

ONE Planet

SAFEGUARDING OUR FUTURE: CREATING A FRAMEWORK FOR SUSTAINABILITY ASSESSMENTS

Summary

Sustainability is a key element of a growing number of policies in Europe and worldwide, such as the UN Sustainable Development Goals (SDGs), and the EU Green Deal. Among the human activities that impact upon sustainability, the food and feed system is recognised as one of the main drivers. A number of SDGs focus on the environmental impact of food and feed production and consumption. Measuring progress against objectives and targets is of the utmost importance in the transition towards a sustainable food system. We therefore plan to discuss possible approaches to defining a framework for sustainability assessments of food systems and how to make it operational, taking account of methodological challenges and opportunities. Such a framework could support policymaking in relation to the environmental, social and economic impacts of the food system.

Vision

The concept of sustainability is founded on the growing evidence that human, animal, and environmental health are inextricably linked. A legislative framework for sustainable food systems is now under development (scheduled by the European Commission for 2023), which will aim to ensure environmental, social and economic sustainability. It will consist of a comprehensive set of principles and requirements for the sustainability of food systems and provide a basis for ensuring policy coherence at EU and national level. EFSA is committed to supporting the objectives of the upcoming legislative framework. To this aim, over the next years, EFSA will revisit its risk assessment methodology so that it can look beyond food/feed safety to take a broader perspective, leading towards a "one health-one environment" approach that includes sustainability. Such assessments will support efforts to ensure the sustainability of the EU's food and feed system as well as to meet policy targets and citizen demands.

Background - Challenges and opportunities

Ensuring the sustainability of the EU's food system is one of the major goals of the EU's Green Deal, and in particular the Farm to Fork strategy, which sets out a series of initiatives to transform the food system. This transition will be a highly complex and uncertain process. Setting out a clear path for transformation will also require the development of approaches for assessing and monitoring sustainability. A clear definition of sustainability and a set of criteria, principles and indicators are also

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needed as well as tools (a framework) that would help in monitoring progress made towards reaching sustainability goals.

Agreeing a common definition and a framework is extremely challenging since sustainability is a broad, interdisciplinary and value-laden concept and food systems are intrinsically variable (e.g. differing consumption patterns and lifestyles). Various stakeholder and cultural groups might have conflicting objectives and perspectives e.g. maximizing efficiency (productivity per energy-, material- and land inputs), prioritizing yields over the resilience and adaptive capacity of the food system, prioritizing food demand versus staying within ecological and social limits. Moreover, in the EU food system, which is open and dependent on international trade, a trade-off is needed between securing food supplies and externalizing their impact. Pressure on the domestic environment would significantly increase if all agricultural production were to be reinternalized within the EU. For these reasons, different stakeholders will need to be consulted at all steps of the process, which therefore needs to be community-based, interactive and participatory. This is especially important since change in one part of the system has knock-on effects on various other parts and the same actors affected by the transformation should have an opportunity to take part in shaping it.

While several operational approaches have been developed and proposed for assessing the sustainability of food systems, they often vary in scope, scale, and the disciplines involved. Therefore, a better understanding of the advantages and limitations of different methods is needed. Key concepts remain under discussion, which will need to be made operational in supporting sustainability policies, such as those related to life cycle thinking, the early integration of sustainability considerations in product design (such as the Safe and Sustainable by Design (SSbD) system), the use of conceptual models (such as the DPSIR causal framework), anticipation science and the relational theory of systems. A number of quantitative assessment methods are also available to translate the concepts into practice such as for example via system dynamics models and Integrated Assessment Models. Examples of those methods include Life Cycle Assessment (LCA), Cost–Benefit Analysis (CBA), Environmental Impact Assessment (EIA), Input-Output analysis, Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism.

Moreover, sustainability is inherently future-oriented, therefore methods such as back-casting, foresight and in particular scenario analysis are necessary to manage the process of transition. These methods may share some common indicators, but the analytical processes, metrics used and field of applications are quite different. Other frequent weaknesses of existing frameworks are the partial coverage of sustainability issues (e.g. applicability to socio-economic aspects) and limited capture of key factors and processes.

