1 Identification

1.1 250311

1.2 METROFOOD-RI: Agroecology, Sustainability & Innovation - a pathway for the Agrifood

1.3 25th September 2024 10:00:00

1.4 Claudia Zoani

2 Speakers and Panelists

2.1 Speaker 1

2.1.1 Name: Claudia Zoani

2.1.2 Organisation name: Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) - Dept. for Sustainability - Sustainable AgriFood Systems Division (SSPT-AGROS)

2.1.3 Type of organisation: Research Institution

2.1.4 Title of the presentation: Agrifood system challenges - the role of Research Infrastructures in contribution to the SDGs

2.1.5 Summary of the presentation (max 200 words):

Food is essential for human life and the agrifood sector is a strategic asset, with particular social relevance. Several are the related challenges, including climate change, food security, sustainability and resilience of agrifood systems. To address them, the scientific community must consider the high intersectoral and transdisciplinary dimension of studying and supporting agrifood systems, towards an agroecological transition. In this respect, Research Infrastructures (RIs) play a strategic role in achieving and practically realizing the UN SDGs, since they assemble resources and services enabling research and innovation to address global challenges such as hunger, health, and environmental sustainability on a long-term basis. They can provide turnkey solutions for researchers, citizens, policy makers and agrifood businesses, with a valuable contribution, e.g., in securing food safety and human health, driving changes towards circular bioeconomy and industrial symbiosis, and sustainable production and consumption. Furthermore, the application of citizen science approaches can boost consumer reliance in food systems, generating knowledge and increasing awareness, thus encouraging healthier dets and more sustainable behaviours. METROFOOD-RI (ESFRI Roadmap, domain Health and Food) aims at promoting scientific excellence in support to the agrifood, integrating the three dimensions of sustainable development - economic, social, and environmental - through a multifaceted approach.

2.2 Speaker 2

2.2.1 Name: Nastasia Belc

2.2.2 Organisation name: Institutul national de cercetare-dezvoltare pentru bioresurse alimentare (IBA)

2.2.3 Type of organisation: government

2.2.4 Title of the presentation: One Health as a promoter of a sustainable food system

2.2.5 Summary of the presentation (max 200 words):

Since the first One Health World Conference in New York, in 2004, the integrative and systemic approaches have been included on the global debates, agendas and policies. This movement was related with the global grand challenges such as climate change, increasing number of Earth population and limited resources as land, water, and energy, available for producing food. Additionally, the higher interconnectedness of human, animal, and environmental health could come with potential sanitary crises. The One Health approach is an integrative effort that aims to balance and optimize the health of people, animals, plants, and their shared environments, promoting interdisciplinary collaboration to address health challenges holistically. When applied to sustainability, this approach offers a comprehensive framework for addressing environmental and health issues in a manner that supports long-term ecological balance and resilience. In one way, METROFOOD-RI, as a comprehensive Research Infrastructure with a high multidisciplinary membership, can integrate the perspectives covered by different food system stakeholders for approaching participatory processes, thus contributing to systemic addressing of the societal challenges. In another way, the systemic approaches such as One Health and Sustainability give to METROFOOD-RI opportunity in increasing cooperation and collaboration within food ecosystem as well as in defining its users' engagement and co-creation strategies.

2.3 Speaker 3

2.3.1 Name: Joris Van Loco

2.3.2 Organisation name: Sciensano

2.3.3 Type of organisation: Public sector

2.3.4 Title of the presentation: Risk assessment of contaminants and additives in food in support of policy

2.3.5 Summary of the presentation (max 200 words):

Consumers often perceive food additives and chemical contaminants negatively, demanding healthier food options. To address these concerns, policymakers and food agencies are requesting scientific bodies to conduct health risk assessments of these chemicals. In Europe, this responsibility falls to the European Food Safety Authority (EFSA), which establishes health-based guidance values to protect consumers. National

authorities then verify the exposure levels for their populations. This presentation outlines the approach of the Belgian food safety authorities, providing recent examples of risk assessments for both food additives and chemical contaminants in the food chain.

