quality. Horizon Europe's Missions will significantly contribute to filling **knowledge gaps** and finding solutions to improve the health of ecosystems and their contribution to human health.

Lastly, for what concerns **Pesticides**, the EC will facilitate the placing on the market of pesticides containing **biological active substances** and reinforce the **environmental risk assessment** of pesticides. It will also act to reduce the length of the pesticide authorisation process by Member States.

The EC will also propose changes to the 2009 Regulation concerning **statistics on pesticides** (Regulation (EC) No 1185/2009) to overcome **data gaps** and promote **evidence-based** policymaking. Revision of the relevant implementing Regulations under the **Plant Protection Products** framework to facilitate placing on the market of plant protection products containing biologically active substances will also take place by Q4, 2021. A more sustainable EU food system also requires increasingly **sustainable practices** by our trading partners. For this reason, to promote a gradual move towards the use of safer plant protection products, the EU will consider, in compliance with WTO rules and following a risk assessment, to review **import tolerances** for substances meeting the **"cut-off criteria"** and presenting a high level of risk for **human health**. These substances may have an impact on human health and include substances classified as mutagenic, carcinogenic, toxic for reproduction or having endocrine-disrupting properties, Reg 1107/2009. The EU will engage actively with trading partners, especially with **developing countries**, to accompany the transition towards the more sustainable use of pesticides to avoid trade disruptions and promote alternative plant protection products and methods.

Furthermore, the Farm to Fork strategy will address the reduction in the use and risk of pesticides and support the wider implementation of **Integrated Pest Management**. This is also directly interlinked to reverse the decline in **pollinators** by 2030. As set out in the Farm to Fork Strategy, the Commission will take action to reduce by **50%** the overall use of – and risk from – chemical pesticides by 2030 and reduce by 50% the use of more hazardous pesticides by 2030. This must be supported by the full implementation of the EU Pollinators initiative ((COM(2018) 395)). By the end of 2020, the Commission will review the initiative and propose additional measures if necessary.

3a. Opportunities and Challenges

Table 3: Chemical Risk Assessment Breakdown

| Theme | Source | Opportunities & Challenges |
|---|--|---|
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | It is expected that any database would be fully compatible and accessible amongst agencies (EMA, ECHA, EFSA), EC and MSs. This is a must in this proposal. Legislative changes would need to be made allowing that the data submitted for one regulatory framework can be "shared" in different regulatory frameworks, respecting all business confidentiality rules. |



| Theme | Source | Opportunities & Challenges |
|---|--|---|
| Chemical Risk Assessment Process | Internal Contribution | Opportunity to consider and program HPAC pilots and proposed data lake with joint computational capability and data sharing and algorithm sharing |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | Simplifying the current set-up and streamlining the risk assessment processes among all relevant EU assessment bodies could make the functioning of the chemicals' legislation more efficient and more predictable. |
| Chemical Risk Assessment Process | EU Biodiversity | Opportunity to highlight EFSA's contribution to new Chemicals Strategy and opportunity to contribute to the formulation of new Chemicals Strategy |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | A more integrated and holistic view in assessing chemicals with similar hazard as a group could accelerate the pace of processes, lead to cost savings for industry and avoid regrettable substitution of chemicals by alternatives that are likely to be banned subsequently. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | The Commission could plan that safety assessments across Commission Scientific Committees and Agencies are to the extent possible, synchronized and priorities identified ensuring efficient planning of the risk assessment and risk management processes, possibly taking into account developments at international level. This would ensure coordination and cost-saving and enhance the predictability of authorities' interventions. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | In particular, for substances with multiple uses or for "groups of substances" the scope of the risk assessment should be set in a way that a holistic view on all the uses and their risks and the eventual needs for risk management action is achieved. In essence, this would imply that through a careful problem formulation phase carried out between the relevant commission services and responsible agencies, the breadth as well as the potential addressees of the hazard and/or risk assessment and/or necessary risk management measures are determined upfront. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | The use of the restriction instrument under REACH could be further examined to explore the more holistic assessment approach given that the restriction Title (VIII) under REACH covers all substances (including PPP and pharma) except for radioactive substances and a very limited list of specific uses of substances. Hence, the instrument exists which can make the best risk management proposal from a scientific and technical perspective covering risk management executed under REACH and other legislation (e.g. food contact materials, drinking water contact materials). This would mean that the Commission would provide a mandate (or a set of mandates to the relevant parties) that ensures that in the Annex XV dossier all relevant exposures are addressed and that during the drafting of the proposal full use is made of the expertise of the relevant parties and the data they obtain. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | In this scope, the ACT (Authority Coordination Tool) that is a supporting tool which provides an overview of the substance-specific activities that authorities are working on |



| Theme | Source | Opportunities & Challenges |
|---|--|--|
| | | under REACH and CLP Regulation, could be further developed for use by other EU agencies/committees. The development could happen in a staggered manner, progressively adding further legal frameworks to organically grow this into an EU coordination registry and its governance. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | The Authority Coordination Tool would support a 'common' problem formulation/mandate to ensure the depth of the hazard characterization, levels of uncertainty and timelines to fulfil the (legal) requirements in different areas of work-related with the assessment of chemical substances in the EU. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | The risk management process, which includes analysis of alternatives, risk management options and socio-economic consequences should be further expanded to address wider sustainability aspects of the production, use and end-of-life of chemicals and their related materials. This will strengthen chemical management systems within the EU's circular economy and farm to fork thinking. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | Another important aspect is to review the existing coordination mechanisms between Agencies and Commission scientific committees, implement the necessary improvements and where necessary to develop new ones whilst ensuring that progress within the individual regulatory frameworks is maintained. |
| Chemical Risk Assessment Process | EU Chemicals Strategy/One Substance - One Assessment | The better governance of the RA process and the division of tasks between different RA actors will reduce cases of overlapping and possibly diverging assessments. |
| Chemical Risk Assessment Process | Research Needs | Have indicators for 'chemical, microbial and overall safety' of food products, and for the sustainability of 'safe food production' |
| Chemical Risk Assessment Process | Research Needs | Incorporate knowledge from interindividual variabilities in metabolism and susceptibility in population-based assessment |
| Chemical Risk Assessment Process | Research Needs | Develop tools to consider protein toxicity and allergenicity Editorial: Food Safety Regulatory Research Needs 2030 |
| Environmental Risk Assessment | EU Biodiversity | Opportunity to highlight EFSA's contribution to new Chemicals Strategy and opportunity to contribute to the formulation of new Chemicals Strategy and further develop work in the area of ERA in particular Ecosystem services and Specific Protection goals |
| Environmental Risk Assessment | Internal Contribution | Opportunity to assess cumulative environmental effects resulting from exposure to multiple regulated substances/compounds or products, and stressors |
| Environmental Risk Assessment | Internal Contribution | Opportunity to develop and design tools and methods (including post-market environmental monitoring) for evaluating the efficiency of risk mitigation measures |
| Environmental Risk Assessment | Internal Contribution | Opportunity to develop a common currency for the assessment of environmental impacts |



| Theme | Source | Opportunities & Challenges |
|---|--|--|
| Environmental Risk Assessment | Internal Contribution | Opportunity to develop and implement the safe and sustainable by design concepts for regulatory ERA |
| Environmental Risk Assessment | Internal Contribution | Opportunity to formulate ERA issues/problems and (specific) protection goals holistically to address overall system impacts |
| Environmental Risk Assessment | Internal Contribution | Opportunity to assess environmental risks resulting from exposure to regulated substances/compounds or products at relevant levels of biological organisation (individual, population, community, ecosystem) and spatio-temporal scales |
| Environmental Risk Assessment | Internal Contribution | Opportunity to compare environmental risks of regulated substances/compounds or products with a range of alternative solutions |
| Environmental Risk Assessment | Internal Contribution | Opportunity to integrate regulatory ERAs in EU environmental impact and sustainability assessments, or policy assessments performed by relevant partners in the context of other regulatory frameworks/policies |
| Environmental Risk Assessment | Internal Contribution | Opportunity to develop more coherent, harmonised and interoperable regulatory ERA approaches |
| Environmental Risk Assessment | Internal Contribution | Opportunity to integrate of pre- and post-registration data of regulated substances/compounds or products, and other environmental monitoring, surveillance and pesticide/pharmacovigilance data |
| Environmental Risk Assessment | Internal Contribution | Opportunity to develop more coherent, harmonised and interoperable regulatory ERA approaches |
| Environmental Risk Assessment | EU Biodiversity | Opportunity for EFSA to contribute to developing a set of indicators for the progressive reduction of pollution and baselines to help the EC to monitor progress. |
| Environmental Risk Assessment | Research Needs | Develop landscape-based environmental scenarios (ideally in an HPAC models/scenarios platforms) for non-target organisms and the impact of regulated stressors, ideally in an HPAC models/scenarios platforms |
| Environmental Risk Assessment | EU Chemicals strategy/One Substance – One Assessment | Opportunity to enable cumulative end-to-end ERA via the integrated framework and hazard/exposure databases spanning the different regulatory frameworks |
| Environmental Risk Assessment | Farm to Fork | Opportunity to expand EFSA's work on ERA/improving environmental health goes hand in hand with ERA and reduction of pesticides; update of protection goals – EFSA contribution to the protection of biodiversity and further utilise the EFSA Data collections on chemical residues for analysis |
| Environmental Risk Assessment | EU Biodiversity | Opportunity to highlight EFSA's work and prominent contribution to pollinators' health |
| Environmental Risk Assessment | Research Needs | Deliver methods for assessing the environmental impact of new technologies. |
| Chemical Exposure Assessment & Risk Characterisation | EU Chemicals Strategy/One Substance – One Assessment | Where specialized exposure database and tools are developed and maintained in one agency or RA organisation, they should be used across regulatory frameworks and agencies. For example, residues (e.g. veterinary medicines) and environmental pollution. |



| Theme | Source | Opportunities & Challenges |
|--|--|---|
| Chemical Exposure Assessment & Risk Characterisation | Internal Contribution | Opportunity to make it the single point of access for and visualisation of European data on chemicals in food, feed and the environment |
| Chemical Exposure Assessment & Risk Characterisation | EU Chemicals Strategy/One Substance - One Assessment | For a given substance or family of substances, there is no systematic holistic assessment of all uses and exposures carried out, the lack of which can lead to fragmented and inconsistent conclusions and hampers the identification of the necessary risk management measures, in particular for substances that fall under various regimes. |
| Chemical Exposure Assessment & Risk Characterisation | EU Chemicals strategy/One Substance - One Assessment | Significant gaps still exist, for instance on the risks associated with human and environmental exposure to and emissions from substances in articles (e.g. consumer products) which is particularly important as the EU is in the process of shifting towards a more circular economy. Another example is dermal exposure in the workplace which is poorly integrated into risk assessment and the contribution to overall exposure is generally little understood. |
| Chemical Exposure Assessment & Risk Characterisation | EU Chemicals Strategy/One Substance - One Assessment | There are different approaches applied by different bodies regarding the generation and use of monitoring and biomonitoring data in their assessments which can lead to different conclusions. |
| Chemical Exposure Assessment & Risk Characterisation | EU Chemicals Strategy/One Substance - One Assessment | Develop criteria and introduce a sustainability assessment in risk assessments and risk management assessments to better guide sustainable uses of chemicals and reduce unsustainable uses. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Working practices have been set up to ensure consistency (e.g. between ECHA and EFSA on active ingredients for Plant Protection Product -PPPs). This working practice (Harmonised Classification and Labelling -CLH and PPP) could be taken up in other legislation to ensure more predictability in its application. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Develop a centralised EU repository or portal of curated health-based limit values (PNECs, DNELs, OELs, ADIs, TDIs etc). These curated values, derived or validated within the EU regulatory framework, should be available for reuse among EU RA actors. This could be developed as part of the common open platform on chemical safety data mentioned in paragraph 3.2. EFSA 'Open FoodTox' database is an example of such a repository of curated health-based values. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Where there is no formal harmonisation process, different EU bodies do assess hazard information and conclude hazard endpoints, which is inefficient and may be diverging. In that context, it's important to recognise that in frameworks like Biocidal Products Regulation -BPR- and PPP there are "fixed" timelines (approval and renewal) where hazard characterization assessments have to be established, in contrast, to REACH and CLP |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | Internal Contribution | Opportunity to have common guidance documents. At the moment the divergence stems from the availability of different guidance's among sectors (e.g. cfr guidance on uncertainty factors in ECHA and EFSA, or the fact that EFSA recommends using the BMD and ECHA still consider it as an alternative to the NOAEL. Another difference between the 2 |



| Theme | Source | Opportunities & Challenges |
|--|--|--|
| | | agencies is how carcinogenic and genotoxic substances are assessed). |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Hazard characterization assessments (e.g. setting of health-based limit/guidance values (PNECs, DNELs, OELs, ADIs, TDIs etc.) are also not centralised nor are the methods fully harmonised internationally and within the EU. Although several coordination mechanisms are in place, diverging views still can occur, due to different expert groups assessing the same/similar data. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | There's also no reference EU institution where formal confirmation of health-based limit values takes place. Depending on the scope of the underlying legislation, hazard assessments may be covering human health, the environment or both. Moreover, often related to the temporal relevance of the data requirements, there can be inconsistencies concerning the extent and way the assessments address 'new endpoints' such as endocrine disruptors (ED) or when assessing PBTs/vPvBs. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Considering that the hazard properties are not use specific, harmonization of the hazard assessment should preferably be centralized. A situation should be envisaged where one hazard assessment is developed which is subsequently used by other bodies in further risk assessment and risk management activities. It would make sense in terms of overall efficiency if the hazard assessment includes concluding on the C&L. In fact, for any substance that enters an EU assessment process, a harmonized classification should be established first. This process is informally piloted for active substances in PPP and Biocidal products but should be formalised and extended to other areas. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Develop an overarching approach on how the risks for specific vulnerable groups should be addressed in risk assessments. Reference to vulnerable groups should be systematic across different pieces of legislation and specificities for these groups (e.g. safety factors, exposure scenarios) should be addressed consistently. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | EU Chemicals Strategy/One Substance - One Assessment | Implement a coherent approach to the identification of PBTs/vPvBs and endocrine disruptors across all relevant Union legislation. Ensure where possible that one expert body assesses the information against one set of criteria common to all expert bodies. |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | Research Needs | Have means to identify emerging chemical and biological risks at the global level and propose prevention strategies (a social analysis platform, observatory, and/or crowdsourcing) |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | Research Needs | Identify potential hazards associated with antibiotic-resistant species present in food of non-animal origin and the environment |
| Soil | Research Needs | Understand the influence of soil and ecosystems for alternative and sustainable production systems |