On the other hand, defining a framework for sustainability assessments could bring about numerous opportunities:

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- It could assist discussions on available options for sustainability assessments and the measurement of performance against potential benchmarks and thresholds. The development of a metric for sustainability assessment could support the future design of policy measures, as well as their assessment and monitoring, and improve the appraisal of impacts and benefits.
- A broader focus on sustainability and its multiple components could also prevent risk migration (across different environmental compartments, societal sectors etc.) and facilitate a thorough consideration of trade-offs, risk-benefits and inefficiencies.
- It could support the monitoring of progress made towards meeting the UN Sustainable Development Goals (SDGs) and ex-post evaluations. When used in an anticipatory fashion, it can also support ex-ante impact assessments.

Scope and objectives

The framework for sustainability assessments within the food system is understood as a set of guiding principles (e.g. minimizing pollution, increasing material efficiency, system variability), criteria, indicators (pressures, impacts, reference/thresholds, performance indicators, baselines, targets etc.), metrics, protection goals, scenarios, performance requirements, as well as the assessment/analytical tools for the evaluation and quantification of sustainability throughout the lifecycle of a product at multiple scales (land parcel, farm, landscape, region or state). Different frameworks might need to be applied depending on the scope of the assessment (products, processes, systems, technologies, diets etc.). Such a framework should assess impacts comprehensively and holistically, highlighting possible trade-offs and burdens shifting (across different environmental compartments, societal sectors etc.), considering the transfer of impacts between life cycle stages, or environmental/social compartments.

The objectives of the session are to:

- Discuss the advantages and limitations of different approaches and identify challenges related to the creation of a framework for sustainability assessments of the food and feed system at multiple scales (by product/sector/whole system/technology/diet or farm/land parcel/landscape/region/state/global).
- Define relevant questions for research and policy such as: What is the most relevant scale for sustainability assessments? Is it possible to develop a single headline indicator to characterise the sustainability achievements of the food system?

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• Showcase studies, examples and good practices (e.g. SSbD for plant protection products and examples of the application of LCA; case study of the sustainability of organic farming).

All sustainability dimensions (social, economic and environmental) will be presented as a general introduction. Particular attention will then be focused on the environmental dimension.

People behind the session

Session Coordinator: Angelo Maggiore (EFSA)
Chairpersons: Anne-Katrin Bock, Joint Research Centre (JRC)
Moderators: Tobin Robinson, European Food Safety Authority (EFSA)
Rapporteurs: Yann Devos, European Food Safety Authority (EFSA); Angelo Maggiore, European Food Safety Authority (EFSA); Dario Piselli, European Environment Agency (EEA); Konstantinos Paraskevopoulos, European Food Safety Authority (EFSA)

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ONE Planet – Session affiliate profiles

SAFEGUARDING OUR FUTURE: CREATING A FRAMEWORK FOR SUSTAINABILITY ASSESSMENTS

Tobin Robinson, European Food Safety Authority (EFSA) Moderator

Tobin Robinson is head of EFSA's Plant Health and Pesticides Residues unit. The unit's main tasks include the preparation of scientific advice on the risks posed by plant pests to plant health, plant products and biodiversity in the EU and on possible risks related to the presence of pesticide residues in food and feed treated with plant protection products as well as making proposals regarding the setting of Maximum Residue Levels for pesticides. He has been working for EFSA for over sixteen years in a variety of posts, including leading the unit coordinating EFSA's Scientific Committee and emerging risks activities as well as a period as acting head of the Science Strategy Department. He previously worked in the dairy industry and started his career at the Reading laboratory of the Institute of Food Research, working on microbiological food safety. He graduated from Cardiff University, where he obtained a degree and PhD in microbiology.