2.4 Speaker 4

2.4.1 Name: Nives Ogrinc

2.4.2 Organisation name: Jožef Stefan Institute (JSI)

2.4.3 Type of organisation: Research institution

2.4.4 Title of the presentation: New challenges in food authenticity and traceability

2.4.5 Summary of the presentation (max 200 words):

Food traceability is a crucial element of any robust food system, supporting the claims and labelling on products. In terms of food safety, traceability has been implemented to help the food industry comply with regulatory standards, ensure food quality, and set up efficient systems for prompt product recalls when needed. This presentation aims to map the different types of traceability techniques, including physical testing, sensing technologies, Internet of Things (IoT), and blockchain-based technologies. Emphasis will be placed on physical traceability using various approaches such as microbiological testing, DNA testing, and stable isotope analysis.

Incorporating physical traceability provides several benefits, including the ability to quickly and accurately identify the source of contamination or adulteration. It also helps in verifying the authenticity of food products, ensuring they meet specified standards and reducing the risk of fraud. However, challenges include the cost of implementation, maintaining the necessary infrastructure and the need for accurate data recording.

Additionally, case studies in the seafood and dairy industries will illustrate how these technologies are used, highlighting gaps, limitations, and benefits. These examples show that when full chain traceability is implemented, simpler supply chains often present lower risks, making traceability more manageable and effective.

2.5 Speaker 5

2.5.1 Name: Barbora Lampová

2.5.2 Organisation name: Czech University of Life Sciences (CZU)

2.5.3 Type of organisation: academic institution

2.5.4 Title of the presentation: Sustainable alternative food and feed protein sources

2.5.5 Summary of the presentation (max 200 words):

With the growing global population, the demand for quality protein sources is also increasing, putting pressure on conventional protein sources. These traditional sources may not be able to meet the rising demand, leading to the search for alternative protein sources. These include fungi- and plant-based proteins, cell-based proteins grown from animal cells in the form of cultivated meat and fish, as well as edible insects. Edible insects represent a promising alternative due to their high nutritional value and low environmental impact. Insects are rich in proteins, essential amino acids, vitamins, and minerals, making them a highly nutritious food source. Additionally, insect farming requires less land, water, and feed compared to conventional livestock farming, contributing to reduced greenhouse gas emissions and a smaller ecological footprint. Insects also offer an attractive option for animal feed, thanks to their ability to efficiently convert organic waste into high-quality proteins. This approach can significantly contribute to addressing global challenges related to food sustainability.

2.6 Speaker 6

2.6.1 Name: Karl Presser

2.6.2 Organisation name: Premotec

2.6.3 Type of organisation: private sector

2.6.4 Title of the presentation: Digital Research Infrastructure

2.6.5 Summary of the presentation (max 200 words):

METROFOOD-RI is a distributed research infrastructure for promoting metrology in food and nutrition, which will provide high level metrology services for enhancing food quality and safety. The physical part of METROFOOD-RI consists of facilities such as laboratories, experimental fields/farms for crop production and animal breeding, small-scale plants for food processing and storage, kitchen-labs for food preparation, and “demo” sites for direct stakeholder engagement, while the digital part consists of resources such as data repositories, apps, Wikis, and e-learning platforms. The digital research infrastructure has a central user database, called Authentication and Authorisation Infrastructure (AAI) which can be federated with apps and external user databases. Another core component is the catalogues which list all available physical and digital services, data repositories, apps, and digital services that are offered by

METROFOOD-RI including descriptions and links. The catalogues will also allow users to order physical and digital services and will manage the ordering process from beginning to end. The digital research infrastructure differentiates database and apps that are needed to manage the association or are available for users. Currently there are 5 data repositories and 2 apps implemented which are analytical result database, reference material database, isotope database, conference app, and survey tool.

2.7 Speaker 7

2.7.1 Name: Maria Fernandes-Whaley

2.7.2 Organisation name: National Metrology Institute of South Africa (NMISA)

2.7.3 Type of organisation: government

2.7.4 Title of the presentation: Advancing Sustainable Agrifood Systems through Scientific Metrology: A Pathway to Achieving the UN SDGs and Empowering the Africa Continental Free Trade Area Agreement (AfCFTA)

2.7.5 Summary of the presentation (max 200 words):

The African Continental Free Trade Area (AfCFTA) and the United Nations Sustainable Development Goals (UN SDGs) aim to promote food security and economic growth across Africa. While agriculture is the continent's oldest industry, its technological evolution has lagged. The African Union's Comprehensive African Agricultural Development Programme (CAADP) seeks to modernize agriculture, enhancing productivity and value addition. However, rapid innovation often outpaces regulatory and measurement capabilities. Scientific and Legal Metrology Bodies are crucial in bridging this gap, shaping legislation, and ensuring product safety, quality, and compliance to support the AfCFTA.

