European Commission

Research & Innovation for Accelerating Food System Transformation

Operationalising FOOD 2030 through Living Labs

#FOOD2030EU

Research and Innovation

Research & Innovation for Accelerating Food System Transformation – Operationalising FOOD 2030 through living labs

European Commission

Directorate-General for Research and Innovation

Directorate B – Healthy Planet

Unit B2 - Bioeconomy and Food Systems

Contact Karen Fabbri

Email Karen.Fabbri@ec.europa.eu

RTD-PUBLICATIONS@ec.europa.eu

European Commission

1049 Brussels

Manuscript completed in December 2020.

Print	ISBN 978-92-76-25445-4	doi:10.2777/374723	KI-02-20-983-EN-C
PDF	ISBN 978-92-76-25446-1	doi:10.2777/122836	KI-02-20-983-EN-N

Luxembourg: Publications Office of the European Union, 2021

EUROPEAN COMMISSION

Research & Innovation for Accelerating Food System Transformation

Operationalising FOOD 2030 through Living Labs

Directorate-General for Research and Innovation
Healthy Planet

2021

EN

The FIT4FOOD2030 was key to supporting the European Commission implement the Food 2030 Research and Innovation Policy Framework throughout Europe. The work presented in this publication is the result of 3 years of extensive collaboration in the FIT4FOOD2030 project (2017–2020). This publication also builds upon previous European Commission FOOD 2030 publications such as: *FOOD 2030 – Future-proofing our food systems through research and innovation* (2017); the report from the Commission FOOD 2030 Independent Expert Group entitled *Recipe for Change: An agenda for a climate-smart and sustainable food system for a healthy Europe* (2018); and the Scientific Advice Mechanism independent export report entitled *Towards a Sustainable Food System* (2020).

We thank the coordinators of the FIT4FOOD2030 labs, the stakeholders involved in our project activities and the project partners for their tireless efforts and energy dedicated to working towards food system transformation. The content of this publication strongly builds on the contributions of the lab coordinators. This publication is a collective effort.

Editors. Kristiaan Kok, Laura Lucht and Jacqueline Broerse.

Contributing authors. Chrissie Brierley (ZonMw), Jacqueline Broerse (Vrije Universiteit Amsterdam (VU)), Barbaros Corekoglu (European Institute of Innovation and Technology (EIT) FOOD), Mads Dahl Gjefsen (Oslo Metropolitan University), Iva Doric (European Food Information Council), Tommaso Emiliani (EIT FOOD), Raymond Gemen (European Food Information Council), Kristiaan Kok (VU), Jonas Lazaro-Mojica (European Technology Platform Food for Life), Heather McKhann (Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (INRAE), Marjoleine van der Meij (VU), Cristina Paca (European Network of Science Centres and Museums), Barbara Regeer (VU), Helge Svare (Oslo Metropolitan University), Hugo de Vries (INRAE), Jolien Wenink (ZonMw) and Beatrix Wepner (Austrian Institute of Technology).

Cite as follows. Directorate-General for Research and Innovation (European Commission). (2021). *Research and Innovation for Accelerating Food System Transformation – Operationalising FOOD 2030 through Living Labs*. Publications Office of the European Union. https://data.europa.eu/doi/10.2777/122836

FIT4FOOD2030 coordinator and partners

Coordinated by: VU UNIVERSITY AMSTERDAM

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

ZonMw

JPI a healthy diet for a healthy life

ecsite EUROPEAN NETWORK SCIENCE CENTRES & MUSEUMS

eufic

OSLOMET OSLO METROPOLITAN UNIVERSITY WORK RESEARCH INSTITUTE AFI

The Research Council of Norway

FOODDRINK EUROPE

FACCEJPI

JPI OCEANS

SUSFANS Food systems for health, environment and enterprise in the European Union