| Theme | Source | Opportunities & Challenges |
|-------------------|-----------------------|---|
| SI | Farm to Fork | Opportunity to contribute EFSA's expertise and involve EFSA more in defining Green Deal research calls and R&I on food, microbiome and soil health |
| Soil | EU Biodiversity | Opportunities for EFSA to identify long term research activities linked to ERA and "soil health and food safety and security" |
| Soil | EU Biodiversity | Opportunity to improve guidance documents used to assess the risks on soil organisms (peer reviews of pesticides) |
| Soil | Research Needs | Opportunity for EFSA to contribute to objectives on (soil) nutrient access – link to EFSA work/MSs project on Ciguatera for example as access of nutrients is contributing factor to Ciguatera development |
| Soil | Research Needs | Opportunity for EFSA to partner with EEA on analysis of soil quality elements linked to food safety |
| Soil | Internal Contribution | Opportunity to liaise/contribute with the Global Soil Initiative (FAO) |
| Pesticides | Farm to Fork | Expand EFSA's role in the assessment of new pesticides or pesticide alternatives. (Access to new knowledge and partnerships would be needed.) |
| Pesticides | EU Biodiversity | Support the full implementation of the EU Pollinators initiative |
| Pesticides | Research Needs | Have a holistic approach on assessing the environmental impact of farming practices, crop threats (e.g. plant pests and diseases, climate change effects as droughts, floods etc.) and threat mitigation measures (e.g. PPP, resistant plant varieties, fertilisers, irrigation, etc.) to biodiversity and ecosystem services |
| Pesticides | SAPEA | A particularly contested technology is genetic modification (GM) of crops, including CRISPR technology, which has been documented to offer advantages such as improved yields, lower pesticide and herbicide usage, decreased tillage, and reduced fossil fuel use |
| Pesticides | Farm to Fork | EU decision will influence pesticide assessment in the whole world - hence further methods harmonisation with international partners presents another opportunity |
| Pesticides | Farm to Fork | Opportunity for EFSA to prepare for and enhance the risk assessment of biologically active substances used as pesticides and the opportunity to contribute to setting statistics on pesticides to overcome data gaps and promote evidence-based policymaking |
| Pesticides | Farm to Fork | Opportunity for EFSA to contribute to achieving goals/advertise its work through the contribution of assessing biological alternatives to pesticides and developing a methodology to assess biological substances |
| Pesticides | Farm to Fork | Contribute to pesticides reduction/sustainability targets through assessment of new technologies |
| Pesticides | Farm to Fork | Replacement of pesticides through e.g. biotech is viewed as controversial |



3b. Legal framework implications (i.e. within/outside FR and sectoral legislation):

For **Chemical Risk Assessment Process**:

- The division of responsibilities between EFSA and ECHA's concerning the Chemical Risk Assessment Process is *potentially outside EFSA's Founding Regulation (FR)*;
- The proposal of the database being fully compatible and accessible amongst agencies is *potentially outside EFSA's Founding Regulation (FR)*;
- Simplifying the current set-up and streamlining the risk assessment processes among all relevant EU assessment bodies is *potentially outside EFSA's Founding Regulation (FR)*;
- A more integrated and holistic view in assessing chemicals with similar hazard, risk or function is *potentially outside EFSA's Founding Regulation (FR)*;
- The possibility to expand the risk management process to address wider sustainability aspects of the production, use and end-of-life of chemicals is *potentially outside EFSA's Founding Regulation (FR)*;
- The possibility that better governance of the RA process and the division of tasks between different RA actors could reduce cases of overlapping and possibly diverging assessments is *potentially outside EFSA's Founding Regulation (FR)*.

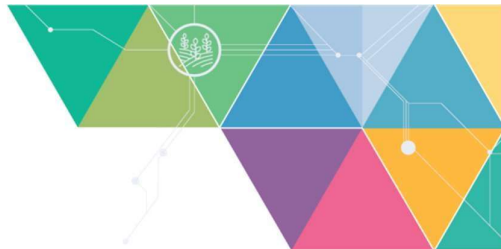
For **Environmental Risk Assessment**:

- The opportunity to enable cumulative end-to-end ERA via the integrated framework and hazard/exposure databases spanning the different regulatory frameworks is *potentially outside EFSA's Founding Regulation (FR)*;
- The opportunity to move to a systems-based approach that formulate environmental risk assessment issues/problems and associated protection goals holistically; address the cumulative effects of multiple regulated substances/compounds or products and stressors; analyse upstream and downstream life-cycle implications; evaluate a range of alternative solutions; involve a broad range of stakeholders; and use interdisciplinary scientific approaches.

3c. Expected Results (considering what needs to be addressed and how to be addressed):

For **Chemical Risk Assessment Process**:

- Applied a more integrated and holistic view in assessing chemicals with similar hazard as a group could accelerate the pace of processes in order to lead to cost savings for industry and avoid regrettable substitution of chemicals by alternatives that are likely to be banned subsequently;
- Incorporated knowledge from interindividual variabilities in metabolism and susceptibility in population-based assessment;
- Developed indicators for 'chemical, microbial and overall safety' of food products, and for the sustainability of 'safe food production';
- Developed tools to consider protein toxicity and allergenicity Editorial: Food Safety Regulatory Research Needs 2030;
- Provided a chemical database fully compatible and accessible amongst agencies (EMA, ECHA, EFSA), EC and MSs;



- Explored and programmed HPAC pilots and proposed data lake with joint computational capability and data sharing and algorithm sharing;
- Simplified the current set-up and streamlining the chemical risk assessment processes among all relevant EU assessment bodies;
- Contributed to formulate the new Chemical Strategy;
- Contribute to the Commission planning to ensure that safety assessments across Commission Scientific Committees and Agencies are to the extent possible, synchronized and priorities identified ensuring efficient planning of the risk assessment and risk management processes, possibly taking into account developments at international level. This would ensure coordination and cost-saving and enhance the predictability of authorities' interventions;
- Participated to a careful problem formulation phase carried out between the relevant commission services and responsible agencies, so that the breadth as well as the potential addressees of the hazard and/or risk assessment and/or necessary risk management measures are determined upfront;
- Examined the use of the restriction instrument under REACH;
- Developed the ACT (Authority Coordination Tool);
- Supported a common problem formulation/mandate through the ACT;
- Expanded the Chemical risk management process;
- Reviewed of the existing chemical coordination mechanisms between Agencies and Commission scientific committees;
- Applied better governance of the RA process and the division of tasks between different RA actors to reduce cases of overlapping and possibly diverging assessments.

For **Environmental Risk Assessment:**

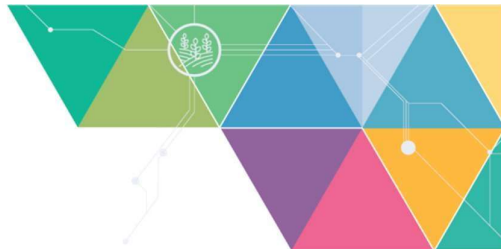
- Assessed cumulative environmental effects resulting from exposure to multiple regulated substances/compounds or products, and stressors;
- Developed and designed tools and methods (including post-market environmental monitoring) for evaluating the efficiency of risk mitigation measures;
- Developed common requirements for the assessment of environmental impacts;
- Developed and implemented the safe and sustainable by design concepts for regulatory ERA;
- Formulated ERA issues/problems and (specific) protection goals holistically to address overall system impacts;
- Assessed environmental risks resulting from exposure to regulated substances/compounds or products at relevant levels of biological organisation (individual, population, community, ecosystem) and spatio-temporal scales;
- Expanded EFSA's work on ERA/improving environmental health goes hand in hand with ERA and reduction of pesticides; update of protection goals – EFSA contribution to the protection of biodiversity and further utilize the EFSA Data collections on chemical residues for analysis;
- Enhanced EFSA's work and prominent contribution to pollinators' health;
- Delivered methods for assessing the environmental impact of new technologies;
- Further developed work on ERA in Ecosystem services and Specific Protection goals;
- A range of alternative solutions identified when compared with environmental risks of regulated substances/compounds or products;



- Brought together partners of relevant sectors across regulatory silos, and improved the cooperation on regulatory environmental risk assessment between these partners (e.g. national competent authorities/agencies, EU Member States, EU Agencies, Commission Services, policy makers, risk managers, risk assessors, scientific community and civil society);
- Developed a set of indicators or the progressive reduction of pollution and baselines to help the EC to monitor progress;
- Developed landscape-based environmental scenarios (ideally in an HPAC models/scenarios platforms) for non-target organisms and the impact of regulated stressors, ideally in an HPAC models/scenarios platforms;
- Enabled cumulative end-to-end ERA to accelerate the development of new/complementary tools and methods, and the uptake of innovative tools and methods for regulatory environmental risk assessment;
- Explored how to overcome the challenges of a fragmented regulatory/policy landscape
- Facilitated the transition to next generation, systems-based environmental risk assessment that addresses new policy targets and society needs;
- Integrated pre- and post-registration data of regulated substances/compounds or products, and other (environmental) monitoring, surveillance and pesticide/pharmacovigilance data;
- Facilitated the transition to next-generation, systems-based environmental risk assessment through the co-development of new and complementary tools and methods, and the sharing of data (including their findability, accessibility, interoperability, and reuse) and expertise, with the establishment of a EU-wide cross-disciplinary network of risk assessors and risk managers (e.g. community of practice).

For **Chemical Exposure Assessment & Risk Characterisation:**

- Contributed to the development of criteria to introduce a sustainability assessment in risk assessments to better guide sustainable uses of chemicals and reduce unsustainable uses;
- Developed and maintained specialized exposure database and tools in one agency or RA organisation and used across regulatory frameworks and agencies. For example, residues (e.g. veterinary medicines) and environmental pollution;
- EFSA became the single point of access for and visualization of European data on chemicals in food, feed and the environment;
- Systematic holistic assessment of all uses and exposures is carried out for a given substance or family of substances, so to avoid fragmented and inconsistent conclusions and hampering the identification of the necessary risk management measures, in particular for substances that fall under various regimes;
- Explored risks associated with human and environmental exposure to and emissions from substances in articles (e.g. consumer products) in the context of circular economy. Example is dermal exposure in the workplace which is poorly integrated into risk assessment and the contribution to overall exposure is generally little understood;
- Ensured alignment in approaches applied by different bodies regarding the generation and use of monitoring and biomonitoring data in their assessments to avoid reaching different conclusions.



For **Hazard assessment (incl. hazard identification, dose-response assessments and classification)**, in terms of:

- Identified potential hazards associated with antibiotic-resistant species present in food of non-animal origin and the environment;
- Developed an overarching approach on how the risks for specific vulnerable groups should be addressed in risk assessments;
- Provide advice to legislator that Reference to vulnerable groups should be systematic across different pieces of legislation and specificities for these groups (e.g. safety factors, exposure scenarios) should be addressed consistently;
- Implemented a coherent approach to the identification of PBTs/vPvBs and endocrine disruptors across all relevant Union legislation. Ensure where possible that one expert body assesses the information against one set of criteria common to all expert bodies;
- Developed means to identify emerging chemical and biological risks at the global level and propose prevention strategies (a social analysis platform, observatory, and/or crowdsourcing);
- Further developed working practices that have been set up to ensure consistency (e.g. between ECHA and EFSA on active ingredients for Plant Protection Product -PPPs- Harmonised Classification and Labelling -CLH and PPP) to be taken up in other legislation to ensure more predictability in its application;
- Developed a centralised EU repository or portal of curated health-based limit values
- Established hazard characterization assessments in the context of Biocidal Products Regulation -BPR- and PPP Framework "fixed" timelines;
- Developed common cross cutting guidance documents among sectors to avoid divergence stemming from the availability of different guidance's among sectors: (e.g. cfr guidance on uncertainty factors in ECHA and EFSA, or the fact that EFSA recommends using the BMD and ECHA still consider it as an alternative to the NOAEL. Another difference between the 2 agencies is how carcinogenic and genotoxic substances are assessed);
- Harmonised Hazard characterization assessments within the EU (e.g. setting of health-based limit/guidance values (PNECs, DNELs, OELs, ADIs, TDIs etc.);
- Harmonised hazard assessments (covering human health, the environment or both) and data requirements, to ensure consistency in risk assessment when addressing 'new endpoints' such as endocrine disruptors (ED) or when assessing PBTs/vPvBs;
- Harmonized classification of substances established prior to the hazard assessment, to ensure harmonised risk assessment and risk management activities. (This process is informally piloted for active substances in PPP and Biocidal products but should be formalised and extended to other areas).

For **Soil**:

- Examined the influence of soil and ecosystems for alternative and sustainable production systems;
- Further contributed to EFSA's expertise and involved EFSA more in defining Green Deal research on soil health;
- Identified long term research activities linked to ERA and "soil health and food safety and security";
- Improved guidance documents used to assess the risks on soil organisms (peer reviews of pesticides);



- Improved the understanding of soil as key element of Food Safety and Food Security;
- Developed the analysis of soil quality elements linked to food safety in partnership with EEA;
- Contributed to the Global Soil Partnership (FAO) and Global Soil Biodiversity Initiative.

