



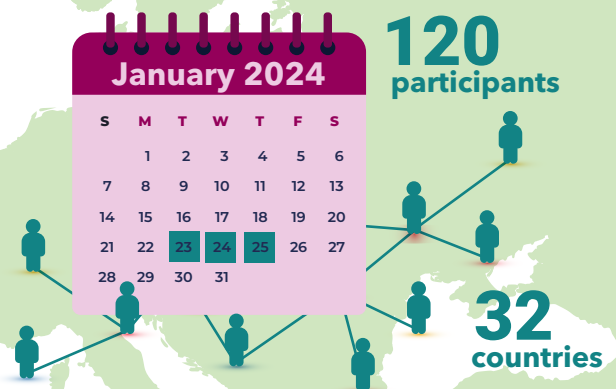
Joint SCAR Workshop Report

“Research needs and priorities for the transformation to sustainable food systems at European and global level”

Introduction

The Strategic Working groups of the Standing Committee on Agricultural Research (SCAR): ARCH, FOOD SYSTEMS and BIOECONOMY jointly organised a workshop entitled “International Expert Consultation on Research needs and priorities for the transformation to Sustainable Food Systems at European and global level”. The workshop was designed to discuss the challenges facing the global food system and to identify priority research and innovation (R&I) issues to be addressed in the short, medium and long term.

The online workshop took place over three half days in January (January 23rd, 24th and 25th) 2024. It brought together 120 participants from international research organisations/academia, National public authorities, EU institutions, the private sector/industry, funding organisations and NGOs from 32 countries.



The questions were organised around the following themes:

1.

Safe and nutritious food and sustainable and healthy diets at global level

2.

Equitable and fair global transformation of food systems

3.

Improve resilience and food security at European and global scales

4.

Governance and policies

The interactive event aimed to collect insights and opinions from international experts. Organised into 8 sub-groups, the participants had an opportunity to share their views, ideas and expertise on specific questions identified by the SCAR SWGs before the workshop.

High-level keynote speakers provided insightful contributions and interesting comments before each breakout session to catalyse ideas and frame discussions.

All ideas and suggestions were collected in Google documents used by the participants during the discussion. Separate Google documents were created for each thematic area. All the information provided was compiled and summarised into a shorter document by members of the organizing committee. A sub-group of this committee compiled this workshop report, which aims to report the findings rather than critically analyse them.

The present document is organised into four sections, each linked to one of the four question sets. Each section begins with general recommendations, followed by research needs identified by the experts and then the needs for research and innovation facilities. A box at the end of the document summarizes the commonalities across all sections.

Based on the workshop results, a policy brief will be developed, which is expected to be published in the late summer 2024.



Introduction





1. Safe and nutritious food and sustainable and healthy diets at the global level

a. General recommendations

- There is wide consensus in Europe about food safety principles and criteria, underpinned by extensive legislation and institutions; however, the definition and regulation of nutritious food as well as sustainable and healthy diets appear to be less certain and more contested. True costs of food and externalities are not generally known and/or transparent and future costs not accounted for.
- Not only Research, Development and Innovation (RDI), but also collecting/sharing, piloting and demonstration (Coordination and Support Action (CSA) - type) activities are needed to further explore the potential for novel farming systems (vertical agriculture, urban farming, etc.), neglected species and varieties (indigenous, tacit knowledge) and to assess the potential of some innovative protein sources (e.g. insect proteins) and food technologies. Simultaneously, such approaches would support the building of trust and relationships between actors as well as within communities.
- There is a need to develop further participatory science-based approaches, tools and frameworks (incl. Living labs and multi-actor approach) ensuring enough flexibility for different contexts, including different geographies and cultural needs.
- Future opportunities exist through the convergence of diverse regulatory frameworks for adoption of novel foods, higher focus on feed in a circular bioeconomy approach and importance of raising general consumer acceptance as well as Willingness to Buy (WTB).
- Social governance aspects, employing co-design and co-identifications across all stakeholder groups is needed for problem identification and prioritisation. To increase sustainability of food systems there is the need to scale up transformative measures and solutions by promoting social innovations. Both, social innovations and policy coherence are needed to ease behavior changes.
- Much pressure is put on consumers to make change their consumption behaviours, acceptance of the need for behavioral change is also required for all other stakeholders of the value chain.
- There is a need to harmonize performance measurement and to understand and communicate the interrelationships between different performance indicators, in order to tell a more systemic and nuanced story. Measuring performance results should be harmonized, considering communication and social science (AI and digitalisation may be useful tools).