Angelo Maggiore, European Food Safety Authority (EFSA) Rapporteur

Angelo Maggiore is a marine environmental scientist. Since 2014, he has been working as Scientific Officer in the Scientific Committee and Emerging Risks Unit of the European Food Safety Authority (EFSA). He is the coordinator of the session on "Safeguarding our future: creating a framework for sustainability assessments" of this Conference. He is coordinating a project on food and feed safety vulnerabilities in the circular economy. He has also coordinated the EFSA climate change project and has been involved in other projects related to climate change (risk characterization of ciguatera food poisoning in the EU and cyanobacteria toxins in food). He has supported the EFSA Scientific Committee in the development of the Guidance to develop specific protection goals for environmental risk assessment at EFSA, in relation to biodiversity and ecosystem services.

In the past, he has worked at the European Chemicals Agency in Helsinki in the field of environmental hazard classification. He has worked as environmental damage assessor at the Italian Environmental Protection Agency, providing technical support to the Ministry of the Environment. At the beginning of his career, he worked as oceanographer at Imperial College London and at the National Research centre in

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Bologna, modelling the ocean circulation under different meteorological forcing conditions and simulating plankton patchiness.

Yann Devos, European Food Safety Authority (EFSA) Rapporteur

Yann Devos is a senior scientific officer and lead scientist operating in the Chief Scientist Office of the European Food Safety Authority (EFSA; Italy) where he is involved in co-shaping new approaches for the environmental risk assessment of regulated products and the development of risk assessment guidelines. He coordinated the scientific program development of the ONE - Health, Environment & Society Conference. He is employed by EFSA since 2008, and previously worked at the Biosafety and Biotechnology Division of the Scientific Institute of Public Health (now Sciensano; Belgium). Through his professional career, Yann has gathered extensive experience in the environmental risk assessment of genetically modified organisms (GMOs). He authors peer-reviewed articles and reviews in the field of GMO biosafety. Yann has a MSc in Biology (ecology) and supplementary degree in Environmental Sciences from the University of Antwerp, and a PhD in Applied Biological Sciences from the Ghent University. In his spare time, Yann enjoys spending time with his family.

Alexandra Nikolakopoulou, European Commission Speaker

Alexandra Nikolakopoulou joined the European Commission in 2003. Nowadays, she serves as Head of Unit for Farm to Fork Strategy in the Food sustainability, international relations Directorate. She has been leading and coordinating work on the adoption the EU Farm to Fork Strategy. Her unit is coordinating the implementation of the Farm to Fork Strategy and is in charge of some of the main initiatives of the Strategy, such as the general framework for sustainable food systems and actions related to the reduction of food waste. Throughout her career at DG SANTE, she has been dealing with issues relating to health claims, food supplements, foods for specific groups, food labelling and general food law, including Regulation (EU) No 1169/2011 on the provision of food information to consumers and the new Transparency Regulation.

She graduated in Law at the University of Athens and completed her DEA in European Law at the University of Toulouse. After 3 years working for the Legal Unit of the European Commission's Directorate-General for Consumer Protection, she joined EuroCommerce, the European association of retail and wholesale companies, where she worked as a food law advisor.

Title of talk: The vision: legislative Framework for Sustainable Food Systems



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Abstract of talk

The transition to sustainable food systems requires systemic changes from all actors and different types of intervention by public authorities. A new legal framework integrating a transformative food systems perspective is key to drive a real, systemic transition to a sustainable food system in the EU. By establishing common definitions, general objectives and principles, the legislative framework for a Union sustainable food system (FSFS) should provide a basis to ensure policy coherence at EU and national level and mainstream sustainability in all food-related policies.

Anchoring in law the holistic thinking of the Farm to Fork Strategy, the future framework law should have the broadest scope possible embracing all food system actors, whilst putting in place appropriate governance mechanisms and addressing both supply and demand side. The different components of the FSFS must be interconnected to facilitate consumers' access to sustainable food choices. Some of those components would act as push measures, aiming to address the problem that sustainability considerations are not taken up systematically by business operators with negative environmental, social and economic impacts. Other components would act as pull measures, including sustainability labelling, public procurement, which may make sustainable foods more attractive for business operators and consumers. By its nature such a framework law and notably the established objectives, principles and concepts would need to be converted into more concrete parameters to define and measure the sustainability or unsustainability and to monitor outcomes and progress over time.