For **Pesticides**:

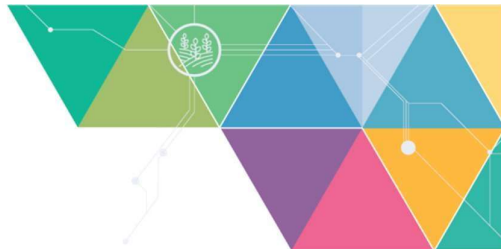
- Contributed to pesticides reduction/sustainability targets through assessment of new technologies;
- Expanded EFSA's access to new knowledge and partnerships through capacity building and the assessment of new pesticides or pesticide alternatives;
- Supported the full implementation of the EU Pollinators initiative;
- Enhanced the risk assessment of biologically active substances used as pesticides and contribute to setting statistics on pesticides to overcome data gaps and promote evidence-based policy making;
- Explored the possibility to include a technology as genetic modification (GM) which has been documented to offer advantages such as improved yields, lower pesticide and herbicide usage, decreased tillage, and reduced fossil fuel use, considering the consumers attitudes and perceptions (even if in Europe, the adoption of these technologies has been met with popular resistance);
- Analysed the replacement of pesticides through biotech to address concerns;
- Contributed to the harmonisation of methodology for the pesticides assessment at international level;
- Set a holistic approach on assessing the environmental impact of farming practices, crop threats and threat mitigation measures;
- Set a more holistic approach to the assessment of pesticides and methodologies used to assess biological substances, joining forces with other organisations.



4. Cross-Cutting Risk Assessment & New Strategic Measures

The Cross-Cutting Risk Assessment & New Strategic Measures Work Area presents **9** themes:

- **AMR**
- **Circular Economy**
- **Food Fraud**
- **Food Security**
- **Food Waste/Loss**
- **Nutrition**
- **One Health / Holistic RA**
- **Sustainable Food Systems**



Antimicrobial Resistance (AMR) linked to the excessive and inappropriate use of antimicrobials in animal and human healthcare leads to an estimated 33,000 human deaths in the EU/EEA every year, and considerable healthcare costs⁹. The Commission has also highlighted the need for **cooperation** measures both at the national and international level and the promotion of integrated cross-sector thinking to promote a One Health Approach. In June 2017 the Commission adopted the **EU One Health Action Plan against AMR**¹⁰. The **EU AMR One-Health Network** is chaired by the EC, includes government experts from the human health and animal health, the EU scientific agencies (ECDC, EMA, and EFSA) and Commission experts.

The EC plan foresees to take action to reduce overall EU sales of antimicrobials for farmed animals and in aquaculture by **50%** by 2030. Medicated feed is not in EFSA's Founding Regulation but within that of EMA. However, **additives** (e.g. probiotics) that will be used as **alternatives to antimicrobials** will be of higher importance, and therefore collaboration between agencies and with industry is necessary. Furthermore, since the reduction of the use of antimicrobials may have serious consequences for animal welfare, a **risk-benefit analysis** is needed.

Advancing our knowledge on the **spread of resistant bacteria** and **resistance determinants** within and between sectors (humans, animals (domestic, wild), plants/crops, environment, food products, in line with One-Health Approach). Further advice on **improving antimicrobial use**, on enhanced **global AMR surveillance**, improvements on **animal husbandry**, and alternatives to antimicrobials. The use of **WGS** would result in extra information on the nature and localization of the resistance determinants, affecting their **dissemination potential** by horizontal gene transfer and their contribution potential to the burden of AMR in humans, as well as the early detection of **emerging resistant clones** and emerging **resistance determinants**.

Speaking of **Circular Economy**, the EC calls for applying the circular model along the whole **food supply chain**, from production to consumption, including processing and transport. **Systems thinking** should be applied, ensuring that for example recycling is sustainable given among other users of energy, water and other costs.

The transition from linear to circular, sustainable food systems, the interface between science, technology, environment, economy and society is likely to become **increasingly significant** in policy debates about the future of food, including consumer responses to novel technologies. Yet, the circular bio-based economy is still largely **untapped potential** for farmers and their cooperatives. For example, advanced biorefineries that produce bio-fertilisers, protein feed, bioenergy, and bio-chemicals offer opportunities for the transition to a climate-neutral European economy and the creation of new jobs in primary production.

Circular economy **principles** (based on valorising food production and reducing consumption of finite resources), such as those applied to food waste management, could help with the transition to a more sustainable food system. Introducing circular principles in the food

⁹ https://ec.europa.eu/health/antimicrobial-resistance/eu-action-on-antimicrobial-resistance_en

¹⁰ https://ec.europa.eu/health/sites/health/files/antimicrobial_resistance/docs/amr_2017_action-plan.pdf



system could deliver significant **economic advantages**. Indeed, it could lead to savings of up to €420 billion in Europe by 2030.

Food Fraud jeopardizes the sustainability of food systems by **deceiving consumers** and preventing them from making **informed choices**. It undermines **food safety, fair commercial practices**, the **resilience** of food markets and ultimately the **single market**. The EC will work with Member States, Europol and other bodies to use EU data on **traceability** and alerts to improve **coordination** on food fraud. It will also propose stricter **dissuasive measures**, better **import controls** and examine the possibility to strengthen coordination and **investigative capacities** of the European Anti-Fraud Office (OLAF). Moreover, in parallel to changes in agriculture, the shift to sustainable fish and seafood production must also be accelerated. Indeed, the proposed revision of the EU's **fisheries control system** will contribute to the fight against fraud through an enhanced traceability system and the mandatory use of **digitalized catch certificates** will strengthen measures to prevent illegal fish products from entering the EU market.

Speaking of **Food Security**, the EU will enable the transition to a sustainable European Union food system that safeguards food security in the face of climate change and biodiversity loss. The current SARS-COV-2 pandemic has no connection on food safety in the EU, however, there is an impact on food security. The Commission will continue closely monitoring food security, as well as the **competitiveness of farmers** and **food operators** and step up its **coordination** of a common European response to crises affecting food systems to ensure food security and safety, reinforce public health and mitigate their socio-economic impact in the EU. It will also assess the **resilience** of the food system and develop a **contingency plan** for ensuring food supply and food security to be put in place in times of crisis.

As per **Food Waste**, misunderstanding and misuse of date marking ('use by' and 'best before' dates) lead to food waste. The EC is committed to **halving per capita food waste** at retail and consumer levels by 2030. It will use the **new methodologies** for measuring food waste and the data expected from Member States in 2022 and it will set a baseline and propose **legally binding targets** to reduce food waste across the EU. Lastly, the EC will integrate food loss and waste prevention in other EU policies.

For what concerns **Nutrition**, reversing the rise in overweight and obesity rates across the EU by 2030 is critical. The EC will seek opportunities to facilitate the shift to **healthier diets** and stimulate **product reformulation**, including by setting up nutrient profiles to restrict the promotion (via nutrition or health claims) of foods high in fat, sugars and salt by Q4 2022. Moving to a more **plant-based diet** with less red and processed meat and with more fruits and vegetables will reduce not only risks of **life-threatening diseases**, but also the **environmental impact** of the food system. The EC also foresees the provision of **clear information** that makes it easier for consumers to choose healthy and sustainable diets will benefit their health and quality of life and reduce **health-related costs**. To empower consumers to make informed, healthy and sustainable food choices, the Commission will propose **harmonised mandatory front-of-pack nutrition labelling**.



For what concerns **One Health/Holistic RA**, the EU will enhance its support to global efforts to apply the One Health approach, which recognizes the intrinsic connection between **human health, animal health and healthy resilient nature/environment**. The One Health agenda offers a potential model for more **integrated cross-sector thinking**.

Lastly, a **Sustainable Food System** must ensure enough and varied supply of safe, nutritious, affordable and sustainable food to people at all times, not least in times of crisis. Drawing on the lessons learned, the Commission will assess the **resilience** of the food system and develop a **contingency plan** for ensuring food supply and food security to be put in place in times of crisis. The EC will make a legislative proposal for a **framework** for a sustainable food system before the end of 2023 looking at the mainstream sustainability in all food-related policies and to strengthen the resilience of food systems. Furthermore, the Commission will work on **common definitions and general principles and requirements** for sustainable food systems and foods. To improve the availability and price of sustainable food, and to promote healthy and sustainable diets in institutional catering, the Commission will determine the best way of setting **minimum mandatory criteria** for sustainable **food procurement**. It will also review the **EU school scheme** to enhance its contribution to sustainable food consumption and to strengthen educational messages on the importance of healthy nutrition, sustainable food production and reducing food waste.

4a. Opportunities and Challenges

Table 4: Cross-cutting Risk Assessment & New Strategic Measures Breakdown

| Theme | Source | Opportunities & Challenges |
|---------------------------------|-----------------------|---|
| Antimicrobial Resistance | Internal Contribution | Opportunity for new mandates(s) on medicated feeds (risk assessment, risk – risk, risk-benefit) |
| Circular Economy | Internal Contribution | Cooperation with EEA, JRC, DG-ENV, FAO, MSs, industry is required. Implement stakeholders identification and engagement protocols. |
| Circular Economy | Farm to Fork | Opportunity for EFSA to prepare for new mandates assessing feed safety and efficacy for these products |
| Circular Economy | Internal Contribution | Opportunity to work with farmers to support and incentivise the transition to circular economy practices |
| Circular Economy | Internal Contribution | Opportunity for EFSA to contribute to EU Circular Economy strategies by stressing the need of food/feed safety by design |
| Circular Economy | Internal Contribution | Strengthen foresight tools in cooperation with JRC, EEA and DG-ENV (TIM, FORENV); |
| Circular Economy | Internal Contribution | Designing principles and strategies to ensure consistency and integration between the overarching policy agendas (sustainability, green deal, circular economy, zero pollution, biodiversity) and sectoral policies for environment and food/feed safety. |
| Circular Economy | Farm to Fork | Many of the aspects affecting food waste are in the hands of risk managers and food business operators. Assessment of risks related to use and reuse of former food of animal and non-animal origin and animal by-products into the feed and food chain in the context of circular economy |



| Theme | Source | Opportunities & Challenges |
|---------------------------------|-----------------------|--|
| Circular Economy | SAPEA | Livestock production contributes to food waste and impacts public health (meat consumption). Alignment of environmental and health goals is therefore required across all sectors. |
| Circular Economy | Internal Contribution | Opportunity for EFSA to expand its current risk assessments to include "end to end" food system considerations |
| Circular Economy | Internal Contribution | Identify challenges for Risk assessment (risk-risk, risk-benefit; accumulation of contaminants; life cycles assessments etc.) |
| Food Fraud/Food Security | Farm to Fork | Opportunity for EFSA to contribute to specific cases, where fraud has involved a known safety risk at a scale likely to affect "many" consumers or vulnerable population groups or is thought to entail emerging risks. At any rate, the terms of reference need to be clear and compatible with the remit of EFSA. |
| Food Fraud/Food Security | Farm to Fork | Opportunity for EFSA to better define the data requirements and risk evaluation for non-compliances (RNew RASFF). |
| Food Fraud/Food Security | Farm to Fork | Opportunity to link with work being led by the JRC and Europol |
| Food Fraud/Food Security | Farm to Fork | Long term opportunity for EFSA to get involved, contribute and influence the contingency plan for elements linked to food safety / food security |
| Nutrition | Farm to Fork | Opportunity for EFSA to provide advice to EC on the formulation of nutrient profiles in the context of front-of-pack labelling |
| Nutrition | Farm to Fork | EFSA data on food consumption could be used to establish a baseline of the food and nutrient intake in the EU. The outcome could be useful in identifying which shifts in the overall diet could have a quick positive impact on consumer and environment (sustainability parameters). |
| Nutrition | Farm to Fork | EC encourages to move towards a more plant-based diet with less red and processed meat. Animal and vegetal protein production have a different impact on the environment determinants. The quality of the protein is also different and so might be the relationship with health. Assessing the impact on all dimensions, EFSA could provide advice to help formulating recommendations for adequate intake of protein that not only meets nutrient requirements, but also has positive or neutral impact on health and low impact on environment. |
| Nutrition | Research Needs | Shift attention towards overall dietary patterns and role of specific foods on disease prevention |
| Nutrition | Research Needs | Anticipate how social changes (e.g., consumer choices, migration, personalised nutrition) drive changes in exposure patterns, and choices in diets that may constitute new hazards |
| Nutrition | Research Needs | Support personalised nutrition, while providing an assessment of nutrient intake and nutritional status across different populations, including migrants |
| Nutrition | SAPEA | Opportunity to use certificates and labels (e.g. traffic-light labelling) to increase the effectiveness of both nutritional |



| Theme | Source | Opportunities & Challenges |
|---------------------------------|-----------------------|---|
| | | and 'carbon footprint' information and encourage sustainable consumption practices |
| Nutrition | Farm to Fork | Need to better understand what the new nutrient profiles should entail. The previous effort revealed considerable distances among the various actors. |
| One Health/Holistic RA | Farm to Fork | Opportunity to further increase EFSA's contribution to One Health objective closely linked with objective of increased cooperation with other Agencies and organisations (considering the link to DG-SANTE and HPAC governance) |
| One Health/Holistic RA | EU Biodiversity | Opportunity to promote EFSA's role in data collection on important One Health domains, e.g. animal health (SIGMA). (Interlinking data sources and improving system interoperability would be important.) |
| One Health/Holistic RA | EU Biodiversity | Opportunity to highlight EFSA's potential in providing scientific advice in international fora (e.g. EFSA's support to EC's role in Codex Alimentarius, OIE, WHO, FAO ...). |
| One Health/Holistic RA | EU Biodiversity | Opportunity for EFSA to strengthen, together with the Commission, the "scientific diplomacy" potential, e.g. by contributing to scientific or institutional capacity development of international partners. |
| Sustainable Food Systems | Farm to Fork | Opportunity for EFSA to provide advice for setting sustainability goals and indicators in the specific legislative areas (e.g. animal welfare, pesticide use, environment management, fertilisers and water etc.). |
| Sustainable Food Systems | Farm to Fork | Opportunity for EFSA to contribute to the "common definitions" the EC refers to and therefore to contribute to creating a sustainable food system |
| Sustainable Food Systems | SAPEA | Establishing systems to secure support for, and extend the availability of, spaces for experiential learning about sustainable food systems are required. |
| Sustainable Food Systems | EU Biodiversity | Opportunity to work with farmers to support and incentivise the transition to fully sustainable practices. |
| Sustainable Food Systems | Internal Contribution | Assess the efficacy of different agricultural practises/measures in-field and off-field at the landscape scale, supporting the development of appropriate modelling tools in order to identify the best strategy to maximise production and conserving biodiversity at the same time. This should include economic and social considerations, through appropriate indicators. |