- Setting common standards and adapting methodologies (i.e. Transdisciplinary approach) are needed to map and perform transformative research.
- Research should be translated into tools that can guide consumers' food choices and practices. Translation of research into practice and behavioral change by consumers should be supported by education and public engagement, including dialogues between all concerned stakeholders.
- There is a need to reinforce use of the Multi-actor approach (MAA), with a particular focus on achieving more long-term collaboration with the private sector.

b. Research needs

Workshop participants identified a need:

- to build systemic knowledge related to the sustainability and competitiveness of the current and future food system. Need to integrate current and future costs (true cost accounting) for food and externalities into modeling.
- to assess overall performance of international trade.
- to assess actual and future costs of agroecological transition and relevance of identifying alternatives to reduce costs, raise prices or identify other measures to overcome barriers to transition.
- to investigate the nutritional and environmental benefits and possible risks of plant-based diets (e.g. bioavailability, contaminants, pesticides).
- to analyze nutrient management and biomass competition systematically across blue and green production and consumption systems when assessing overall performance of food systems.
- to investigate safe circulation of nutrients in the production system for both food and feed, including research to support policy coherence for safe recirculation.
- to investigate the potential of non-food bio-based products, i.e. biomaterials, bioplastics, to improve the overall performance of food systems.
- to develop new models and/or enhance existing models and conduct further research on food system conceptualization to gain information for a sustainable food system transformation,
- to identify methods and data that should be aligned through shared indicators and by integrating different levels and scales.
- to investigate path-dependencies along with social, environmental and economic trade-offs between bioeconomic activities and food and waste streams as well as social acceptance to increase circularity.
- to collect more data related to the private sector so as to better understand their role as part of the transformation.

c. Research and Innovation Facilities (hard infrastructures, observatories, platforms, ...)

Workshop participants identified a need:

- to develop further participatory science-based approaches, tools and frameworks (incl. Living labs and multi-actor approach with an emphasis on public-private partnerships) but with enough flexibility for different places and cultural needs.
- to develop strategies for scaling successful interventions emerging from multi-actor approaches and living labs (living labs are a good system of knowledge exchange/management but wider implementation is needed, extrapolation/scaling up and impact is an issue).

- to develop more quantitative models for the multi actor approach, based on the generation of new data, according to the principles of open information and innovation.
- to explore opportunities of AI and digitalization for the transformation of food systems (e.g. observatory of FS partnership to take and harmonize data with international dimension).



2. Equitable and fair global transformation of food systems

a. General recommendations

- For an equitable transformation of food systems at a global scale, diet sustainability needs better assessment from a local/regional perspective (resource limits, local difficulties, traditions, know-how, culture, potentials, etc...) and how it contributes to the global dimension (global systems boundaries, international trade versus food self-sufficiency/sovereignty, places and actors of the food production, etc...).
- Imported feed and food are keys for the transformation towards sustainable diets and their implications for smallholders and new opportunities for import substitution should be identified.
- International R&I cooperation is particularly needed to integrate true cost accounting into food systems and traded products, for the development of standards and certification, and to address food related health issues and pollution of water, soil and air.
- There is a need for strengthened cooperation with the global south which has untapped potential in terms of sustainable food production (vertical farming also). The global south could make an ambitious business case regarding trade with the EU as European farmers do not have the same local possibilities (need to look into future sustainable dietary developments).