eit European Institute of Innovation & Technology

WAGENINGEN UNIVERSITY & RESEARCH

IrsiCaixa Institut de Recerca de la Sida

INRAE

food for life

ESSRG Environmental Social Science Research Group

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Milano Comune di Milano

MILAN URBAN FOOD POLICY PACT

ILSI Europe International Life Sciences Institute

PRIMA IN THE MEDITERRANEAN AREA

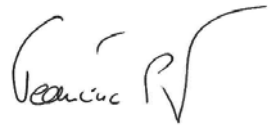
CONTENTS

FOREWORD

It gives me great pleasure to present this co-publication between the European Commission and the FIT4FOOD2030 project. Food Systems are at the heart of the EU Green Deal, the Farm-to-Fork Strategy, and the Next Generation EU recovery package, and are a central part of the EC's Bioeconomy Strategy and Action Plan. Securing a sustainable future for our food systems is a task of strategic importance requiring wholesale transformation and disruption of existing systems. Food systems, on the other hand, are complex non-linear, multi-actor, multi-level and multi-functional, and their transformation towards improved social, environmental and economic sustainability needs extensive analysis, study, and new and inclusive approaches. The Food 2030 research and innovation policy framework established in 2016 was one such approach, and its deployment across Europe was enhanced by the launch of the Horizon 2020 project FIT4FOOD2030 (2017-2020). The project engaged and promoted awareness of the Food 2030 policy framework to a wide range of food system-related stakeholders and audiences. It established and facilitated unique spaces for dialogue and collective visioning with the active involvement of European universities, research funders, technology and innovation platforms, industry networks, and science engagement organisations and civil society.

One of its objectives was to build upon the concept of 'living labs', which have emerged in recent years as instruments to tackle sustainability challenges through multi-stakeholder experimentation in real-life contexts involving diverse stakeholders. The results and lessons learned from the experiences of 25 'living laboratories' are described herein and they highlight essential cross-cutting conclusions, which can inspire researchers and policymakers across the EU. The overall exercise has provided evidence-based examples of Food 2030 impact, along with practical ways to lead and facilitate the engagement of actors addressing systemic issues, using the participatory approaches critically needed for food system transformation.

I strongly feel that the work of the FIT4FOOD2030 project has played a key role in helping us identify the changes needed to realise a food systems transformation that can deliver tangible co-benefits for nutrition, climate, circularity and communities. The approach advocated here, promoting the uptake of systems thinking and responsible research and innovation, needs to be amplified across Europe and demonstrated through continued transdisciplinary and transformative research and innovation efforts. A key success factor was its ability to demonstrate the impact of place-based deployment in towns, cities and regions. It has demonstrated that living labs, as spaces for multi-actor co-creation at multiple levels, can be effective catalysers of change to help implement the EU Farm-to-Fork Strategy and wider EU Green Deal priorities across Europe.



Jean-Eric Paquet

LIST OF INITIALISMS

COP	community of practice
DLA	dynamic learning agenda
EIT	European Institute of Innovation and Technology
ESSRG	Environmental Social Science Research Group
EU	European Union
R&I	research and innovation
RRI	responsible research and innovation
SFSN	Sustainable Food Systems Network
VU AMSTERDAM	Vrije Universiteit Amsterdam

1. INTRODUCTION

1.1. RESEARCH AND INNOVATION AS A CATALYST FOR FOOD SYSTEM TRANSFORMATION

Food systems face a number of **severe and persistent interlinked challenges**. These include environmental problems such as resource scarcity, excessive pesticide and herbicide use – contributing to biodiversity loss, pollution and decreased soil quality – and excessive greenhouse gas emissions. Furthermore, consumption patterns lead to malnutrition, which carries the triple burden of undernourishment, overweight and micronutrient deficiency – factors which coexist within countries and to some extent in individuals. These challenges point to the urgent **need to transform the world's food systems** in order to stay within planetary boundaries ([1]).

However, tackling these interlinked challenges is difficult as it is increasingly recognised that food systems can best be understood as **complex adaptive systems**. This complexity means that food systems are **multi-actor, multilevel and multifunctional systems** that exhibit **non-linear dynamics**, such as trade-offs, synergies and systemic feedback loops. Governing the transformation of complex systems is challenging as it involves managing uncertainties, systemic trade-offs, cross-sectoral interactions, power dynamics and conflicting perspectives.