4b. Legal framework implications (i.e. within/outside FR and sectoral legislation):

For **Antimicrobial Resistance**:

- The opportunity for EFSA to contribute to F2F through assessing alternatives to medicated feed is *potentially outside EFSA's Founding Regulation (FR)*;

For **Circular Economy**:

- The opportunity for EFSA to expand its current risk assessments to include "end to end" food system considerations is *potentially outside EFSA's Founding Regulation (FR)*,



depending on if EFSA assesses additional endpoints or whether it cooperates with other actors in joint mandates;

- *Assessment of risks related to use and reuse of former food of animal and non-animal origin and animal by-products into the feed and food chain in the context of circular economy*

For **Food Fraud**:

- The opportunity for EFSA to contribute to specific cases, where fraud has involved a known safety risk *does not necessarily fall in the remit of EFSA (e.g., where food fraud does not affect safety but concerns product's qualities, ingredient substitutions by similar food ingredients, etc.)*;
- The opportunity for EFSA to highlight joint work with BfR on FoodChainLab *does not fall under the current remit of EFSA as control is a risk management task, but it is an opportunity to link to EFSA's work on traceability*;
- The opportunity to harmonize data collection and exchange of tracing information among the stakeholders in the food/feed supply chain, national administration and MS;
- The opportunity to collect freely available product information, e.g. ingredients and processing steps, in common product repositories.

For **Food Security**:

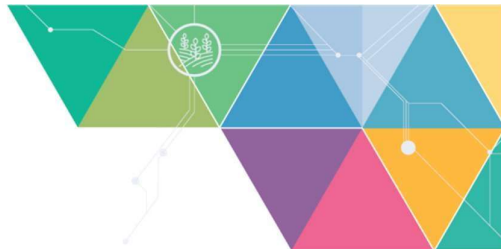
- The opportunity for EFSA to expand its role on food security is *potentially outside EFSA's Founding Regulation (FR)*;
- The opportunity for EFSA to provide scientific support to food security related policies is *potentially outside EFSA's Founding Regulation (FR)*;
- The opportunity to establish relationships and to contribute to the activities of Food Security related EC DGs is *potentially outside EFSA's Founding Regulation (FR)*;
- The opportunity for EFSA to get involved, contribute and influence the contingency plan for elements linked to food safety/food security is *potentially outside EFSA's Founding Regulation (FR)*;
- Mapping of regular food/feed supply chains in Europe is transversal to food fraud, food security, and investigations in food/foodborne incidents. This includes the analysis of hotspots as critical links in the food/feed supply chain with respect to supply stability, concentration, food safety, and food characteristics (e.g. quality, origin (->food fraud)).

For **Nutrition**:

- The opportunity for EFSA to expand its role on nutrition is *potentially outside EFSA's Founding Regulation (FR)*;
- The opportunity to anticipate the impact of socio-demographic and consumer trends on food availability, product reformulation and dietary patterns is *potentially outside EFSA's Founding Regulation (FR)*;
- The affordability of food and the sensitivity of citizens to food cost is *outside EFSA's Founding Regulation (FR)*;

For **Sustainable Food Systems**:

- The opportunity for EFSA to provide advice for setting sustainability goals in the specific legislative areas is *potentially outside EFSA's Founding Regulation (FR)*;



- The opportunity to improve information about the sustainability of various food options is *potentially outside EFSA's Founding Regulation (FR)*;
The opportunity to work with farmers to support and incentivise the transition to fully sustainable practices is *potentially outside EFSA's Founding Regulation (FR)*;

4c. Expected Results (considering what needs to be addressed and how to be addressed):

For AMR:

- Improved our knowledge on the emergence and spread of resistant bacteria and resistance determinants within and between sectors (humans, domestic and wild animals, plants/crops, environment, food products), strengthening the potential of its available evidence in partnerships with EMA.
- Assessed alternatives to medicated feed as per new Regulation with EMA and SANTE;
- Further implemented the role of EFSA contributing to AMR work and EFSA data on VMP residues, with the collaboration of EMA, EEA and SANTE;
- Contributed to EU One Health Action Plan against AMR, in partnerships with EC and Agencies (EMA, ECDC, EEA).

For Circular Economy

- Implemented stakeholders' identification and engagement protocols and cooperation with EEA, JRC, DG-ENV, FAO, MSs, industry is required;
- Enhanced tighter regulation of recycled products for food contact material, agriculture and aquaculture;
- Supported the circular (bio)economy practices in farming/food production, working with the farmers;
- Contributed to food/feed safety and risk assessment included in Circular Economy Action Plans, recycling targets, design of new biobased materials, in partnerships with DG-RTD, DR-ENV;
- Strengthened foresight tools and elaborating scenarios in cooperation with JRC, EEA and DG-ENV (TIM, FORENV);
- Designed principles and strategies to ensure consistency and integration between the overarching policy agendas (sustainability, green deal, circular economy, zero pollution, biodiversity) and sectoral policies for environment and food/feed safety;
- Assessed risks related to use and reuse of former food of animal and non-animal origin and animal by-products into the feed and food chain in the context of circular economy;
- Contributed to the alignment of environmental and health goals across all sectors to decrease livestock production impact on food waste and public health (meat consumption);
- Expanded EFSA current risk assessments to include "end to end" food system considerations;
- Identified emerging risks potentially associated with circular economy.



For **Food Fraud/Food Security**

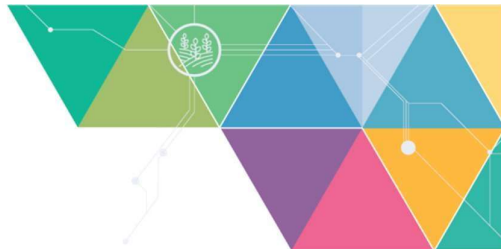
- Harmonized terminology developed regarding food fraud and links to risks related to food between all actors in the supply chain;
- Contributed to specific cases where fraud has involved a known safety risk and to better define the data requirements and risk evaluation for non-compliance;
- Improved the exchange of information on the food/feed supply chain, linking with work being led by the JRC and Europol;
- Involved EFSA and contributed to the contingency plan for elements linked to food safety/security, either at EU level or at international level (FAO, Soil Global Partnership, IPPC), in collaboration with EC DGs whose policies are relevant for food security (DG-AGRI, DG-RTD, DG-TRADE, etc.).

For **Nutrition**

- Provided scientific advice to risk manager on the feasibility of implementing supported personalised nutrition, while providing an assessment of nutrient intake and nutritional status across different populations, including migrants;
- Used certificates and labels (e.g. traffic-light labelling) to increase the effectiveness of both nutritional and 'carbon footprint' information and encourage sustainable consumption practices;
- Provided scientific advice to the legislator regarding nutrition labelling, e.g. the "traffic lights" scheme;
- Provided scientific advice to the risk manager on the formulation of the new nutrient profiles;
- Provided scientific advice on the formulation of the nutrient profiles in the context of front-of-pack labelling thus contributing to better consumer's information for a healthy diet;
- Established a baseline of the food and nutrient intake in the EU enabling policy makers to identify shifts in the overall diet that could have a quick positive impact on consumer and environment (e.g. more plant-based diet);
- Provided scientific advice on the relationship between food/food groups and chronic metabolic diseases and the environmental impact of food to enable consumers to choose a healthy and sustainable diet;
- Explored research possibilities on dietary patterns and role of specific foods on disease prevention;
- Explored how anticipating the impact of socio-demographic and consumer trends on food availability.

For **One Health/Holistic RA:**

- Further increased EFSA's contribution to One Health objective;
- Promoted EFSA's role in data collection on important One Health domains;
- Enhanced EFSA's potential in providing scientific advice in international fora (e.g. EFSA's support to EC's role in Codex Alimentarius, OIE, WHO, FAO ...);
- Strengthened together the "scientific diplomacy" potential together with the European Commission.



For **Sustainable Food Systems**

- Established systems to secure support for, and extend the availability of, spaces for experiential learning about sustainable food systems are required;
- Enhanced collaborations with farmers and food producers to incentivise the transition to fully sustainable practices and monitor the safety of these practices;
- Developed advice on the best strategy to maximise production and conserving biodiversity at the same time. This should include economic and social considerations, through appropriate indicators;
- Formulated risk assessment issues/problems and (specific) protection goals holistically to address overall system impacts;
- Assessed cumulative health and environmental effects resulting from exposure to multiple regulated substances/compounds or products, and stressors;
- Developed tools and methods (including post-market environmental monitoring) for evaluating the efficiency of risk mitigation measures;
- Monitored regulated substances/compounds, or products in different environmental compartments and matrices, and along the food/feed chain;
- Examined health and environmental risks of regulated substances/compounds or products with a range of alternative solutions;
- Developed more coherent, harmonised and interoperable regulatory risk assessment approaches;
- Developed a common currency for the assessment of health and environmental impacts;
- Integrated environmental risk assessments in EU environmental impact and sustainability assessments, or policy assessments performed by relevant partners in the context of other regulatory frameworks/policies;
- Developed and implemented the safe and sustainable by design concepts for health and environmental risk assessment;
- Included plant-based diets / nutrition – policy option, currently out of EFSA remit.
- Examined the legal fragmentation and gaps (e.g. fertilisers) – legal remit of EFSA is currently not covering all relevant products. Fertilisers can affect food safety too;
- Improved the definition of sustainable food system; trade-offs; align the goals; container concept, so not practical (multiple facets/angles). Sustainable intensification is not sufficient – less waste/loss needed and better food/feed; distribution/accessibility. Food security – safety – sustainability interplay;
- Provided advice to the EC for setting sustainability goals and indicators in the specific legislative areas;
- Contributed to the “common definitions” the EC refers to and therefore to contribute to creating a sustainable food system.



5. New Technologies & Products

The New Technologies & Products Measures Work Area presents **4** themes:

- **Sustainable Aquaculture & Seafood**
- **Feed Additives**
- **Food Packaging**
- **New Technologies / Biotechnology**

As for **Sustainable Aquaculture & Seafood**, the EC will set out well-targeted support for the **algae industry**, as algae should become an important source of **alternative protein** for a sustainable food system and global food security under the European Maritime and Fisheries Fund for sustainable seafood farming. Some of today's sea uses endanger food security, fishers' livelihoods, and the fishery and seafood sectors. Marine resources must be harvested sustainably and there must be **zero-tolerance** for **illegal practices**.

For what concerns **Feed Additives**, the EC will facilitate placing on the market **sustainable** and **innovative** feed additives. The aim is to help reduce the environmental and climate impact of animal production, avoid carbon leakage through imports and to support the ongoing transition towards more sustainable livestock farming. The EC will examine EU rules to reduce the **dependency** on **critical feed materials** (e.g. soy grown on deforested land) by fostering EU-grown **plant proteins** as well as **alternative feed materials** such as insects, marine feedstocks (e.g. algae) and by-products from the bio-economy (e.g. fish waste) and more in general from circular economy practices. The Commission has also highlighted the need to improve animal health/welfare through **better feed** and the development of a **feed consumption database** could be envisaged.

Speaking of **Food Packaging**, the EC will revise the **food contact materials legislation** to improve food safety and public health (in reducing the use of hazardous chemicals) as food packaging plays a key role in the sustainability of food systems. The aim is to use **innovative** and **sustainable packaging solutions** using environmentally friendly, reusable and **recyclable materials**, and contribute to food waste reduction. Furthermore, under the sustainable products initiative announced in the CEAP, the EC will work on a legislative initiative on the **re-use** in **food services** to substitute single-use food packaging and cutlery by re-usable products.

Lastly, for what concerns **New Technologies**, new technologies used in the Farm to Fork production chain will result in new products to be assessed by EFSA and will provide opportunities to assess better the **risks** of **products** or **food hazards** in general. New innovative techniques, including biotechnology and the development of bio-based products, could accelerate the process of reducing **dependency** on **pesticides**. Consistently, the EC is carrying out a study which will look at the potential of **new genomic techniques** to improve sustainability along the food supply chain – to be published in 2021. The sustainability



challenge call for **innovative techniques**, including **Biotechnology** and the development of innovative **bio-based products**, may play a role in increasing sustainability, provided they are safe for consumers and the environment while bringing benefits for society. They can also accelerate the process of reducing **dependency** on **pesticides**. Furthermore, sustainable food systems also rely on seed **security** and **diversity**. Lastly, innovative techniques include also **sustainable farming systems biological control, integrated and smart pest and disease management** which will become even more essential in the future.