Food sustainability analysis is a concept in need of further reflections, which may play a key role at different levels in the transition to sustainable food systems. For example, to underpin sustainability labelling to inform consumers on the nutritional, climate, environmental and social impacts of their food choices. A sustainability analysis could also be a tool for appraising sustainability aspects of products/processes regulated in the EU food chain, or of future sustainability-related legislation that may build on the FSFS.

Many challenges and opportunities are open in order to establish definitions, methodologies, expertise and data to substantiate the potential for sustainability analysis as a tool for evidence-based food sustainability policymaking and implementation.

Serenella Sala, Joint Research Centre (JRC)

Speaker and Panellist

Serenella Sala is a scientific officer and a scientific project manager at the Joint Research Centre (JRC) of the European Commission since 2010. She is the Deputy Head of Unit of the Land resource Unit of the Directorate D (Sustainable Resources), and the team leader of the life cycle assessment group of the JRC. She is

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coordinating the activities on life cycle assessment (LCA), with specific focus on its application at meso and macro scale for supporting policies, e.g. for product and organisation environmental footprint. She is an environmental scientist, holding a PhD in Ecology and Ecotoxicology. Her research activities have been always focused on sustainability assessment of supply chains, adopting Life cycle assessment as reference methodology. With strong interdisciplinary approach, she developed methodologies and models for sustainable development, integrated environmental assessment, life cycle assessment, and risk assessment for supporting eco-innovation of process and products. She is currently involved in the development of the framework for safe and sustainable criteria for chemicals and materials and in the application of life cycle assessment in the evaluation of EU food system (from raw materials extraction, all along the supply chains up to food waste generation and management).

Title of talk: ONE introduction: Components and operationalisation of a framework for sustainability assessment

Abstract of talk

Sustainability is a multi-dimensional concept that involves different (environmental, social and economic) aspects, as well as normative positions and empirical knowledge. Sustainability Science (SS), which is an emerging and solution-oriented discipline, aims to integrate environmental, social and economic issues in the context of cultural, historic and institutional perspectives. Environmental, economic and social aspects interact in complex patterns, and operate in cultural, political and regulatory contexts that can affect such interactions positively or negatively. While EU policies increasingly refer to sustainability targets, we are still in the process of turning such ambitions into actions. In this respect, the lack of an agreed definition and a systematic framework for a holistic assessment is hampering progress. The scientific and social nature of sustainability challenges requires the development of assessment approaches that are coherent from an ontological, epistemological and methodological point of view. An assessment framework should address key features of sustainability, including: complexity (multi-sectoral knowledge, multispatial and time scales); occurrence of wicked problems; uncertainty and variability of data; transdisciplinarity for shaping solutions and their evaluation; the ambition to remain within planetary boundaries.

This talk aims to illustrate the key components needed to define a sustainability assessment framework, along with the practical requirements for its operationalisation when applied to complex systems, e.g. in support of the Farm to Fork and Chemical strategy. As an example of a conceptual and operational method, life cycle thinking (LCT) and life cycle assessment (LCA) will be illustrated, as they may be used more extensively to support policymaking, from problem definition to policy impact assessment and implementation. The LCA-based footprint already

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fulfils some of the main requirements of sustainability assessment methods: i) the system thinking, i.e. the capability of understanding and addressing a system by analysing the linkages and interactions between the elements that compose the entirety of the system; and ii) an interdisciplinary approach. A successful framework supporting EU policies will necessarily build on the most advanced scientific discussion of SS, attempting to bridge gaps between current methods and the ambition of a comprehensive and harmonised approach to sustainability assessments.