Scientific metrology plays a vital role in Africa's agrifood system by providing scarce region-specific training, reference materials (RMs), and Proficiency Testing (PT) schemes. These efforts focus on food safety and nutritional content, addressing contaminants like mycotoxins, pesticide residues, and heavy metals and food fortification in key crops such as maize, groundnuts, cassava, wheat, cocoa, and fruit. Partnering with several agrifood stakeholders, including the Africa Food Safety Network, AOAC-Africa and the Pan African Quality Infrastructure, several scientific metrology initiatives have progressed, that align with African Union's Food Safety Strategy for Africa 2022-2036. Locally produced RMs and PT reference values have shortened the measurement traceability chain, enhancing laboratory performance and measurement result comparability, leading to more reliable decision-making.

3 Content

3.1 Session Abstract (max. 500 words)

The agrifood sector is a strategic asset of all Countries, with particular social relevance: it is of crucial importance to ensure sufficient food production to citizens, and vital to ensure employment, preserve rural public goods, supply healthy and quality products, including sustainable and secure production and distribution chains. It has also to facilitate the enhancement of competitiveness and sustainability approach of SMEs into the food chain, while quality, safety, and traceability being key elements.
It is essential to consider all factors affecting food quality & safety, from farm to fork, thus making health converge into a unicum as a system by applying the "One Health" approach. Well-balanced and sustainable agroecosystems & agrifood systems can highly contribute to the well-being and security of the human-animal-plant capitals, while increasing the capacity of handling and managing their complex system of interdependencies. Sustainable agrifood systems are key to attain the UN SDGs. An important aspect of sustainability is the agroecological transformation of the whole food value chain from farm to fork, as well as to improve resilience of supply chains, the vulnerability of which has been highlighted during the recent pandemic and war crises. In this context, diets must not only be healthy but also sustainable, as the food choices have significant relapses on individuals, the society, and the environment. They can concretely influence the future of humans on the planet. Dietary patterns must therefore interpret health protection and food choices as integrated components of the overall health of the ecosystem. Another key element is the promotion of integrated traceability systems, enhancing the digitalization of the agrifood system in support of transparency. The data infrastructure should comply with the FAIR principle (Findable, Accessible, Interoperable, Re-usable), should be interoperable with other data repositories, access to data repositories should be federated and data quality must be maintained and improved.

Research Infrastructures (RIs) play a strategic role and have the capacity to assemble resources (equipment, data, knowledge) and services for the agrifood sector (including research communities) on a long-term basis both within EU and globally. In this context, RIs are the best positioned not only to address societal challenges, but also to provide turnkey solutions for citizens, policy makers and industry. In particular, METROFOOD-RI - *Infrastructure for Promoting Metrology in Food and Nutrition* is a distributed RI aimed to promote scientific excellence in the field of food quality and safety. It provides high-quality metrology services in food and nutrition, comprising an important cross-section of highly interdisciplinary and interconnected fields throughout the food value chain, including agrifood, sustainable development, food safety, quality, traceability and authenticity, environmental safety, and human health.

The session will underscore the role of Research Infrastructure in approaching agrifood system challenges with reference, e.g., to food quality & safety, traceability & transparency, innovation, digitalization, circular bioeconomy, sustainability, and resilience, represent the occasion to debate about the relevance of boosting research, cooperation, innovation, and stakeholder engagement in support to the agrifood.

3.2 Project Objectives

List the key objectives your session or project aimed to achieve.

3.2.1. Enhancing the Role of Metrology in Strengthening the Global Food Sector

Explore how metrology (science of measurement) can bolster food quality, safety, security and traceability across the global food sector. Metrology represents the essential basis to make data reliable, providing objectivity and neutrality, supporting harmonisation, and ensuring the comparability of measurement results. Standardizing measurements ensures that food products meet international standards, facilitating trade, protecting consumers, and fostering innovation in food production and processing.

3.2.2. Leveraging Research Infrastructures (RIs) to Support the Sustainable Development Goals (SDGs)

Focus on the critical role that Research Infrastructures (RIs) play in achieving the United Nations' Sustainable Development Goals. By providing cutting-edge facilities and collaborative platforms, RIs enable scientific research and innovation that address global challenges such as hunger, health, and environmental sustainability, ultimately contributing to the practical realization of the SDGs.