5a. Opportunities and Challenges

Table 5: New Technologies & Products Breakdown

| Theme | Source | Opportunities & Challenges |
|--|-----------------------|--|
| Sustainable Aquaculture & Seafood | EU Biodiversity | Fisheries-management measures must be established in all marine protected areas according to clearly defined conservation objectives and based on the best available scientific advice. Not falling under the current remit of EFSA as control is a risk management task, but it is an opportunity to link to EFSA's work on traceability. (see above work with BfR and RASFF) |
| Sustainable Aquaculture & Seafood | Research Needs | Support food sustainability through safe agricultural and aquaculture practices |
| Sustainable Aquaculture & Seafood | Internal Contribution | Opportunity to identify emerging risks associated with alternative food and feed resources from the sea and innovative aquaculture strategies and opportunity for foresight in cooperation with JRC, EEA and DG ENV. |
| Sustainable Aquaculture & Seafood | Internal Contribution | Opportunity to identify uses of marine resources for food and feed in cooperation with JRC-EEA and DG ENV (TIM, FORENV). |
| Sustainable Aquaculture & Seafood | Internal Contribution | Opportunity to replace dietary fish protein by protein originating from plants/insects. |
| Sustainable Aquaculture & Seafood | Internal Contribution | Opportunity to improve fish feeding when fish is kept in sea cages (unconsumed feed that goes to the bottom of the sea as waste). |
| Feed Additives | Farm to Fork | Opportunity to contribute to developing methodologies and criteria for assessing new feed additives and ingredients |
| Feed Additives | Farm to Fork | Opportunity to contribute to designing a strategy for the reduction of the environmental impact of animal production by using new sources of protein, improving animal efficiency and reducing waste |
| Feed Additives | Farm to Fork | Opportunity for EFSA to contribute to F2F through assessing new medicated feed as per new Regulation |
| Food Packaging | Farm to Fork | A possible role for EFSA, in collaboration with ECHA, to look at food packaging after recycling and the presence of contaminants |
| Food Packaging | Farm to Fork | Opportunity for EFSA to act and proactively look at environmentally friendly FCM alternatives |
| Food Packaging | Farm to Fork | Non-harmonisation in legislation and prolonged discussion/unanswered demands from MEPs on the revision of legislation cause disappointment – EFSA guilty by |



| Theme | Source | Opportunities & Challenges |
|--|----------------|---|
| | | association and delays in the area also paint EFSA in a negative light |
| New Technologies /Biotechnologies/Novel Foods | Research Needs | To be able to assess novel products in a pre-market phase (e.g. synthetic biology, nanotechnology) |
| New Technologies /Biotechnologies/Novel Foods | Research Needs | Development of novel foods and feeds and ensuring their safety, including the development of safe GMO-based plant and animal products |

5b. Legal framework implications (i.e. within/outside FR and sectoral legislation):

For **Sustainable Aquaculture & Seafood:**

- The opportunity to link fisheries-management measures to EFSA's work on traceability is *potentially outside EFSA's Founding Regulation (FR)*;
- The opportunity to set out well-targeted support for the algae industry is *potentially outside EFSA's Founding Regulation (FR) if move beyond human, animal, environment safety issues*;

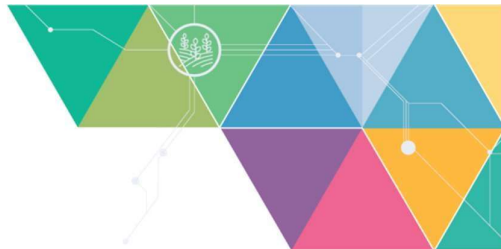
For **Feed Additives:**

- The opportunity to contribute to developing criteria of assessing new feed additives is within the remit of the FR and covered already partially by the sectoral legislation. EFSA was and is already active in this area and will continue to deliver its advice.
- The opportunity to contribute in defining criteria for the acceptability of alternative/innovative feed materials is potentially outside EFSA's Founding Regulation (FR), as it is not strictly related to safety issues. The assessment is performed by the competent authorities of the MS and the EC, while EFSA is consulted EFSA in case the feed materials pose a concern in terms of safety (Regulation (EC) No 767/2009). EFSA was already active in providing advice on safety aspects and will continue to do so.
- The opportunity to contribute in designing a strategy for the reduction of environmental impact of animal production is probably out of the FR and is probably not the main task for EFSA. EFSA could collaborate with other agencies/institutions and provide advice based on its experience in the area of pesticides and feed additives.
- The opportunity to contribute to improving animal health/welfare through a better feed is probably within the remit of the FR. EFSA was already active in this area and will continue to deliver its advice.

5c. Expected Results (considering what needs to be addressed and how to be addressed):

For **Sustainable Aquaculture & Seafood:**

- Provided advice during the revision of the fisheries management legislation;
- Set out well-targeted support for food sustainability and the algae industry through safe agricultural and aquaculture practices;
- Identified emerging risks associated with alternative food and feed resources from the sea and innovative aquaculture strategies in cooperation with JRC, EEA and DG ENV;



- Identified uses of marine resources for food and feed in cooperation with JRC-EEA and DG ENV (TIM, FORENV);
- Explored the replacement of dietary fish protein by protein originating from plants/insects;
- Improved fish feeding when fish is kept in sea cages (unconsumed feed that goes to the bottom of the sea as waste).

For **Feed Additives:**

- Contributed to F2F through assessing new medicated feed as per new Regulation;
- Developed harmonised approach (e.g. use of feed consumption database per target animal category) and definition of criteria for the acceptability of novel feed additives and feed materials, thus providing incentives for industries to develop such solutions globally;
- Contributed to a global strategy to reduce the environmental impact of animal production by using new sources of protein (e.g. insects, bacterial biomass from production of amino acids and biogas), improving animal efficiency (via genetics and feed management measures, including feed additives) and reducing waste (precise nutrition) with Feed and feed additives industry and animal science associations, Leading Research Institutes, Other International partners (e.g., FAO, US FDA, CFIA), MS with relevant expertise, and other sister agencies (EEA, EMA, ECHA);
- Detected possible emerging risks associated to the use of novel/alternative feed materials;
- Developed harmonised approach/criteria to define the acceptability of physiological condition stabilisers (substances or microorganisms), thus providing incentives for industries to develop such products globally.

For **Food Packaging:**

- Explored food packaging after recycling and the presence of contaminants, in partnerships with ECHA;
- Explored proactively environmentally friendly FCM alternatives;
- Provided advice during the revision of the food packaging legislation.

For **New Technology/Biotechnology/Novel Foods:**

- Examined the ability to assess novel products in a pre-market phase (e.g. synthetic biology, nanotechnology);
- Developed novel foods and feeds and ensuring their safety, including the development of safe GMO-based plant and animal products



6. Risk Communication, Engagement & Social Research

The Risk Communication, Engagement & Social Research Work Area presents **2** themes:

- **Communication & Engagement with Stakeholders**
- **Social Research**

Improved and expanded **Communication and Engagement with Stakeholders** remains at the basis of EFSA's work and was reconfirmed with the new Transparency Measure and various European Strategies. New **alternative engagement approaches** should be tested and implemented, providing more **digital approaches** with a big emphasis on **communication to consumers and stakeholders**.

As part of its approach of food information to consumers and combined with the legislative framework on sustainable food systems, the EC will promote schemes (including an EU sustainable food labelling framework) and lead the work on international sustainability standards and environmental footprint calculation methods in **multilateral fora** to promote a **higher uptake** of sustainability standards. It will also support **enforcement** of rules on misleading information.

Lastly, for what concerns **Social Research**, the EU has reconfirmed the need for R&I on social solutions to increase the sustainability of food systems. Understanding citizen's perceptions will inform risk communication which, on evidence-base, will employ a tailored approach to meet the information needs of target audiences.

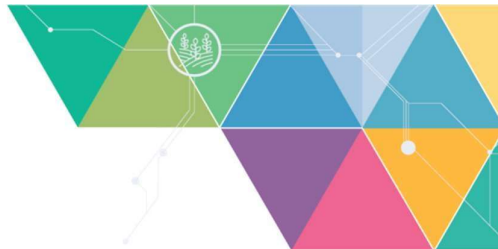
6a. Opportunities and Challenges

Table 6: Risk Communication, Engagement & Research Breakdown

| Theme | Source | Opportunities & Challenges |
|---|--|--|
| Communication & Engagement with Stakeholders | EU Chemicals Strategy/One Substance - One Assessment | It will also be important for the agencies' communication teams to jointly consider the aspect of both regulatory and public (e.g. target audience research; handling plans; social media campaigns) communications, in the overall context of the strategy developed on one substance - one assessment, to enhance the impact of communication and also improve the risk assessments. |
| Communication & Engagement with Stakeholders | Farm to Fork | Opportunity for EFSA to use EFSA's mandate on risk communication to contribute to F2F sustainability objectives and continue EFSA's clear and timely communication vis-à-vis EU citizens |
| Communication & Engagement with Stakeholders | Farm to Fork | Term "sustainability" is being used by the EC to refer to ecological and economic sustainability; need to distance ourselves from the economic angle and ensure EFSA is not identified with unsustainable elements/practices (e.g. pesticides) |



| Theme | Source | Opportunities & Challenges |
|---|--------------|---|
| Communication & Engagement with Stakeholders | Farm to Fork | Opportunity to highlight EFSA's work in this area, which has gained more prominence during the last year with NGOs/MEPs demanding better animal welfare or German consideration of animal welfare label; has also been very prominent in coronavirus debate – link to animal health, healthy planet, AMR, One Health data space for collaboration. |
| Communication & Engagement with Stakeholders | Farm to Fork | Opportunity for EFSA to contribute to solving issues of high societal concern in a pro-active manner rather than simply responding to legislative necessities |
| Communication & Engagement with Stakeholders | BEUC | Information about the sustainability of various food options must be improved to enable consumers to make more informed choices |
| Communication & Engagement with Stakeholders | BEUC | Public awareness about the environmental impact of food production and consumption– especially when it comes to people's own food choices –is insufficient and must be increased. |
| Communication & Engagement with Stakeholders | BEUC | Diversified and innovative ways to raise awareness should be explored, such as dedicated school curricula, information sessions at the workplace, websites, and apps that allow users to calculate the environmental impacts of their lifestyles (including food habits). |
| Communication & Engagement with Stakeholders | BEUC | Knowing what consumers most spontaneously associate with 'sustainable food' provides useful insights into what they may infer from a 'sustainable food' label, which would come without clear indications of what it exactly covers and means. Any 'sustainable food' label that might be developed in the future will have to be transparent on the underpinning criteria – including any potential trade-offs – to avoid confusing consumers or creating expectations that cannot be met. |
| Communication & Engagement with Stakeholders | BEUC | Public awareness campaigns could help to clear the misconception that eating sustainably is reserved for a select few. |
| Communication & Engagement with Stakeholders | BEUC | Consumers must be provided with more practical tools and solutions to help them turn their intentions into practice. These include for instance improved storage instructions for food products, clearer date marking, meal planning apps to cut food waste at home, greater availability of seasonal fruit and vegetables, suggestions for easy recipes, etc. |
| Communication & Engagement with Stakeholders | BEUC | Considering the influence of gender on food choices, tailoring messages and interventions to different population groups might also be necessary. |
| Communication & Engagement with Stakeholders | BEUC | Public health authorities should greatly increase their communication towards the public about recommendations for healthy diets. This should be done in very practical and concrete terms so that consumers can better assess the extent to which their own dietary habits deviate (or not) from the recommendations. |
| Communication & Engagement with Stakeholders | SAPEA | Social media provide a new means for exchanging information about food, particularly in relation to food risk, nutrition and food waste reduction |

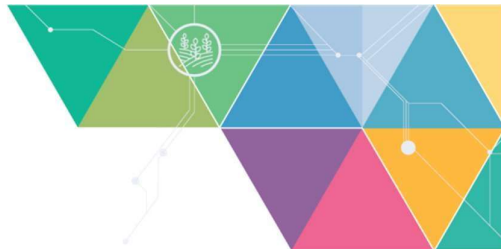


| Theme | Source | Opportunities & Challenges |
|-----------------|-----------------------|---|
| Social Research | Research Needs | Traditional quantitative and qualitative methods will be complemented with tools such as social media analysis, or community-based monitoring, in social research to understand citizens' awareness, perceptions and behaviour in the area of food safety |
| Social Research | Internal Contribution | Broaden the engagement and understanding of food safety advice; influence public opinion positively by continuing the digital communication strategies from communicating and engaging to influencing. |
| Social Research | Research Needs | Understanding citizen's perceptions will inform risk communication which, on evidence-base, will employ a tailored approach to meet the information needs of target audiences |
| Social Research | Research Needs | Insights from social research will help identify right timing and adequate methods of engaging with society during the risk assessment process |

6b. Legal framework implications (i.e. within/outside FR and sectoral legislation):

For **Communication & Engagement with Stakeholders:**

- The possibility that the EU coordination registry described in paragraph 3.1 has a public version accessible to stakeholders and citizens is *similar to the dissemination portal whose development is underway and within EFSA's Founding Regulation (FR) and TR provisions;*
- The opportunity for EFSA to use its mandate on risk communication to contribute to F2F sustainability objectives industry is *within EFSA's Founding Regulation (FR), unless communication includes non-food safety issues; (in which case non-food safety aspects can be provided by partners and integrated on EFSA channels/tools)*
- Public awareness campaigns are *within EFSA's Founding Regulation (FR);*
- Public awareness about the environmental impact of food production and consumption is *outside EFSA's Founding Regulation (FR); (unless remit expanded based on F2F-linked mandates from the EC)*
- Diversified and innovative ways (websites, apps) to raise awareness is *within EFSA's Founding Regulation (FR);*
- The possibility of public health authorities to increase their communication towards the public about recommendations for healthy diets is *outside EFSA's Founding Regulation (FR) (unless remit expanded based on F2F linked mandates from the EC);*
- Sustainable food label criteria are *outside EFSA's Founding Regulation (FR);*
- The possibility to consider the aspect of both regulatory and public (e.g. target audience research; handling plans; social media campaigns) communications, in the overall context of the strategy developed on one substance one assessment is *within EFSA remit;*
- The possibility to make any 'sustainable food' label on the underpinning criteria to avoid confusing consumers or creating expectations that cannot be met is *outside EFSA remit (only communication on potential RA in support of this if requested by EC);*
- Public awareness campaigns to clear the misconception that eating sustainably is reserved for a select few is *outside EFSA remit; (but can be included in EFSA awareness campaigns in partnership with MS, FAO, EEA)*