Xenia Trier, European Environment Agency (EEA) Speaker

Xenia Trier has a background in environmental chemistry and advisory, and is the lead EEA expert on chemicals, environment and human health. Since joining the EEA in 2016 she has contributed to the assessment and further development of the EU chemicals policy, including the Chemicals strategy for Sustainability, PFAS, chemicals in the Circular Economy and the Safe and Sustainable by Design concept. Reference publication: EEA webbriefing on Safe and Sustainable by Design (EEA 2021)

Title of talk: Designing safe and sustainable by design chemicals and products

Abstract of talk

Safe and sustainable by design (SSBD) is a relatively new concept developed to achieve the multiple goals of The European Green Deal. These goals simultaneously and with no significant burden shifting between these protection goals - include: avoid pollution to humans and nature; protect biodiversity; reduce consumption of resources in a circular economy; and combat climate change. SSBD is foreseen to be applied broadly and across industries in the design phase of future chemical substances, materials where they will become part of processes and products. In this context, the first step is to consider how a service can be provided, without the use of harmful substances. This is then followed by an assessment of impacts that accounts for the entire lifecycles of selected design candidate substances (EEA 2021). In March 2022, the European Commission published options for criteria to score design candidates and indicated possible methodologies to be used in such assessments. The design of services that can provide food according to SSBD is critical, exactly to avoid burden shifting between the important protection goals of pollution, biodiversity, climate or circularity. This talk will explore what are the considerations for agrichemicals, and which financial and other incentives could support the transition to SSBD across industries? Moreover, the talk will address which tools are needed to verify that claims of SSBD are substantiated and thus credible, both for products imported or produced in Europe.

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Ansel Renner, Institute of Environmental Science and Technology, Autonomous University of Barcelona

Speaker

Ansel Renner is a researcher and consultant in the field of sustainability science based out of the Institute of Environmental Science and Technology of the Autonomous University of Barcelona. He has conducted research in various geopolitical and socioeconomic contexts across numerous countries and continents and has served as expert advisor to several multinational establishments. The focus of his work is the development of accounting methodology towards the holistic assessment of social-ecological systems under change. This work sees the integration of insights from perspectives and disciplines such as societal metabolism, biophysical economics and relational biology, all with a view towards science for governance. In parallel to said work, he develops a line related to the translation of theory to practice by way of codebase rolled up into data-driven, visualization-first deliberation support solutions. Applications of all the abovementioned efforts include the system-wide evaluation of agricultural paradigms and alternative energy technologies, in the Global North and in the Global South.

Title of talk: System-scale sustainability assessment based on societal metabolism and scenario analysis

Abstract of talk

According to the understanding of societal metabolism, the functional-structural organisation of social-economic systems is analogous to that of organisms. The implications of the metabolic understanding of the functioning of social-economic systems are various, incisive and far-reaching, in particular regarding sustainability science. At an introductory level, in order to maintain coherence across nonequivalent representations, the metabolic approach demands that analysts perform impredicative loop analysis ('chicken-egg paradox analysis') across different hierarchical levels. In other words, a congruence across scales of the following four aspects is demanded of analysts. (1) The representation of the dynamic behaviour expressed by the observed system-input/output ratios. (2) The processes determining input/output ratios-metabolic systems are becoming in time, so are said ratios. (3) What is needed to stabilise the interactions determining the behaviour-metabolic systems require an admissible environment, they must be compatible with their surroundings. (4) Changes in the observer-observed complexthe relevance and usefulness of analyses depend on the interests and concerns of the analyst. Note that this last point entails a shift from 'normal science' to 'postnormal science' where 'facts are uncertain, values in dispute, stakes high and decisions urgent'. In this contribution, several of these above-mentioned implications

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are explored using contemporary issues of the strategic autonomy of European food systems to illustrate the points. Regarding issues of food system security, the approach and its related frameworks can be rolled into a deliberation support tool, wherein profiles of biophysical indicators referring to the various aspects of the entangled relations over consumption and production patterns can be provided to decision-makers. In this way, it is possible to generate an improved characterisation of the option space and what would be needed to guarantee metabolic security. Worded differently, what would be needed to guarantee 'strong sustainability'. Through a series of hypothetical 'What if?' scenarios, the impressively high level of food system externalisation found across European Union Member States is shown to be a precarious situation meriting broader and increased policy consideration—in addition to novel holistic, biophysical approaches to addressing issues of sustainability, among them the approach of societal metabolism.