- There is a need for transnational sharing of information on new or rediscovered crops, and their cultivation methods, and for sharing of information on business approaches among stakeholders. Such information sharing should be used as a basis for co-construction and co-creation of initiatives and policies.
- There is a need for political actors to alter and adapt existing policies, and to make new policies that coherently address emerging needs.

b. Research needs

Workshop participants identified a need:

- for a scientific assessment of the impacts of existing regulations and private standards on global transformation of food systems.
- for case studies of local food systems and, taking advantage of new data processing technologies like AI, inclusion of the outcomes of these studies in refined analyses of global food systems and global trade.
- for scientific evidence of the implications of more sustainable diets and the development of safe products at a global scale, under global standards/certification systems : for example on the safety, production cycle and energy consumption of alternative proteins, the potential benefits, risks and implications of new technologies, consumers acceptance of alternative and more sustainable diets.
- for research to better understand the nitrogen (N) cycle and to define a global policy coherence on nitrogen (N). At the core of this is how proteins are sourced and used, which in turn means how reactive nitrogen is captured and used. Nitrogen is the tracer of food systems like Carbon is the tracer of energy systems.
- for research on the links between the N-cycle and dietary guidelines and commodity use at global scale.
- for a better conceptualization of a range of footprints in relation to the transformation of food systems: more multi criteria assessment is needed (e.g. Life Cycle Assessment) not only considering environmental impact, transparency and traceability, but also including inputs from the true cost accounting systems, and evaluating the impacts of imported products in a value chain. This includes assessing the carbon footprint, water usage, land use, and other relevant indicators. It should also assess the dimension of ecosystem service valuation (e.g. compensatory measures like environmental subsidies both Global North and South).
- to identify new and standardized data to feed indicators on the global transformation of food systems in order to enhance consistency and interoperability between open platforms/dashboards and indicator frameworks.
- to develop metrics and indicators specifically focused on assessing equity and justice in food systems transformation at local and country level and, across countries, at the global level. The overarching objective is to establish indicators for monitoring sustainability, food safety and access, socio-economic dimensions (income level, employment, etc.) and other critical issues (ethics, equity, well-being, fair trade, social inclusion, etc.), providing evidence-based recommendations for the formulation of common international standards.
- to assess the impacts of changes in agriculture practices and land use such as organic farming or agroecology on the quantity and type of food available for local versus international trade.
- to model the changes in food supply chains and the impact of new measures for traceability and adherence to environmental and ethical policies and standards on sustainable transformation of

food systems and international trade, considering the diversity of stakeholders, particularly small-holders, marginalized communities and vulnerable populations.

- to prioritize legal and trade issues (north-south but also south-south) and develop more research for sustainable trade considering the social and the environmental impact.
- for the definition of low cost and participatory standards and certifications in the context of small-scale producers.
- to assess the role of finance and private/public partnerships in the support of local producers, entrepreneurs and businesses for the local transformation of food systems and adoption of sustainable practices (e.g. regenerative agriculture, organic farming, sustainable fisheries, etc.).
- to identify and assess transformation pathways for improving dietary composition in both the global North and global South, improving consumption habits (e.g. systematic promotion and addressing bottlenecks for the adoption of a more diverse diet), for increasing the production of diverse, climate resilient crop varieties with improved nutritional characteristics (e.g. including risk assessment associated with 'fortification of staples' varieties).

c. Research and Innovation Facilities (hard infrastructures, observatories, platforms, ...)

Workshop participants identified a need:

- for versatile instead of generic modeling technologies and methodologies to assess the impact of diet shifts in one place on local/regional/global food systems and on international trade. Harmonization and interoperability of models and data are important aspects to consider.
- to develop models for scenario testing/forecasting that can be taken up/used by all concerned actors for evidence-informed changes (sustainable agricultural practices, climate-neutral food transformation and retailing, dis/incentive for un/sustainable food value chains, consumer behaviour changes).
- to support affordable technologies for data collection in production sites (farms, connectivity conditions, etc...) to avoid asymmetric adoption and use of these technologies, between farmers, countries, etc. Capacity building will be necessary to ensure that individuals and organizations have the necessary skills to manage and share data effectively.
- to use data on trade of specific products (organic, alternative proteins) to monitor the level of transformation of food systems, with relevance given to place of origin, place of consumption, intermediate processing, etc.
- for an international protocol on nomenclature, format, frequency for data collection encompassing data collected at farm level, on transformed products (nutritional content, safety...), on retailers' practices, on consumer preferences and local/national/international policies and certification schemes (especially low cost and participatory standards and certifications in the context of small-scale producers). Data openness is essential (at local, research and industry levels).
- to develop a platform or venue for science-policy interface and for sharing local/country/regional/global experiences, transfer of knowledge, success stories, best practices coming from project implementation, open to all stakeholders using a common language for creating a common understanding.