- The opportunity to provide consumers with more practical tools and solutions to help them turn their intentions into practice is within EFSA remit;

6c. Expected Results (considering what needs to be addressed and how to be addressed):

For Communication & Engagement with Stakeholders:

- Enhanced preparedness through engagement focused on new scientific methodologies/data
- Agencies' communication teams jointly considered the aspect of both regulatory and public (e.g. target audience research; handling plans; social media campaigns) communications, in the overall context of the strategy developed on one substance - one assessment, to enhance the impact of communication and improve the risk assessments;
- Developed a Social Media Strategy.
- Broadened the engagement and understanding of food safety advice through an open dialogue with the public, by continuing the digital communication strategies from communicating and engaging to influencing;
- Enhanced visibility of EFSA's work in animal welfare/health, and link to sustainability goals;
- Increased public authorities' communication towards the public in terms of recommendations for healthy diets, dietary guidelines or environmental impact of food production and consumption with MS and the EU;
- Made available practical communication tools and solutions tested and developed by EFSA with its partners, that can be used for provision of new food-related information to consumers (EFSA recognized as a "vehicle" of preference to place such information to a broader audience)
- If appropriate, the above included improved information about the sustainability of various food options to enable consumers to make more informed choices; enhanced public awareness about the environmental impact of food production and consumption especially when it comes to people's own food choices with EEA, FAO and MS;

For Social Research:

- Examined insights from social research which will help identify right timing and adequate methods of engaging with society during the risk assessment process;
- Analysed citizen's perceptions to inform risk communication to employ an evidence-based tailored approach to meet the information needs of target audiences;
- Tested tools, such as social media analysis, or community-based monitoring, in social research to understand citizens' awareness, perceptions and behavior in the area of food safety.
- Used EFSA's mandate on risk communication to contribute to F2F sustainability objectives by promoting evidence-based communication to EU citizens;
- Supported risk managers to explore consumer perception and expectations regarding scientific information behind product labels, in areas of nutrition or sustainability.



Conclusion

What are the implications for the draft 2027 Strategy? What will the High-level Implementation Plan look like?

The draft EFSA 2027 Strategy will be updated to include the changes mentioned above. Following the Ambition Setting Workshop, a comprehensive and consolidated list of Expected Operational Results will be available. This list includes the EORs identified in the Strategic Directions exercise, in the 2020 Workplan and in the Changing Context Analysis exercise. The latter foresees, beyond the EORs identified during the consultation process, also EORs stemming from the O&Cs gap analysis.



Section III - 2035 Perspective

Identification of viable strategic directions based on EFSA's Environmental Scans

Updated: October 2020



The Context

Envisioning and getting prepared for the future is essential for EFSA and for European Food Safety. With sustainability and health high on the global agenda and considering the crucial role played by food in that context, EFSA has a duty to think ahead and consider how its role and purpose might evolve in the long-term.

The EU holds firm on its global ambition to lead the way on the UN sustainability agenda. The recent Commission reflection paper “Towards a sustainable Europe by 2030¹¹” confirms that pursuing the **17 UN’s Sustainable Development Goals** (SDGs) will continue to drive EU policies in the 10 years to come, further capitalising on the substantial achievements made thus far by the Juncker Commission.

This endeavour will surely continue and likely intensify beyond 2030, hence it can be safely assumed that post-2030, sustainable development objectives will continue to frame EU food policies. Food and food safety does matter for most if not all SDGs, more specifically for SDGs no. 2 (“Zero Hunger”), no. 3 (“Good health and well-being”), no. 6 (“Clean water and sanitation”), no. 12 (“Responsible consumption and production”), no. 13 (“Climate action”), no. 14 (“Life below water”) and no. 15 (“Life on land”). Also, relevant to EFSA, SDG no. 17 calls for “regional and international cooperation on and access to science, technology and innovation, and enhanced knowledge sharing”. In the **EU policy agenda**, food is very much at the core of all initiatives under, or ongoing reforms of, public health, common agriculture and fisheries policies, the circular economy package, Horizon 2020/Horizon Europe and other R&I programmes.

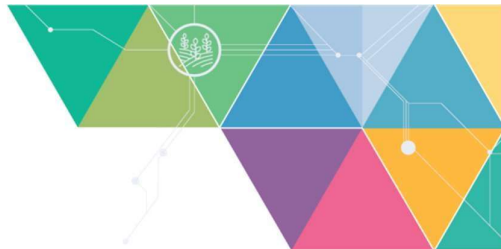
The new challenges posed by **SARS-COV-2** and its implications also represent a key opportunity for EFSA and for the European Food Safety to envision and get prepared for the future. A robust and diverse food supply is an essential part of the health and nutrition response to SARS-COV-2 pandemic. EFSA, together with key international partners, will increasingly play a crucial role in providing nutrition and food safety guidance and advice during and post the SARS-COV-2 pandemic for governments, food businesses, health workers and the general public, to maintain good health and prevent malnutrition in all its forms.

On a global level, and since 2015 in particular (SDGs and the EXPO exhibition) food is also very much in focus as a topic, with countless initiatives from multilateral bodies and institutes at both scientific and policy levels. Among them, a recent study by the World Resource Institute¹² (WRI) constitutes a useful reference as it examines on a holistic level the global implications on food systems¹³ arising from the expected increase in world population by 2050 (9.8M in 2050 from 7M in 2010). The study identifies three main gaps that need to be filled at a global level in order to achieve a sustainable food future. They are respectively; the food gap, i.e. the required increase in yields/crop calories produced (+56% on 2010 levels); the land gap, i.e. the area that would normally be required for increasing production, which has to

¹¹ https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_30-01_en_web.pdf

¹² <https://www.wri.org/publication/creating-sustainable-food-future>

¹³ Food systems: “the aggregate of food-related activities and the environments (political, socioeconomic, and natural) within which these activities occur” (Ref.: https://serc.carleton.edu/integrate/teaching_materials/food_supply/student_materials/1033).



be saved to protect the biodiversity status quo to 2010 levels (593 Mhs, i.e. twice the size of India), and; the greenhouse gas mitigation gap, i.e. the difference between the likely emissions from agriculture and land-use change in 2050 and the current target linked to maintaining global warming below 2°C above pre-industrial temperatures (-67%). The study proposes several methods and initiatives to address the three gaps, including technological innovation, regulatory and management actions, educational programmes, as well as market and behavioural incentives. Unsurprisingly, all these proposals have clear implications regarding food safety. The WRI study clearly shows that adopting one-health concepts, integrating food safety along with food security, health and sustainability aspects is essential to address the scientific and policy challenges of future food systems.

Regrettably, reality shows that traditionally food safety is often neglected in the EU/global political discourse. The debate tends to focus on food security and over/under-nutrition, and food safety aspects are often relegated as a given (“unsafe food is not food”) or less essential (“no food, no hazards”). This attitude should be changed, as it is evident that food security, health and sustainability can only be pursued in parallel with an equally significant effort to address the related food safety aspects.

Thanks to the current crisis though, food safety could acquire more prominence in the global and European discourse. The pandemic has been affecting the entire food system and has laid bare its fragility. Border closures, trade restrictions and confinement measures have been preventing farmers from accessing markets, including for buying inputs and selling their produce, and agricultural workers from harvesting crops, thus disrupting domestic and international food supply chains and reducing access to healthy, safe and diverse diets. The pandemic has decimated jobs and placed millions of livelihoods at risk. As breadwinners lose jobs, fall ill and die, the food security and nutrition of millions of women and men are under threat. There will be a growing need to develop long-term sustainable strategies to address the challenges facing the health and agri-food sectors.

What will the food future hold? i.e. How will the methods and initiatives envisaged in the WRI study unfold in practice? It will depend on several factors, including climate and market developments, innovation, the SARS-COV-2 crisis and its consequences and expectations emerging at a societal level. It is therefore difficult to make predictions on the context within which EFSA will be called to operate.

Useful insights on the context within which EFSA will be called to operate are provided by the foresight study 'Delivering on EU food safety and nutrition in 2050 - future challenges and policy preparedness' issued by the European Commission Joint Research Centre. The study highlights a few scenarios including trends and long-term projections on how the EU food systems might evolve in the future.

EFSA will operate in a context increasingly shaped by the EU Biodiversity Strategy, the Farm to Fork Strategy, a sustainable agriculture in the EU through the Common Agricultural Policy (CAP) and a sustainable industry to ensure more sustainable and environmentally respectful production cycles, largely interlinked with the EU Chemical Strategy. In particular, six EFSA's areas will be greatly impacted by these policy documents: Biological Risk Assessment; Capacity



Building, Data, Methodologies & Artificial Intelligence; Chemical Risk Assessment; Cross-Cutting Risk Assessment & New Strategic Measures; New Technologies & Product; Risk Communication, Engagement & Social Research.

For the purpose of this current reflection, to help **identify future pathways for EFSA and food safety in the EU**, three scenarios are singled out and summarized below. They are assessed with regard to their potential impact on environmental sustainability, food security, food safety and societal expectations.

- a) **“Global Food” Scenario** assumes a continuation of current macro-trends (land use, agro-industries, trade etc.) and existing public policies.

The expected outcomes by 2050 are clearly negative. While the system might deliver food security on a global scale, it is widely expected to fail in regard to ensuring sustainability, solving the prevailing food safety issues (food-borne and diet-related diseases), and in meeting the concerns increasingly expressed by society. Furthermore, this scenario raises the prospects of increasing inequalities worldwide through the development of privileged partnerships and trade routes (e.g. among BRICS, Europe and North America etc.¹⁴)

- b) **“Regional Food” Scenario** assumes that global trade is abandoned, and “self-sufficient” food production occurs locally or regionally, employing advanced technologies and enhancing the food value (e.g. organic, extensive farming, low-scale).

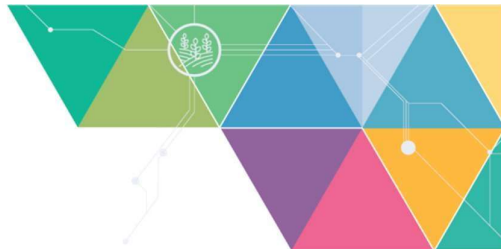
This scenario is often portrayed as highly desirable in the EU policy debate and seems to reflect the desires of many EU consumers. It would surely help to scale down the pressure on natural resources. On the other hand, it would not deliver food security, considering the EU is already today a net importer of food. It would also raise important challenges with regards to food safety, given that food production would be scattered among a large number of communities and individuals, often lacking know-how and instruments to enforce food-safety standards, hence raising the risk of food crises.

- c) **“Pharma Food” Scenario** assumes a strong emergence of innovation and new technologies both at the level of farming and production. This shall ease the pressure on the environment and also respond to consumers’ wish for a healthy lifestyle through the production of functional, processed foods and even foods with added pharmaceutical substances (“Phoods”).

This scenario would likely be unwelcome by a significant part of EU society in view of more traditional attitudes still prevailing towards food, yet it is very appealing in regards to food security and environmental sustainability. It is also potentially beneficial in promoting safe and healthy nutrition, although it would require constant and timely support by science in assessing the collateral hazards while new technologies are developed.

The above scenarios are a nice reference for envisioning how EFSA’s operating environment might evolve until 2035 and what is needed to prepare for it, strongly leveraging on the disruptive potential of digitalisation. The Regional and the Pharma Food scenario can be seen as two extreme goal posts, and the pathway to 2035 will surely place itself somewhere between the two, hopefully avoiding the bad compromise portrayed by the “Global Food”

¹⁴ A scenario envisioning the emergence of reinforced regional partnerships is presented separately in the JRC study (“Partnership Food Scenario”).



scenario. The Regional and Pharma food scenarios portray different sets of food safety challenges and as food systems will navigate in search of the best way forward, EFSA will have to ensure that priorities can be quickly shifted and that relevant scientific knowledge is generated as the scenarios evolve. For example, the Pharma Food scenario would require boosting food safety research to accompany the rapid pace of innovation, and a strong engagement with the society to ensure that innovation is accepted and embraced. Conversely, the Regional Food scenario would require redefining the way risk assessment, risk management and risk communication are carried out, seeking new ways to interact with producers and consumers for knowledge generation and policy enforcement.

As food safety is increasingly a global issue, global approaches will be required to address threats and seize opportunities. This calls for enhanced international interaction at scientific and policy level with the aim of harmonizing standards, methods, models and protocols worldwide.

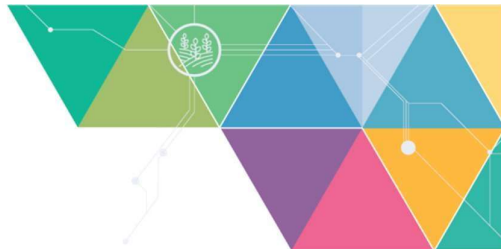
In summary, the food future is uncertain, but some challenges facing EFSA are clear: raising the profile of food safety within the broader policy debate on food and with regard to research, develop the capabilities and the organisational agility to be able to adapt to rapidly evolving environment, crucially, enable a system whereby food safety issues are treated in close connection with food security, health and sustainability in an integrated system that brings together national, EU and international players. Agility will be a distinctive feature in light of the complexity of the issues to be addressed and requiring cross-sector/area collaboration and in a context of growing inequalities and globalization of risks and hazards.

In view of the above, EFSA's 2035 perspectives regard food safety as linked with food security and nutrition, which in turn are linked to health and sustainability. These three dimensions are envisioned in sequence in the following sections.



