

INRAE contribution to building Food 2040 Strategic R&I Agenda on Food Systems

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[INRAE](#), the French National Research Institute on Agriculture, Food and the Environment, welcomes the European Commission's commitment to deliver a new strategic R&I agenda (SRIA) on food systems and is ready to contribute with its expertise and resources to ensure Food2040 becomes a catalyst for the development of competitive, sustainable and resilient food systems solutions.

INRAE recommends four top priorities to guide Food 2040 and related R&I challenges:

- 1. Healthy, sustainable and affordable food** • Characterise the relationship between food and health • Develop a systemic multi-criteria quality approach throughout the food chain • Strengthen research on fermented foods as levers for healthy and sustainable diets • Leverage knowledge on gut microbiota toward better nutrition and health • Extend studies on the influence of food environments, better taking into account social/digital networks and mobility on food practices • Develop and test interventions based on theories of change to promote sustainable and equitable transitions, at both consumers and food environment levels • Deploy multi-criteria benefit/risk analyses for health and the environment • Food waste throughout the supply chain, including in households • Alternative proteins: integrate plant proteins and plant-based agrobiodiverse food into consumers' diets and eating habits; mild/minimal processing methods; think beyond protein sources and integrate plant-animal equilibrium in protein sources; assess market potential for various market segments • Strengthen and diversify assessment methods for food labelling (e.g. participatory guarantee systems) and on the co-evolution between supply and demand (e.g. local food systems) • Develop foresight on changes in consumer behaviour, consequences on food supply, and subsequent costs-benefits for human and planetary health • Develop targeted, easy-to-implement, and affordable dietary recommendations for different population segments and territories while ensuring their effective adoption and sustainability • Document alternatives to food banks to favour universal access to healthy food • Make nutrition and health the driver of food systems transformation.
- 2. One Health approach in food systems** • Microbiomes for One Health in the food systems • Risks related to food safety and quality in the context of climate change • Antimicrobial resistance; toxicological risks • Risks related to food and water security for humans • Food system governance schemes adapted to One Health • Exposome applied to food systems: develop integrated framework for measuring, monitoring and managing major and emerging pollutants (PFAS, plastics...) • Links between agricultural soil health and other components of One Health.
- 3. Impact of climate change on diets** • Managing shortages and considering lower use of resources, especially water • Food system consequences of adaptation of agricultural production to climate change (e.g. new crops) • Interaction of multiple transitions (food, climate, social, energy, demographic, economic) • Strengthening the study of the sociology of actors in the food chain (barriers to changes, lock in and drivers)
- 4. European food sovereignty and the competitiveness of European companies** • Agriculture-food-health nexus (nutrition-sensitive competitive agriculture) • Food-bioeconomy nexus • Food/climate change nexus • How to make public and environmental health a priority for national and pan-EU competitiveness of food sovereignty in the context of intra-EU and international competition, and international trade • Develop knowledge about food flows in relation with power issues (e.g. which actors control the flows) and health issues (e.g. how food quality evolves throughout the flows) toward better value distribution • Develop tools to analyse consequence of geopolitical instability on international food trade toward quick and efficient policy adaptation

Food 2040 should aim to reconnect human health concerns with the broader environment-agriculture-food systems nexus. Given that around 75% of the hidden costs of food systems are linked to **human health** impacts ([FAO 2023 Report](#)), policies and innovations should prioritise the benefits of transformative changes while carefully managing potential risks. Achieving this **holistic vision** also requires strengthening links with primary production stakeholders, the intermediaries, and the retailers, chefs, citizen-consumers and adopting a genuinely multi-stakeholder approach (beyond traditional R&D players). All actors across the food chain should be involved in this co-design while fostering stronger connections among these key stakeholders within food systems.

Thus, **the main added value of the SRIA is to envision the transformation of food systems towards sustainability and healthy diets and food security by co-designing options with all stakeholders** (and providing evidence for public policies and public-private partnerships). Developing a portfolio of projects that are consistent to address the **whole value chain of food systems**, the **value redistribution** as well as their embeddedness at **local scale** while addressing the **resilience of food systems to ensure food sovereignty** at European level can have a significant impact in accelerating the transition towards more sustainable and competitive food systems, not only at European level but at global level (ie through cooperation with countries from the Global South). Addressing **European food sovereignty** challenges the EU requires to define an integrated pan-member state vision of gaps and opportunities, consider R&I on multiple, compound and cascading risks as well as food value chains, food flows and (inter)dependencies.

Upstream research on food science & technology should not be overlooked as well as the field of social innovation. More financing should be planned to support core research (at low TRLs) on sustainable food to enable the emergence of tomorrow's solutions and technology and prepare the next generation of European innovations in the field. **The entire value chain, from fundamental research to applied research and innovation activities, must therefore be covered in order to promote long-term European competitiveness.** The agri-food sector offers numerous opportunities for technological development and promising innovations -including digital ones- that will boost European competitiveness and European economic diversity. Food 2040 must ensure that it mobilizes all stakeholders likely to contribute to strengthening European competitiveness.

Comments on the current Food 2030 framework

INRAE considers that **the four Food 2030 priorities are still relevant** and should be maintained, while further exploring the following R&I challenges:

1. **Nutrition.** The relationships between nutrition, gut microbiome and health including affordability should be considered. We need to fully integrate food environment and eating behaviours in nutrition and health concerns. Go deeper in nutritional needs and recommendations to vulnerable populations, including in the context of climate change, and rise of social vulnerability and food insecurity. Human health – through associations with nutrition and food in the one hand, and as part of One Health – should be considered as the main driver of food systems transformation.
2. **Climate & environment.** The pathways towards climate neutrality and climate resilience of EU food systems deserves more attention, since the stability and quality of food provision & procurement is increasingly threatened by climate change. Engaging with the many initiatives in the agri-food sector to diversify food sourcing, and promote greater agrobiodiversity from seed/breeds to plates, to decarbonize and adapt to climate change is essential for future proofed EU food systems. We recommend to continue the “zero pollution food systems pathway” with priority research on the exposome, alternatives to plastics and to pesticides, and on soil health, agroecology and (agro)biodiversity promotion.
3. **Circularity.** The end-of-life of food products, as well as their packaging, has to be systematically and fully considered in the early design of the proposed innovations. Benefits and risks of circularity should be evaluated, including food safety.
4. **Communities & innovation.** Short food value chains, compatible with agroecological farming minimal processing and local markets, involving all actors to combine (and not oppose) technological solutions and social innovations, develop food democracy and justice, as well as circularity proof of concept at a small scale.

On the **Food 2030 Pathways for action** there is room for further improvements to ensure stronger interconnections between the different pathways, which is essential to maintaining the holistic approach at the core of Food 2040. Several pathways are inherently linked—for example, clear connections exist between “Food Safety” and “Zero Pollution”, between “Food Safety” and the “Microbiome”, as well as between “Food Security” & “Food Production”. INRAE therefore strongly advocates that the Food 2040 framework actively supports and strengthens these cross-pathway interactions by 2040, as they are a key condition for delivering a truly integrated vision.

In conclusion, Food systems' R&I should greatly foster and contribute to:

- Improve the transformative resilience of EU food systems regarding multiple climate, health, economic, environmental, social, political, security risks (see [HLPE 2025 report](#))
- The emphasis on consumers' habits and expectations with respect to food innovation acceptance and resistance to changes
- Thoroughly review the current obstacles that hinder the necessary transformations and develop transformative toolbox
- European competitiveness, promoting individual and collective sustainable business models of different sizes