Gianna Lazzarini, Research Institute of organic agriculture (FiBL) Speaker

Dr Gianna Lazzarini is a scientist at the Research Institute for Organic Agriculture FiBL in Frick, Switzerland. She studied Environmental Sciences at ETH Zurich where she wrote her dissertation on consumers' sustainability perception of food products. Since her studies, she has had a special interest in people's environmental perception and behaviour and the sustainability of agricultural production. She joined the Sustainability group at FiBL in 2018. Her research focuses on sustainability at the farm level and along agricultural supply chains. One of her major research projects Enhancing supply chain stability, resilience and sustainability through improved sub-supplier management is part of the National Research Program Sustainable Economy of the Swiss National Science Foundation. She applies the SMART farm tool in various research projects and commissioned studies and is actively involved in the improvement and further development of this tool.

Title of talk: Sustainability assessment of food and agriculture systems: A global reference framework

Abstract of talk

Farm sustainability highly depends on various factors such as production systems, geographic, cultural, and legal context. For example, sustainability hotspots on a dairy farm might be very different from the main issues on a coffee plantation. Another example is a vegetable farm in Spain, which has to deal with climatic conditions that are different to those of a vegetable producer in Germany. Thus, a holistic overall approach, that sufficiently covers the different circumstances, is needed to assess and compare the sustainability of farms with diverse production systems, environmental conditions, or cultural backgrounds.

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The Guidelines for Sustainability Assessment of Food and Agriculture Systems (SAFA) were developed by the FAO to harmonise sustainability assessment of agricultural and food systems. The SAFA guidelines are structured along 58 subtopics organised in topics within four dimensions of sustainability: Good Governance, Social Wellbeing, Economic Resilience, and Environmental Integrity. For each of the 58 subtopics, there is a target description characterising an ideal sustainable enterprise or farm.

To assess the sustainability performance of farms in line with these guidelines, the Research Institute of Organic Agriculture FiBL developed the SMART Farm tool. With the help of various examples from our research, we will present the whole process of the sustainability assessment with the SMART-Farm tool, from the gathering of preliminary information, through data collection and analysis, to the final report. The SMART Farm tool enables sustainability assessment of farms across different production systems and cultures. It is a suitable method for starting agricultural sustainability research as it helps to get a first holistic overview of the system and allows identifying main hotspots. Follow-up analysis with more targeted approaches is often needed for in-depth understanding that considers the specificities of the production system, environmental conditions, and cultural background.

Antoine Messéan , National Research Institute for Agriculture, Food and the Environment (INRAE) Speaker

Dr Antoine Messéan is Research Manager at the National Institute for Agriculture, Food and the Environment (INRAE, France) and has a background in agronomy and statistics. He leads a coordination unit addressing ecological impacts of innovations in plant production and has been coordinating National and European multiactor and interdisciplinary projects about the environmental risk assessment of Genetically Modified (GM) plants and the development of Integrated Pest Management. He currently leads the H2020 project DiverIMPACTS whose main goal is to remove technological, organisational and institutional barriers to crop diversification to support transition towards sustainable agrifood systems. His research has a particular focus on modelling environmental impacts at cropping systems and landscape levels as well as the design of multi-criteria assessment tools to help farmers monitor the sustainability of their cropping systems and thus drive their own pathway towards sustainable agrifood systems. For the last 25 years, he has been providing scientific advice to National and European agencies in the field of GM plants and Pesticides. He has served as a member of the EFSA GMO Panel and various working groups within EFSA since 2009.