3.2.3 Addressing Agrifood Challenges Through Collaborative Innovation

Identify and tackle key challenges in the agrifood sector, including climate change, food security, sustainability. Collaboration among stakeholders - researchers, policymakers, food businesses and consumers/citizens - can lead to innovative solutions that enhance the resilience and sustainability of global agrifood systems, towards an agroecological transition.

3.3 Key Themes

Main themes and topics that were covered during the session. The same ones you selected when you submitted your original session proposal. Select from the following. Maximum three

- **One Health**
- **Food systems**
- **Digital**

4 Planned Impacts of the science and innovation presented in you session

4.1 Contribution to the SDGs

The SDGs provide a comprehensive framework for addressing the world's most pressing challenges and promoting sustainable development globally. Select the Goal/s that your project contributes to (max 3 SDGs)

2. **Zero Hunger**: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

3. **Good Health and Well-Being**: Ensure healthy lives and promote well-being for all at all ages.

9. **Industry, Innovation, and Infrastructure**: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

12. **Responsible Consumption and Production**: Ensure sustainable consumption and production patterns.

5 Contribution to the UN Summit of the Future

5.1 Main challenges (max 200 words)

Main challenges and difficulties experienced in implementing the science to contribute to the Sustainable Development Goals and provide recommendations to address the same whole.

Implementing science to contribute to the Sustainable Development Goals (SDGs) faces several challenges. Key among these are data integration and access, particularly ensuring that diverse agrifood data is reliable, comprehensive, and accessible to all stakeholders. Addressing Zero Hunger and Good Health and Well-Being requires advanced technologies and infrastructures that many regions lack, compounded by financial constraints and uneven technological advancements. Promoting sustainable agriculture and food security involves navigating complex supply chains and stakeholder interests, from smallholder farmers to multinational corporations. Additionally, achieving Responsible Consumption and Production demands a significant shift in consumer behaviors and industrial practices, often hindered by entrenched economic interests and regulatory environments. Recommendations to address these challenges include fostering international collaborations, securing sustained funding, enhancing capacity-building initiatives, and promoting policies that support innovation and equitable access to technologies.

5.2 Additional goals (max 200 words)

Additional goals, beyond the Goals, which are considered priorities

Beyond the primary SDGs, METROFOOD-RI prioritizes goals such as enhancing scientific literacy and public awareness around sustainable agrifood systems. This involves educational outreach and public engagement to drive behavioral changes towards sustainable production and consumption. Another priority is advancing precision agriculture through cutting-edge research and innovation, aiming to optimize resource use and minimize environmental impact. Enhancing global partnerships and networks to share best practices, technologies, and knowledge is also crucial. This includes fostering cooperation between research institutions, governments, and industry stakeholders to create a cohesive and collaborative approach towards sustainable development. Additionally, addressing climate resilience in agrifood systems is vital, emphasizing the need for research and practices that can withstand and adapt to climate change impacts.

5.3 Integration: economic, social and environmental (max 500 words)

The steps being taken to integrate the three dimensions of sustainable development (economic, social, and environmental) and share best practices where available and how activities are being designed and implemented to reflect such integration.

METROFOOD-RI integrates the three dimensions of sustainable development - economic, social, and environmental - through a multifaceted approach. Economically, the infrastructure focuses on

building resilient services supporting the agrifood system and its stakeholders that boost innovation and sustainable production and consumption approaches. This involves developing cost-effective technologies and processes that can be adopted across various scales, from small farms to large agribusinesses. Efforts to enhance financial sustainability ensure that the benefits of innovation are widely accessible and economically viable.

Social integration is achieved by prioritizing inclusivity and equity in all infrastructure's activities. This includes actively engaging with diverse stakeholders, from farmers and local communities to policymakers and industry leaders, up to consumers, ensuring that all voices are heard and considered. Educational and outreach programs are designed to raise awareness and empower communities, fostering a sense of ownership and participation in sustainable practices. Special attention is given to gender equality and supporting marginalized groups, ensuring that the benefits of the infrastructure's services and R&D activities are shared equitably.

Environmentally, METROFOOD-RI emphasizes sustainable practices that minimize ecological footprints and promote biodiversity. Research and innovations focus on reducing waste, optimizing resource use, and promoting regenerative agricultural practices. The infrastructure also addresses climate change adaptation and mitigation, developing strategies and technologies to enhance the resilience of agrifood systems to environmental stressors.