The Perspective

1. EFSA envisions to operate as a regulatory science agency within a wider **EU food sustainable and safety system**, which is resilient, efficient, open and connected and brings together policymakers, stakeholders and the society at large. EFSA anticipates:
 - An EU set of food safety methods and standards (EU Risk assessment toolbox) becoming a benchmark globally, adopted or referred to by international partner organisations.
 - The creation of common definitions and general principles and requirements for sustainable food systems and foods in collaboration with the EU Commission.
 - A clearly defined organisational identity, whereby EFSA's role is to promote and enable a risk assessment system which:
 - provides responses to scientific questions while meeting commonly agreed scientific and quality standards, and;
 - is based on inter-dependence, participation, collaboration and co-design of scientific advice.
 - A shared system for managing food safety knowledge involving EU, Member States and international organisations, based on a model which:
 - interlinks people, technology and processes while enabling innovation;
 - promotes joint tools, methodologies, and shared datasets;
 - ensures that information is fully transparent, accessible and usable by the entire EU food safety ecosystem when and as needed;
 - supports faster knowledge development and decision-making;
 - preserves the independence of science while addressing confidentiality, data protection, privacy and ethical aspects;
 - Regular monitoring of the occurrence of long-term diseases caused by chemical contamination (e.g. cancer) and development of methodologies to assess their societal burden alongside the cost-benefit ratio of risk management decisions.
 - Common, interoperable data formats covering various sources (e.g. market-monitoring, official controls, nutri-vigilance) and types (e.g. biomonitoring, biosensors).
 - Digitalised scientific processes, including the widespread use of prognostic and predictive algorithms, in-silico modelling, Big Data analytics, Artificial Intelligence, etc.
 - Regular use of crowdsourcing for data and knowledge mining purpose.
 - Well-developed and widely available risk assessment knowledge and methodologies, on top of the traditional "domain" expertise (toxicology, microbiology, nutrition, statistics, pesticides, etc.) provided by academia and research.
 - Comprehensive and adequately funded research programmes (EU-wide, globally-connected), to update/develop data and methods regarding inter alia:
 - biological, chemical, ecological and microbiological predictive modelling, computational toxicology, bioinformatics biomonitoring and omics data;
 - antimicrobials use in human and animal healthcare;
 - holistic models (multiple stressors, multiple geographical and temporal scales);
 - new hazard and emerging risks (chemical mixtures and combined toxicity, endocrine active substances, plastics and pollutants)



- innovative products and technologies, including also biotechnologies;
 - landscape-environmental risk assessment methodologies;
 - new plant pests and animal diseases;
 - granular exposure assessments (multiple target groups, allergies and auto-immune diseases).
- Collaborative communication on risks involving science and policy bodies across the EU, reaching out to all EU citizens and enabling them to improve their understanding and critical evaluation of scientific information.
 - Monitoring of risk perceptions and societal concerns across the Member States and use of social science methods to develop clear, contextualized, relevant, fit-for-purpose communication on risks.
 - New communication technologies to maximize impact and provide personalized messages addressing the needs of diverse audiences.
 - New technologies supporting the engagement with stakeholders, enabling to extend the scope for interaction and to reach out to the national organisation.
 - Customer services allowing regular interaction with applicants and helping to deliver process efficiency, legal certainty and reduced time-to-market.
2. EFSA recognises the critical importance of food systems to deliver **food security and healthy nutrition and sustainability** (i.e. stability of supply, availability, physical and economic access and utilisation based on cultural and dietary values). Accordingly, EFSA's vision embraces:
- A substantial decrease of hunger and obesity on a global scale through healthier diets and product reformulation.
 - Continuing high standards of safe, nutritious and affordable food for all EU citizens, resulting from a system that allows sustainable use of natural resources.
 - Material progress towards food security, based on the critical contribution by the EU to multilateral programmes and governance bodies.
 - A material reduction of food-borne diseases from all hazards (bacteria, viruses, parasites, prions, chemicals) and diet-related chronic metabolic diseases at the EU level thanks to the shift to a more plant-based diets with less red and processed meat and with more fruits and vegetables.
 - The promotion of harmonised mandatory front-of-pack nutrition labelling to empower consumers to make informed, healthy and sustainable food choices.
 - EU R&I policies and programmes geared towards increasing yields and productivity while reducing emissions and preserving biodiversity and natural resources.
 - An EU food policy framework promoting a multi-disciplinary approach and a system-view to face increasingly complex issues, including:
 - new risks, emerging issues/complexities linked to systemic changes (climate, demography, trade, production techniques, and society);
 - holistic approaches (risks vs. benefits, alternative production and consumptions patterns, food and non-food related health-outcomes);
 - good nutritional practices (collective, personalized) and enforcement strategies (regulatory norms, soft policies and behavioural nudging);



- circular food systems (waste, recycling, packaging);
- fraudulent or deceptive practices (tracing, detection and rapid reaction);
- tools and systems to provide consumers with comprehensive information on hazards and dietary values.

3. EFSA also recognizes that food systems should be **compatible with the overarching sustainability goals** and that its future role shall be connected with the wider set of science and research bodies active on these issues. Accordingly, EFSA's vision in support of a climate-smart sustainable food system comprises of:

- Material progress on a global scale towards the entire set of "post-2030" SDGs¹⁵, based on multilateral science-based policies adopted with the decisive contribution of the EU.
- First-rate health and safety at the EU level for people, animals, plants and the environment, thanks to the adoption of "one-health" science-based policies supported collaboratively by EU science and research bodies.
- The application of the circular model along the whole food supply chain, from production to consumption, including processing and transport.
- Solutions for restoring soil health and functions, contribution to soil sealing and to the rehabilitation of contaminated brownfields and participation to the EU Soil Thematic Strategy.
- Support for the algae industry, as algae should become an important source of alternative protein for a sustainable food system and global food security.
- Support the EC to place on the market sustainable and innovative feed additives, aiming at reducing the environmental and climate impact of animal production, avoiding carbon leakage through imports and supporting the ongoing transition towards more sustainable livestock farming.
- Open and transparent knowledge management processes, whereby EU science and research bodies engage with partner organisations, stakeholders and citizens in a climate of mutual trust and collaboration.
- A comprehensive framework for capacity building programmes, enabling international cooperation on food research and innovation:
 - under the policy direction of the EU legislative and executive institutions;
 - based on shared goals, aligned strategies and coordinated investments and work-programmes;
 - developing Green Partnerships and cooperation with Africa, neighbours and other partners and will have regard to distinct challenges in different parts of the world;
 - pursuing resource efficiency via pooling enabling services such as procurement, HRM and digital, and by optimizing work-sharing (also based on regulatory streamlining/alignment);
 - enhancing effectiveness through the joint deployment of scientific capacities (expertise, data management, computational power);

¹⁵ to be defined by the UN/multilateral system.



- jointly developing scientific knowledge and preparedness face to new threats and emerging risks;
- optimizing EU and national R&D and structural funding on agriculture, health, environment and R&D;
- supporting R&I and the introduction of new technologies while promptly addressing the related safety concerns.

Conclusion

The above perspective sets the scene for the development and update of EFSA's Strategy 2021-2027. It helps place the Environmental Scans in an EFSA context and provides a long-term reference for the definition of the strategic objectives and actions to pursue them.



Annexes

Annex 1 – Scanning the Food Safety Environment

Glossary

Drivers

Factors causing change, affecting or shaping the future. Usually, fully the macro-environmental factors found in a PESTLE analysis.

Foresight

A systematic, participatory and multi-disciplinary approach to explore mid- to long-term futures and drivers of change.

Environmental/Horizon Scanning

A systematic method for gathering new insights on issues which may impact the future. The scanning process explores novel and unexpected issues as well as persistent problems and trends, including matters at the margins of current thinking that challenge past assumptions. It is often based on desk research, which involves a wide variety of sources, such as the Internet, government ministries and agencies, non-governmental organisations, international organisations, research communities, and on-line and off-line databases and journals.

Sustainability

The concept of sustainability underpinning the Farm to Fork Strategy (F2F) considers health as an inherent part of sustainability. It is composed of three dimensions: (a) the social (including health), (b) environmental/climate and (c) the economic dimension. Relevant in this respect is the following FAO document, entitled "Sustainable Food Systems: concept and framework" (2018) to be found at: www.fao.org/3/ca2079en/CA2079EN.pdf (see in particular p. 1 and 4).

Horizon / Time Frame

The farthest point in the future that one will consider in a Futures Study. The time frame refers to the complete period (past-to-future) considered in a Futures Study.

PESTLE Analysis

The PESTLE analysis (political, economic, socio-cultural and technological, legal and environmental) describes a framework of macro-environmental factors used in the environmental scanning

Scenarios

A description of how the future may unfold according to an explicit, coherent and internally consistent set of assumptions about key relationships and driving forces. A scenario is a "story" illustrating visions of possible future or aspects of a possible future. Scenarios are not



predictions about the future but rather similar to simulations of some possible futures. They are used both as an exploratory method or a tool for decision-making, mainly to highlight the discontinuities from the present and to reveal the choices available and their potential consequences.

Scenario Trends/Narrative Storyline

A coherent description of a scenario (or a family of scenarios), highlighting its main characteristics and dynamics, the relationships between key driving forces and their related outcomes. How the specific driver and related trend theme simulates itself within the specific context of the scenario.

Strategic Planning

Strategic planning is an organization's process of defining its strategy, or direction, and making decisions on allocating its resources to pursue this strategy. It may also extend to control mechanisms for guiding the implementation of the strategy.

SWOT Analysis

The SWOT analysis (or SWOT matrix) is a strategic planning technique representing;
 Strengths: (internal) characteristics of the business that give it an advantage over others.
 Weaknesses: (internal) characteristics of the business that place the business or project at a disadvantage relative to others. Opportunities: (external) elements in the environment that the business or project could exploit to its advantage. Threats: (external) elements in the environment that could cause trouble for the business or project.

Abbreviations

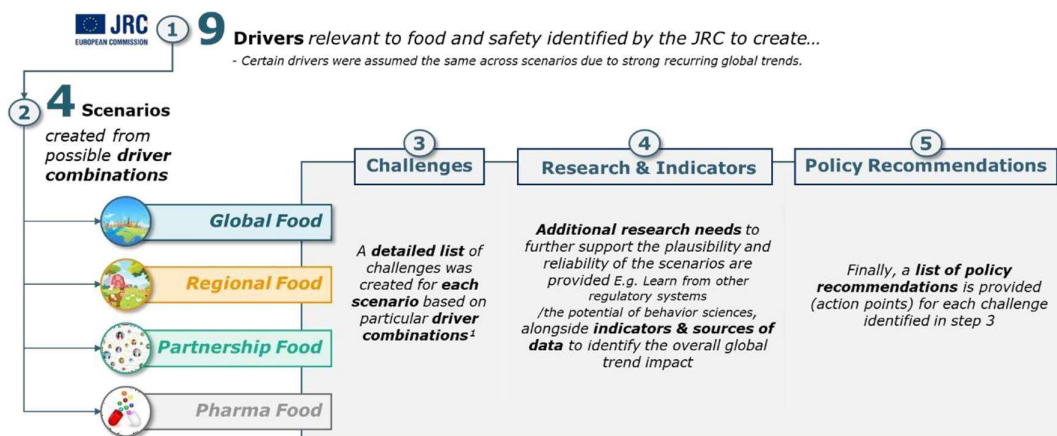
| Abbreviation | Full Name |
|--------------|---|
| DG SANTE | Directorate-General for Health and Food Safety |
| EC | European Commission |
| EFSA | European Food Safety Authority |
| EU | European Union |
| DG-JRC | Directorate General Joint Research Centre |
| MS | Member States |
| PESTLE | Political, Economic, Social, Technological, Legal & Environmental |
| RA | Risk Assessment |
| SDG | Sustainable Development Goal |
| SWOT | Strengths, Weaknesses, Opportunities & Threats |
| 3R | Replacement, Refinement, and Reduction |

Desk Analysis



In the link provided, you can find the original report, used as the starting point for the analysis, the Joint Research Centre's (DG-JRC) [Science for Policy Report on 'Delivering on EU Food Safety and Nutrition in 2050 - Future challenges and policy preparedness'](#);

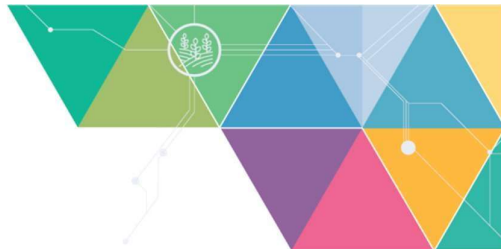
The image below, depicts the original structure of the JRC Report;



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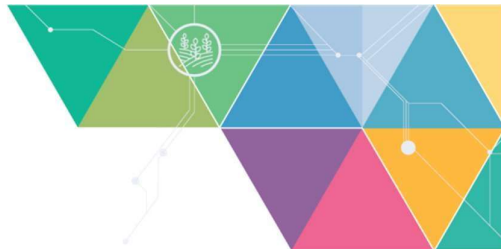
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Consultations, Stakeholders & Acknowledgments

As mentioned above, EFSA's Environmental Scan was interactive and collaborative in its approach. Please find below the comprehensive information on the consultations held *i.e.* *workshops*, stakeholder groups and an extensive list of acknowledgements;



Annex 2 - Changing Context Analysis

The Changing Context Analysis was a deliverable of the 2027 Strategy Definition process performed by the core Strategy Process Team together with other key staff. It involved different internal actors based on their expertise in specific work areas, analysed and consulted with internal document leaders (e.g. Partnership Roadmap) to reflect ongoing work in these areas. The Engagement and Cooperation unit played an integral role in supporting the analysis and review of the Policy Landscape (e.g. Green Deal Policies) and the various external literature reviews.

What to the external policy documents in the document hierarchy call for?