Title of talk: Sustainability assessment of agricultural systems: criteria, opportunities and challenges

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Abstract of talk

Over the last 50 years, agricultural systems have evolved towards specialisation and intensification to increase the efficiency of food production and the agri-food sector as a whole. However, side-effects have been a major concern due to natural resource depletion, high reliance on chemical pesticides and fertilisers, unprecedented biodiversity loss and greenhouse gas emissions contributing to climate change. In response to these growing environmental challenges, agroecological transition and agricultural diversification aim at maintaining a high level of affordable food supplies, while reducing negative impacts, restoring biodiversity, mitigating climate change and thus helping to achieve the Sustainable Development Goals overall. Nature-based or technology-based innovations, as well as organisational and institutional changes play a crucial role in supporting the transition to more sustainable and resilient agricultural systems. Yet, they will need to be combined and tailored to local receiving environments to account for local specificities. When assessing the extent to which innovations, such as GMOs, can support sustainability, a major challenge is that their indirect impacts, positive or negative, at larger geographical scales and longer temporal scales are likely to outweigh their direct and local effects due to interactions with other environmental stressors (including global warming) and farming systems, which remain largely unpredictable. Actual impacts across geographical and temporal scales can hardly be predicted during the prospective environmental risk assessments of regulated products such as pesticides and GMOs. Quantitative models, multicriteria assessment tools and uncertainty analysis can help to frame ex-ante risk assessments. Due to the high diversity of receiving environments and the unpredictable nature of their evolution, retrospective/post-market environmental monitoring/surveillance is necessary to ensure that risk assessment assumptions and conclusions remain valid and/or to adapt them to regional contexts and over time. Such monitoring/surveillance frameworks should go beyond individual innovations and combine general monitoring/surveillance systems with innovationdriven case-specific ones. The existing framework for the risk management of GM plants will be presented, and its applicability to other regulated products will be explored.

Hanna Tuomisto, University of Helsinki Panellist

Hanna Tuomisto is an Associate Professor in Sustainable Food Systems at the University of Helsinki where she leads the Future Sustainable Food Systems research group. She has 15 years of experience in the development and use of sustainability assessment methods especially in the context of agriculture and food systems. Currently, Tuomisto is involved in various projects exploring ways to

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improve the sustainability of food systems through developing sustainable agricultural systems, utilising novel food production technologies and changing diets. Tuomisto holds an MSc degree in Agroecology from the University of Helsinki and a doctoral degree from the University of Oxford. She gained postdoctoral research experience at the European Commission's Joint Research Centre (JRC) where she was involved in projects that developed carbon footprint and environmental footprint methods, and at London School of Hygiene & Tropical Medicine (LSHTM) where her work focused on the links between environmental change, nutrition and health.

Roberta Sonnino, University of Surrey

Panellist

Roberta Sonnino is a Professor of Sustainable Food Systems in the Centre for Environment and Sustainability (CES) at the University of Surrey, UK. Working across the research-policy interface, she has an internationally-renowned expertise in food policy and governance. Over her career, she has produced more than 100 publications, with a particular focus on local and alternative food networks, urban food systems, food security, public food systems and place-based approaches to food system transformation. Professor Sonnino has acted as a commentator to print and broadcast media organizations in Italy, Finland, Denmark, Spain and the UK and has been an advisor for many scientific, governmental and civil society organisations, including the European Commission (as vice-chair of the FOOD2030 Expert Group and as Rapporteur of the International Platform for Food System Science High-Level Expert Group) and the Food and Agriculture Organisation of the United Nations (as lead author of their Framework for the Urban Food Agenda and currently member of their Working Group on Urban Food Systems). In the last fifteen years, Professor Sonnino has been awarded more than â, - 5 million of research funds . Her most recent project, which has received funding from the Horizon Europe programme, will support the development of integrated food policies across eight European and three African city-regions through the implementation of pilot projects co-designed with vulnerable communities.