Research and innovation (R&I) could serve as catalyst for food system transformation ([2]). While traditional R&I has been successful in contributing to solving problems in specific food system sectors or departments, **current R&I systems are not fully equipped to contribute to food system transformation** precisely because they are unable to effectively address the complex dynamics of food systems as a whole. To effectively deal with this complexity, **R&I should be inter-sectoral, multi-stakeholder, multifactorial, interdisciplinary and transdisciplinary** ([3]). Such transdisciplinary processes aim to stimulate learning, problem-solving and co-production of knowledge between science and society, in order to tackle complex societal challenges ([4]). Therefore, in addition to traditional R&I, there is a need for these novel R&I efforts.

([1]) Willett, W. et al., 'Food in the Anthropocene: the EAT–*Lancet* Commission on healthy diets from sustainable food systems', *The Lancet*, Vol. 393, No 10170, 2019, pp. 447–492; Rockström, J. et al., 'Planet-proofing the global food system', *Nature Food*, Vol. 1, 2020, pp. 3–5.

([2]) Den Boer, A. C. L. et al., 'Research and innovation as a catalyst for food system transformation', *Trends in Food Science & Technology*, 2020.

([3]) European Commission, *FOOD 2030 – Future-proofing our food systems through research and innovation*, Publications Office of the European Union, Luxembourg, 2017.

([4]) Thompson Klein, J. et al., *Transdisciplinarity: Joint problem solving among science, technology, and society: An effective way for managing complexity*, Birkhäuser Basel, 2001.

However, such transformative approaches to R&I are far from easy to adopt in practice. They not only require fundamentally different ways of thinking about and carrying out R&I but also require stakeholders to deal with systemic environments in which these principles are barely stimulated ([5]). This means there is a need for a **coupled transformation** of not only food systems but also R&I systems ([6]).

1.2. THE FIT4FOOD2030 PROJECT

In order to adapt European R&I systems for food system transformation, the European Commission launched the **'FOOD 2030' R&I policy framework**. Through the implementation of FOOD 2030, the Commission aims to tackle food and nutrition security challenges with R&I policies that are designed to future-proof European food systems, making them sustainable, resilient, diverse, inclusive and competitive, for the benefit of society. The framework integrates R&I into four key food and nutrition security priorities: (1) **nutrition** for sustainable healthy diets, (2) **climate-smart** and environmentally sustainable food systems, (3) **circular** and resource-efficient food systems and (4) **innovation** and empowerment of communities. In particular, the framework supports the uptake of multilevel, cross-sectoral and transdisciplinary R&I efforts across the European Union (EU) in an effort to future-proof food systems through different ways of performing and organising EU food systems' R&I.

In support of the implementation of the FOOD 2030 policy framework and to contribute to the transformation of R&I systems at European, national and local levels, the **Horizon 2020 project FIT4FOOD2030 (2017–2020)** was established. The FIT4FOOD2030 consortium comprised 16 organisations across Europe, representing universities, research funders, technology and innovation platforms, industry networks and science engagement organisations. As a **coordination and support action project**, its main objective was to create a sustainable, multi-stakeholder **FOOD 2030 platform** to mobilise a wide variety of European food system stakeholders.

1.3. THE FIT4FOOD2030 APPROACH

In order to contribute to the required dual transformation, FIT4FOOD2030 developed and implemented a **theory of change** that aimed to address multiple systemic leverage points in EU food systems' R&I. This theory of change supported the development of the FOOD 2030 Platform, by **(1) strengthening R&I policy coherence and alignment, (2) building food**

([5]) Fazey, I. et al., 'Transforming knowledge systems for life on Earth: Visions of future systems and how to get there', *Energy Research & Social Science*, Vol. 70, Article 101724, 2020.

([6]) Kok, K. P. W. et al., 'Transforming research and innovation for sustainable food systems – A coupled-systems perspective', *Sustainability*, Vol. 11, No 24, 2019.

systems' R&I capabilities and (3) raising awareness. The FOOD 2030 Platform comprises three interlinked structures:

- **the EU Think Tank**, linking the platform to the Commission, serving as a sounding board and developing policy briefs;
- **11 Policy Labs** at the national/regional level, bringing together multi-stakeholder networks to develop shared visions for national/regional food system transformation and experiment with new ideas for R&I policymaking, focusing on aligning R&I policies and programmes on food and nutrition security;
- **seven City Labs** and **seven Food Labs** at the local/regional level that develop shared visions for local food system transformation and pilot action-oriented training for students, citizens, researchers and professionals in co-creation processes.