Best practices are shared through open science approaches and an open-access portal, facilitating knowledge exchange and collaboration. Activities are designed to reflect this integration, with cross-cutting initiatives that simultaneously address economic viability, social equity, and environmental sustainability. For instance, developing precision agriculture technologies not only enhances productivity (economic) but also ensures resource efficiency (environmental) and supports smallholder farmers (social).

5.4 Impact on the 2030 Agenda (max 1000 words)

A success metric for your project is primarily in how it delivers for all persons in our societies. Describe how other principles of the 2030 Agenda, for example, respect for all human rights, gender equality, the principle of Leaving No One Behind, non-discrimination, etc, have been mainstreamed in your science project.

More info on: 2030 Agenda: https://sdgs.un.org/2030agenda

Please select also the transition relevant to your science project:

(1) food systems; (2) energy access and affordability; (3) digital connectivity; (4) education; (5) jobs and social protection; and (6) climate change, biodiversity loss and pollution

More info on Six transitions: https://unsdg.un.org/sites/default/files/2023-09/Six%20Transitions%20English.pdf

METROFOOD-RI is dedicated to enhancing food safety and quality, which is crucial for reducing hunger and ensuring access to nutritious and safe food. By advocating for sustainable food production practices, the project contributes to protecting the planet and managing natural resources responsibly. This approach not only supports economic growth within the food industry but also fosters prosperity through sustainable methods. Additionally, METROFOOD-RI aims to improve public health and stability by minimizing foodborne illness risks, thereby promoting a more secure and peaceful environment.

Commented [Ga1]: Here I would focus more on sustainability, and prosperity

Commented [CZ2R1]: I agree, I revised a bit and added a sentence that maybe can be useful. Don't know if now it's too long, in case some sentence can be condensed (or somewhere we can use RI for Research Infrastructure?)

The project relies on international collaboration, involving various countries and stakeholders to build robust global partnerships for sustainable development.

Gender equality is included in METROFOOD-RI, as the project follows EU guidelines and integrates gender analysis and equality approaches throughout its activities. By promoting women's participation and ensuring balanced gender integration, METROFOOD-RI aims to unlock the full potential of women in the field, thus contributing to a gender-equal Europe.

Overall, METROFOOD-RI's impact aligns with the 2030 Agenda by transforming food systems to advance Sustainable Development Goals (SDGs) related to food security, nutrition, and sustainability. The project supports human rights, gender equality, non-discrimination, and inclusion, helping to create a more resilient, equitable, and sustainable food future for all.

5.4.1 Relevant Transition: Food Systems

METROFOOD-RI is particularly relevant to the transition in food systems. By advancing sustainable agricultural practices and circular bioeconomy approaches, promoting food security, and improving nutrition, the project addresses key challenges in transforming global food systems. Through innovation and collaboration, METROFOOD-RI contributes to a more resilient, equitable, and sustainable food future.

6 Forward-looking Statement

6.1 Financial aspects

Why giving $ 1 million to your project will turbo boost the achievement of the SDGs.

Three bullets (50 words/bullet).

METROFOOD-RI will significantly accelerate the achievement of the SDGs through:

- Enhanced Research and Innovation: expanding research capabilities and developing advanced technologies to improve food safety, quality, and sustainability.
- Capacity Building and Training: offering services and comprehensive training and technology transfer programs for researchers, as well as for farmers, producers, consumers, local authorities and policy makers to adopt sustainable practices and innovative technologies.
- Infrastructure Development: establishing state-of-the-art facilities, e-tools and data management systems to support robust and reliable research & innovation in the agrifood sector.

6.2 To further advance your science project, you will need:

Please select an option and develop it further (50 words). Multiple selection is possible.

- **Access to Funding**
- **Open Access to Data**
- **Establish Partnerships and Collaborations**
- **Dissemination and Communication activities**

- **Advanced Technology**

- **Access to Funding:** Essential for expanding research initiatives, developing new technologies, and ensuring long-term project sustainability.
- **Open Access to Data:** Facilitating data sharing and transparency to improve research quality, foster collaboration, and accelerate innovation.
- **Establish Partnerships and Collaborations:** Building strategic alliances with academic institutions, industry partners, and other research organizations to leverage expertise and resources.
- **Dissemination and Communication activities:** Promoting findings and best practices through conferences, publications, and outreach programs to maximize impact and engagement.
- **Advanced Technology:** Investing in the latest technologies to enhance research capabilities and drive sustainable solutions in the agrifood sector.