3. Resilience and food security at European and global scales

a. General recommendations

- The EU should support other regions in the Global South in R&I with a focus on local food production, including the identification of local solutions and the integration of indigenous knowledge to make local food systems more resilient. In particular, the EU and African Union (AU) should align their priorities for food systems resilience and food and nutrition security.
- Food systems' transformation should include a focus on food production for local markets, improving local markets, implementing de-risking strategies, removing barriers to (global) food distribution, considering aspects of food quality, food safety, governance and consumer demand.
- Preparedness and tailor response capabilities should be enhanced to strengthen resilience
- Public sector should invest to develop the agri-food sector.
- Information asymmetry among value chain actors should be lowered while inclusive decision making should be promoted.
- Capacity building for all relevant food systems actors, including farmers and consumers, should be developed
- There is a need to invest in knowledge and education at all levels to foster system-oriented research and transformation.

b. Research needs

(hard infrastructures, observatories, platforms, ...)

Workshop participants identified a need:

- for a clear and refined concept of resilience to make it measurable at different scales.
- for research approaches that embrace an inclusive multi-actor approach (science, industry, policy, consumers/citizens) and frame resilience in a way that considers context and ecosystem-based dimensions as well as an actor perspective and their individual and collective capacities to adapt or transform (translocal and social resilience dimension).

- for a clear and refined concept of resilience to make it measurable at different scales.
- for research approaches that embrace an inclusive multi-actor approach (science, industry, policy, consumers/citizens) and frame resilience in a way that considers context and ecosystem-based dimensions as well as an actor perspective and their individual and collective capacities to adapt or transform (translocal and social resilience dimension).
- for holistic methodologies to measure and monitor the impact and performance of interventions and strategies and to analyze their trade-offs and co-benefits, e.g. short term costs vs long term benefits.
- to identify ways for scaling up local solutions for improving food systems resilience
- to identify and understand the link between diets and resilience.
- to identify effective and accepted climate adaptation measures and innovations to tackle extreme weather events.
- to develop common methods to measure the impact of diets and dietary changes on reaching climate goals and achieving greater food systems sustainability.
- to understand the impact of climate change on food systems and of food system transformation on climate goals.

c. Research and Innovation Facilities (hard infrastructures, observatories, platforms, ...)

Workshop participants identified a need:

- for observatories and mapping of food system resilience to gain knowledge on effective measures and conditions to improve resilience at different levels and scales. It was noted that when designing food systems observatories that it is important to keep their purpose in mind to be able to identify ways of comparing food systems outcomes and to scale up local solutions.
- It was also noted that observatories require open data policies and data-sharing, fostering collaboration and knowledge exchange:
 - observatories and resilience mapping require the definition of metrics and threshold values as well as coherent indicators and procedures.
 - developing observatories needs to take into account actor-orientation, context-specificity and bottom-up approaches, and should be built on existing tools and methodologies and integrate ongoing initiatives.
- to map all relevant food system practices and interventions (farming, distribution, policy level etc.).
- to improve local capacities and research structures for inter- and transdisciplinary research on food systems resilience, focusing on local investors and entrepreneurs and establishing open data policies.



4. Governance and policies for sustainable food systems

a. General recommendations

- Research outputs should be progressed to reach a sufficient technology readiness level to be scaled up and put into the market for adoption.
- Scientists need to deliver clear messages related to governance and policies on food systems transformation to policy makers as well as to the broader public, backed up by solid evidence.
- Environmental sustainability should be integrated into many research areas related to agrifood systems/nutrition.
- The Agricultural Knowledge and Innovation System (AKIS) should be strengthened to enhance adoption of innovations.
- The uptake of innovations should be fostered through targeted measures including for example innovation valleys, and innovations lab.
- Incorporation of the 'consumer angle'/'citizen angle' in research should be strengthened.
- Sharing of knowledge and best practices among countries in Europe and internationally should be encouraged to foster a global approach to addressing common challenges.
- Joint social sciences and "technical sciences" discussions about ways to improve the participation of and highlight the role of different societal groups should be undertaken.
- Training is needed for policy makers on how to use science effectively and efficiently in the political process (policy labs).
- Training for scientists and funding are needed to translate scientific evidence into recommendations that are of use to policy makers.
- There is a need for capacity building to enable farmers to better take part in the innovation process.
- Different ministries need to collaborate for joint programming and funding.
- Transparency and reporting on environmental and social performance through certification and disclosure mechanisms needs to be encouraged.