The 25 FIT4FOOD2030 labs serve as real-world laboratories for co-creation and experimentation. Though these labs are highly diverse in their respective focuses, they build on the **'living labs'** that emerged in recent years as instruments to tackle sustainability challenges through **multi-stakeholder experimentation** ([7]). Living labs facilitate experimentation that is relevant to real-life contexts and are characterised by their equal involvement of diverse stakeholders in creating concrete and sustainable societal value. Through the use of **participatory methodologies and reflective learning**, FIT4FOOD2030 labs have brought together networks of diverse groups of stakeholders (policymakers, researchers, educators, practitioners and citizens), including **groups and individuals who are often excluded** from such discussions (e.g. civil society organisations and farmers), to develop interventions at city, regional and national levels. These networks operated as a **community of practice (CoP)** ([8]).

Central to the theory of change in the project and its labs is the concept of **responsible research and innovation (RRI)**. RRI emerged as a means to democratise and legitimise processes of science and technology and to improve their societal impact ([9]). It is a dynamic, iterative process by which all stakeholders involved in the practice of R&I become mutually responsive and **share responsibility for the outcomes and processes of the R&I**. RRI activities aim to align a wide range of actors and activities involved in R&I processes with desirable, sustainable and acceptable future outcomes. RRI processes are based on the following principles: (1) diversity and inclusion, (2) openness and transparency, (3) anticipation and reflection and (4) responsiveness and adaptive change.

([7]) Schäpke, N. et al., 'Labs in the real world: Advancing transdisciplinary research and sustainability transformation: Mapping the field and emerging lines of inquiry', *GAIA – Ecological Perspectives for Science and Society*, Vol. 27, No 1, 2018, pp. 8–11; McCrory, G. et al., 'Sustainability-oriented labs in real-world contexts: An exploratory review', *Journal of Cleaner Production*, Vol. 277, Article 123202, 2020.

([8]) A **CoP** brings together a group of stakeholders that share an interest in a particular topic or problem. Within the community, key values include reflection and learning from each other through regular interactions.

([9]) Owen, R. et al., 'Responsible research and innovation: From science in society to science for society, with society', *Science and Public Policy*, Vol. 39, No 6, 2012, pp. 751–760.

FIT4FOOD2030 set in motion change towards the urgently needed food system transformation by promoting the uptake of systems thinking and RRI in the transformative networks of the 25 living labs and beyond, thereby fostering transdisciplinary and transformative R&I efforts in Europe. An overview of the FOOD 2030 Platform, including the locations of all the labs and the EU Think Tank, is presented in Figure 1.