Anne-Katrin Bock, Joint Research Centre (JRC) Speaker

Anne-Katrin Bock is the Head of the Competence Centre on Foresight at the European Commission's Joint Research Centre (JRC) in Brussels. The Competence Centre provides strategic and future-oriented input into EU policymaking by using inclusive and participatory techniques with key stakeholders. It strives to make foresight practically useful for decision making processes. Being involved in Foresight since 2012, recent work by Anne-Katrin includes projects such 'Concepts

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for an EU sustainable food system', 'Farmers of the Future', and long-term scenarios for EU rural areas. Anne-Katrin spend most of her career working at the sciencepolicy interface. She joined the JRC and its Institute for Prospective Technological Studies, Seville, Spain, in 2000. Her work focussed on techno-economic analyses of emerging biotechnological developments and applications in agriculture and health. A biologist by training, Anne-Katrin Bock holds a PhD in microbiology from the Freie Universität Berlin, Germany.

Dario Piselli, European Environment Agency (EEA) Rapporteur

Dario is an Expert in Environment, Health, and Well-Being at the European Environment Agency (EEA) in Copenhagen, Denmark. He has previously held research positions at both the Centre for International Environmental Studies (2018-2020) and the Global Health Centre (2016-2018) of the Graduate Institute of International and Development Studies in Geneva, Switzerland. Before joining the EEA, Dario also worked as an independent consultant on projects including the Lancet & Financial Times Commission on Governing Health Futures 2030, the UN75 Initiative, and the Governing Pandemics Initiative. From 2012 to 2019, he collaborated with the UN Sustainable Development Solutions Network in a variety of roles, and since 2017 he has twice been a co-recipient of Erasmus+ grants for Jean Monnet modules relating to international and European environmental law issues. He is presently a member of the IUCN World Commission on Environmental Law and the IUCN Commission on Ecosystem Management. Dario holds a PhD in International Law from the Graduate Institute of Geneva and is also a graduate of the University of Siena (JD) and the London School of Economics (MSc in Environment and Development). His main areas of expertise include international and European biodiversity law, global health governance, and science and technology-policy interfaces in health and environment.

Konstantinos Paraskevopoulos, European Food Safety Authority (EFSA) Rapporteur

Konstantinos (Kostas) is currently working at EFSA's chief scientist office (CSO) as a scientific project coordinator in the SPIDO (Science Studies and Project Identification and Development Office) team which supports EFSA's preparedness for future risk assessment requirements by advancing selected scientific themes while fostering connectivity and partnerships with Member States and other EU Agencies as well as international organisations and third countries. Prior to joining the CSO, Kostas worked in the genetically modified organisms Unit of EFSA for 6 years Before joining EFSA in 2014, Kostas held an academic career working as researcher in molecular and cell biology and biochemistry in several research

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institutes (e.g. the European Molecular Biology Laboratory (EMBL) in Germany and the Medical Research Council (MRC) in UK) Kostas obtained his Bachelor's degree in Biophysics followed by a Master's in cheminformatics and a Ph.D. in molecular and structural biology. Kostas is an interdisciplinarily trained scientist with skills in several scientific areas (molecular biophysics and biochemistry, in silico-based drug design and bioinformatics, molecular and cell biology and genetics).

Andrea Hagyo, European Environment Agency (EEA) Panellist

Andrea Hagyo is a subject-matter expert on agriculture and agro-ecological systems working at the European Environment Agency (Biodiversity and Ecosystems Programme) since 2020. She coordinates activities related to food systems. She is developing a sustainability assessment framework for food production systems, linking it with the entire food value chain, drivers of change and emerging issues. Her focus is mainstreaming biodiversity in sustainability assessments to support policies, describing the role of nature and biodiversity in sustainability, including socio-economic resilience. Hagyo holds an MSc and PhD in Biological Sciences. After graduation she worked at the Research Institute for Soil Science in Budapest for 12 years. Her interdisciplinary research activities focused on sustainable agriculture, soil and land management, climate change mitigation and adaptation, and risk assessment. Between 2013 and 2020, she was providing scientific policy support to the EU Common Agricultural Policy and the Biodiversity Strategy in the Food Security Unit of the Joint Research Centre (JRC). She is a representative of the European Environment Agency in the new Advisory Group on Sustainability of Food Systems (AGSFS) of the European Commission.

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