- Collaboration between private enterprises, including food producers, retailers, and distributors, and other stakeholders needs to be promoted to develop and adopt sustainable practices.
- Access to finances to support the uptake of innovation by stakeholders along the value chain needs to be improved.

b. Research needs

The workshop participants identified a need:

- to design guidelines for the development and operation of cross border value chains that will be mutually beneficial to the involved parties.
- to explore the potential of IT and AI solutions to develop sustainable solutions and to implement developed solutions by means of an open and respectful culture of discussion.
- to conduct research projects to determine the role and influence of specific societal groups, and to engage with different stakeholders to ease the transition towards sustainable food systems.
- to conduct environmental impact assessments of trade policies, including the carbon footprint of food transportation and production. At the same time, there is the need to explore ways to minimize negative environmental externalities and promote eco-friendly trade practices.
- to develop different governance approaches taking into account that needs are different according to the scale. Local approaches are also relevant to enable the interests of small-scale producers to emerge.
- for social standards to influence consumer behavior by promoting awareness of ethical considerations in food choices. Certifications and labels based on social standards help consumers make informed decisions that align with values related to fairness, social justice, and ethical production.

c. Research and Innovation Facilities (hard infrastructures, observatories, platforms, ...)

The workshop participants identified a need:

- to establish collaborative platforms between researchers, start-ups, small- and large-scale enterprises, where research outcomes can be scaled up.
- to establish living labs to act as innovation accelerators.
- to establish a Science-Policy Platform: This would include the development of networks that connect scientists and policymakers, fostering ongoing communication and collaboration. These networks can provide a space for the exchange of information, research insights, and policy priorities.
- to encourage and fund research projects and platforms that involve both scientists and decision-makers.
- to establish dedicated fora where different societal groups can find a safe space for discussion and to ensure they are represented in discussions on issues that directly impact their lives.
- to promote transparency in scientific research and communication, and to ensure accessibility of data and information (Open Science, European Open Science Cloud (EOSC)).
- to improve data accessibility and interoperability to channel research outputs related to governance through innovation mechanisms to foster a real impact on food systems transformation.

Commonalities across all sessions

Besides the diversity of the themes discussed, common needs were identified across all sessions. Such commonalities addressed how research should be conducted, noting the need for research processes that enable the integration of different actors, their diverse perspectives and different types of knowledge, and systems and structures that ensure good governance in relation to all research stages

The workshop participants commonly raised a need:

- for transdisciplinary and multi-actor approaches and capacity building to ensure systems perspectives. Embracing an inclusive multi-actor approach (science, industry, policy, consumers/citizens) and framing the problematic situation at hand in a way that considers not only ecosystem-based dimensions but also an actor perspective and their individual and collective capacities. Inclusion of all relevant actors and strengthening collaboration with private sector actors.
- to promote collaboration between private enterprises, including food producers, retailers, and distributors, and other stakeholders to develop and adopt sustainable practices.
- to surface the true costs of food, taking into account social and environmental as well as future costs. Need to develop appropriate methodologies and ways to also integrate aspects of time into models.
- to translate research results into customized messages for the different practitioners.
- for holistic assessments of systems and interventions, including all sustainability dimensions as well as time and scale related aspects.
- for local and innovative R&I approaches (e.g Living Labs, multilocal approach) while addressing global food system transformation.
- for platforms to share data and knowledge.
- for the definition and standardization of data and threshold values to feed coherent indicators for the monitoring of the global transformation and resilience of food systems. This would enhance consistency and interoperability between open platforms/dashboards and indicator frameworks.
- to understand and communicate the interrelationships between different indicators, in order to tell a more systemic and nuanced story.