Below you can find an overview of all the documents in the hierarchy presented in figure 1, where for each document a relative hyperlink, horizon and overview is provided:

1. [EU Green Deal set of policies](#)

Horizon 2050

The European Green Deal sets out how to make Europe the first climate-neutral continent by 2050. It maps a new, sustainable and inclusive growth strategy to boost the economy, improve people's health and quality of life, care for nature, and leave no one behind. It includes other policy documents as action plans, such as the Farm to Fork Strategy or EU Biodiversity Strategy for 2030.

2. [Chemical Strategy](#)

Horizon 2030

This strategy aims to reduce the risks associated with producing and using chemicals. It will simplify and strengthen EU rules on chemicals, and review how EU agencies and scientific bodies can work together towards a process where substances are only reviewed by one agency.

This will help to:

- better protect people and the environment from hazardous chemicals
- encourage the development of safe and sustainable alternatives
- make it even easier to trade safe chemicals within the EU.

3. [Multi-annual Financial Framework 2021 – 2027](#)

Horizon 2027

The EU's long-term budget, the 2021-2027 multiannual financial framework (MFF) package proposed by the EC outlines €1 850 billion:

- a revised long-term EU budget of €1 100 billion for 2021-2027
- a temporary reinforcement of €750 billion – Next Generation EU

4. [EU4Health Programme 2021 – 2027](#)

Horizon 2027

The Programme has been proposed by the Commission as part of the upcoming MFF. It will account € 9.4 billion, of which € 7.7 billion to be provided via the temporary Recovery Plan – Next Generation EU. It mainly aims at:

- Boosting the EU's preparedness for new cross-border health crisis;
- Strengthening health systems in Europe;
- Ensuring the availability of medical devices and medicines while advocating for prudent use of antimicrobials.



EU4Health will be based on the One Health approach, acknowledging that the EU Agencies – including EFSA – “have a key role to play in Europe’s defence against serious cross-border health threats and pandemics, both on the prevention and the crisis management front”.

5. Horizon Europe **Horizon 2020**

Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe’s global competitiveness. Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.

The identification of research priorities and the communication of such priorities to Commission services (Director-General Research and Innovation (DG-R&I) and Director-General Research Agriculture and Rural development (DG-AGRI), Directorate General Health and Consumers (DG-SANCO) and the Joint Research Centre (JRC)) as well as the Member States is an important aspect of EFSA’s Science Strategy for the strengthening of the scientific evidence for risk assessment and risk monitoring.

6. Common Agricultural Policy (CAP)

Launched in 1962, the EU’s common agricultural policy (CAP) is a partnership between agriculture and society, and between Europe and its farmers. The CAP is a common policy for all EU countries. It is managed and funded at European level from the resources of the EU’s budget. Key elements of the future common agricultural policy proposed by the European Commission, such as income support, market measures, rural development and financing.

7. Farm to Fork Strategy **Horizon 2030**

The Farm to Fork Strategy is at the heart of the Green Deal. It addresses comprehensively the challenges of sustainable food systems and recognizes the inextricable links between healthy people, healthy societies and a healthy planet. The strategy is also central to the Commission’s agenda to achieve the United Nations’ Sustainable Development Goals (SDGs).

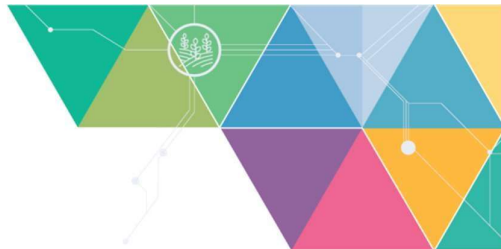
8. EU Biodiversity Agenda 2020 **Horizon 2030**

This strategy sets out how Europe can help make this happen. As a milestone, it aims to ensure that Europe’s biodiversity will be on the path to recovery by 2030 for the benefit of people, the planet, the climate and our economy, in line with the 2030 Agenda for Sustainable Development and with the objectives of the Paris Agreement on Climate Change. Biodiversity is also crucial for safeguarding EU and global food security. Biodiversity systems, loss threatens our food putting our food security and nutrition at risk. Biodiversity also underpins healthy and nutritious diets and improves rural livelihoods productivity and agricultural.

9. European Environment Agency Report on EU Environment & Sustainability **Horizon 2030**

The EEA’s mission is to provide sound, independent and timely information on the environment to European citizens and policymakers, with the overall aim of supporting sustainable development in the EU and EEA member countries.

10. BEUC Survey on Consumer Attitudes for Sustainable Food



Between October and November 2019, BEUC, The European Consumer Organisation, carried out a survey together with 12 of its member organisations across 11 EU countries¹ to investigate consumer attitudes towards sustainable food.

Which showed some encouraging trends regarding consumer willingness to adopt more sustainable food habits (albeit these trends are not commensurate with the shift that experts say is needed). The survey also highlights important barriers to change that need to be addressed to support sustainable food choices by consumers.

11. SAPEA Analysis of Food Safety

Horizon 2050

This Report informs a corresponding Scientific Opinion, and both the present Evidence Review Report and the Scientific Opinion will inform policymakers, in these important times where Europe strives to be a global leader on sustainability issues through its Green Deal.

12. EFSA-ECHA One Health – One Substance

Horizon 2030

The Commission published its European Green Deal in which it announced the development in 2020 of a chemicals strategy for sustainability. The Commission noted it would look at how to simplify and strengthen the legal framework and review how to use better the EU's agencies and scientific bodies to move towards a process of 'one substance – one assessment'.

This position paper, developed jointly by EFSA and ECHA, provides an analysis of the steps that are normally addressed in a risk assessment and the potential problems encountered therein and identifies several fit-for-purpose solutions that would support the one substance-one assessment approach.

13. Food Safety Regulatory Research Needs / Research Agenda

Horizon 2030

The European Food Safety Authority (EFSA) regularly collects recommendations from members of the Scientific Committee and Scientific Panels on EFSA's research needs and priorities. To inform research agendas, this paper presents, in the following tables, three research streams bringing together the main research needs and priorities in support of food safety risk assessment in the coming years. These Food Safety Regulatory Research Needs for 2030 should be useful when developing Safe Food Systems of the future as well as EFSA's Strategy for 2027.

14. Roadmap for the Fitness check of the animal welfare legislation

The Fitness Check will evaluate the EU legislation applicable to the protection of the welfare of farmed animals. It will do so using the criteria of overall effectiveness, efficiency, relevance, added value, and coherence. This will be done while taking into account the interactions with other related EU policies, notably with other agri-food chain rules, with environmental legislation, and with the functioning of the single market.

The report will assess whether the legislation in question remains fit for purpose and effective to pursue the EU's animal welfare objectives, considering the evolution of scientific knowledge. It will also assess the animal welfare needs and citizens' expectations since the adoption of the legislation. The Fitness Check will also seek to identify possible shortcomings in the design, scope or implementation of the existing rules, look at the potential for simplification and reduction of regulatory costs and burdens, and possible gaps and areas for improvement.

The results of the Fitness Check will be part of the follow up to the Farm to Fork Strategy and inform the reflection on what further action (legislative and non-legislative) might be



necessary to align the EU's animal welfare objectives to the sustainability goals of the Green Deal and of the Farm to Fork Strategy.

15. Implementation Report on the Sustainable Use of Pesticides Directive

The SUD provides for a range of actions to achieve sustainable use of pesticides by reducing the risks and impacts of their use on human health and the environment. One of its key elements is the implementation of Integrated Pest Management (IPM) and the promotion of alternative approaches or techniques, to reduce dependency on pesticides.

16. Report on the REFIT evaluation of the pesticide legislation

Plant protection products (PPPs), also often referred to as pesticides, are used to protect crops against pests, diseases, or competing plants to optimise food production in conventional or organic farming. Pesticides are also used to maintain food quality (during storage) or to preserve certain areas in the condition needed for their proper use (e.g. railways). Pesticides can be of chemical or non-chemical origin (e.g. micro-organisms) and their residues in food and feed can be harmful to consumers. Because of their potentially harmful effects on human health or the environment, pesticides are subject to strict rules in the EU, namely Regulation (EC) No 1107/2009, hereinafter referred to as 'the PPP Regulation', and Regulation (EC) No 396/2005, hereinafter referred to as 'the MRL Regulation'.

The Commission has carried out an evaluation of the PPP and MRL Regulations covering the period of their respective entry into the application until end 2018 as part of its regulatory fitness and performance programme (REFIT) to assess whether the Regulations are fit for purpose and achieve their objectives while keeping EU law simple and remove unnecessary burdens.

17. Report on front-of-pack nutrition labelling

This report presents the main FOP nutrition labelling schemes currently implemented or being developed at the EU level, as well as some of the schemes implemented at international level. It also addresses consumer understanding, effectiveness and impacts of FOP schemes.

18. Staff Working Document on the evaluation of the Nutrition and Health Claims Regulation

The Claims Regulation harmonises the provisions laid down by law, regulation or administrative action in the Member States which relate to nutrition and health claims to ensure the effective functioning of the internal market whilst providing a high level of consumer protection. The Claims Regulation applies to nutrition and health claims made in commercial communications, whether in the labelling, presentation or advertising of foods to be delivered as such to the final consumer. The Claims Regulation also applies to health claims made on plants and their preparations used in foods.

19. Staff Working Document on the link between the CAP reform and the Green Deal

The Commission services have analysed the links between the CAP reform proposals and the Green Deal and identified the potential obstacles and/or gaps jeopardizing the ambition level of the Green Deal in the agricultural sector. Considering positions expressed in the Council and the European Parliament, the analysis concludes with the identification of steps needed to fully align the CAP with the Green Deal and its associated strategies such as the Farm to Fork Strategy and the Biodiversity Strategy.



Which internal documents were considered in this section?

6 draft internal documents were analyzed to align with internal developments. Further work areas, O&Cs and EORs were identified in this bottom-up approach. Below is an overview of the internal documents analysed for this section and who the lead staff contributors were:

| Internal Document | Staff Contributor |
|--------------------------------------|--|
| Future of Data | Fabrizio Abbinante |
| Future of Risk Assessment | Tobin Robison |
| New Normal | Nikolaus Kriz James Ramsay |
| Partnership Roadmap | Victoria Villamar Gorgias Garofalakis Claudia Paoletti Gisele Gizzi Paul Devalier Didier Verloo |
| Research Agenda | Marta Hugas |
| Science of Risk Communication | Domagoj Vrbos |

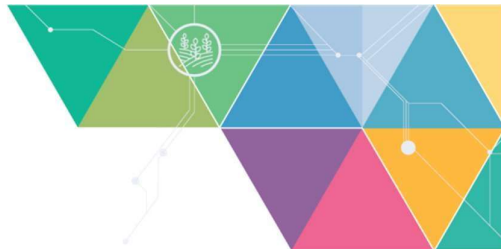
Who were the work area contributors?

Work areas were originally identified in the various **policy and external documents** described in the Policy Landscape section. Work area contributors were selected for their expertise in further defining and initial content documents analyzed for this section and who were the lead staff contributors in defining its content:

| Work Area | Work Area Contributor |
|---|--|
| Animal Health/Welfare | Yves Van der Stede Nik Kriz |
| Antimicrobial Resistance | Ernesto Liebana Beatriz Guerra Pietro Stella Frank Verdonk Mary Gilsenan |
| Artificial Intelligence & Machine Learning | Didier Verloo Chiara Bianchi Barbara Ghizzoni |
| Capacity Building | David Caira Victoria Villamar Tobin Robinson Eileen O'Dea |
| Chemical Risk Assessment Process | Claudia Roncancio George Kass |



| Work Area | Work Area Contributor |
|--|--|
| | Tobin Robinson Marco Binaglia |
| Circular bio-based economy | Tobin Robinson Angelo Maggiore |
| Communication & Engagement Stakeholder | James Ramsay Victoria Villamar Matthew Ramon |
| Crisis Preparedness | Tobin Robinson Nik Kriz Valentina Rizzi Giovanna Mancarella |
| Data, Selection, Access & Sharing | Fabrizio Abbinante Didier Verloo Mary Gilsenan Jacopo Alabiso |
| Environmental Risk Assessment | Domenica Auteri Yann Devos |
| Exposure Assessment & Risk Characterisation | Bruno Dujardin George Kass |
| Farmed Fish & Seafood: Algae Production / Sustainable Aquaculture | Ana Afonso |
| Feed Additives & Ingredients | Franck Verdonck |
| Food Fraud | Olaf Mosbach-Schulz Valeriu Curtui Ernesto Liebana |
| Food Packaging | Claudia Roncancio |
| Food Security | Ciro Gardi Olaf Mosbach-Schulz |
| Food Waste | Ernesto Liebana Marco Binaglia Pietro Stella |
| Hazard assessment (incl. hazard identification, dose-response assessments and classification) | Claudia Roncancio George Kass Tobin Robinson Marco Binaglia |
| Methodologies | Tobin Robinson Didier Verloo George Kass |



| Work Area | Work Area Contributor |
|--|--|
| | Valentina Rizzi, Olaf Mosbach-Schulz |
| Microbiological Assessment / Zoonoses | Ernesto Liebana Yves Van der Stede Pietro Stella Valentina Rizzi |
| New Technology / Biotechnology | Schoonjans Reinhilde Anna Lanzoni Paul Devalier Tobin Robinson Beatriz Guerra Matthew Ramon |
| Nutrition | Valeriu Curtui |
| One Health / Holistic RA | Marta Hugas Nik Kriz Claudia Roncancio George Kass Tobin Robinson |
| Pesticides | Benedicte Vagenende Manuela Tiramani Flavio Fergnani |
| Plant Health | Giuseppe Stancanelli |
| Social Research | Tony Smith Domagoj Vrbos |
| Soil | Domenica Auteri Sybren Vos |
| Sustainable Food Systems | Yann Devos Angelo Maggiore Ciro Gardi |