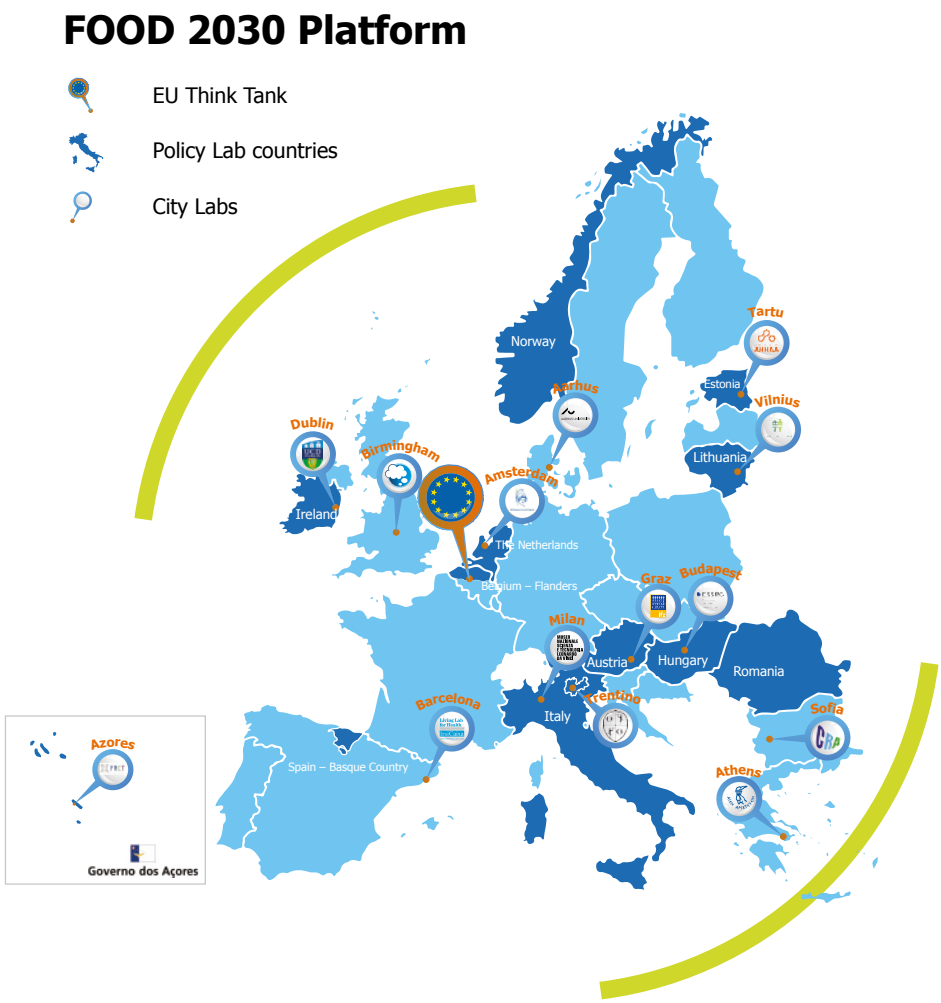


Figure 1. Overview of the FOOD 2030 Platform.

1.4. OVERVIEW OF THIS PUBLICATION

In this publication, the **lessons and learnings from FIT4FOOD2030** are presented. Emphasis is placed on the outcomes, learnings and processes of the labs in the FOOD 2030 Platform. In **Section 2**, the key outcomes of the City, Food and Policy Labs are presented. In **Section 3**, some of the key findings with regard to processes and learning in labs are highlighted. Subsequently, **Section 4** elaborates on the different tools that have been developed through the project and used to support the labs and other actors in their efforts to (1) increase system understanding and (2) foster system transformation. Finally, in **Section 5**, recommendations from and implications of the lessons learnt in the FIT4FOOD2030 project are presented with regard to some relevant developments within EU food systems' R&I, such as the development of the Commission's 10 R&I pathways, R&I funding and programming efforts, future R&I projects and the development of multi-stakeholder (food systems) partnerships.

2. KEY OUTCOMES OF THE LABS

2.1. CITY AND FOOD LABS

FIT4FOOD2030 supported 12 city-level and two regional-level labs that aimed formally to **build food systems' RRI capabilities** and **raise awareness** of food system transformation and related initiatives and action plans among a wide range of audiences. An underlying objective was that of **laying the foundations of a transformative network** of stakeholders who would eventually form a CoP.

The project's experience has shown that City and Food Labs, implemented as tangible spaces for experimentation at the city level, can be a powerful instrument in building collaborative networks of stakeholders that work together to deliver concrete goals.

2.1.1. HOW DOES A CITY OR FOOD LAB WORK?

City and Food Labs are hosted by organisations that are integral in different ways to the lifelong skill building of different target audiences: schools, science centres and museums, science shops, living labs, universities and research centres. This diversity matches the wide range of audiences targeted by the project's skill-building activities: school students, university students, researchers, professionals and society at large. Nevertheless, all labs have a common wish to act as an interface between R&I and society, and embed the principles of RRI in their work and local communities.

Lab activities took the form of continuous stakeholder engagement and a mix of workshops, multi-stakeholder meetings and consultations, following a broad, shared approach with the following characteristics:

- **iterative stakeholder work**, mapping and identification, and communication and engagement;
- **building a shared vision**, chosen as it can both generate compelling statements about preferred futures and act as a starting point for thinking about concrete recommendations and transformations;
- **fostering local food system knowledge and understanding**, by exploring trends, current R&I initiatives and potential breakthrough developments, as Section 4 further elaborates;
- **co-developing roadmaps**, such as identifying the capabilities needed or working on concrete R&I agendas;

- **action planning**, be it through imagining, shaping, testing and further adjusting a series of skill-building modules, or further specifying action plans to implement R&I agendas and local plans;
- **scaling, embedding and translating innovations**, through actions such as further implementation, focused on the adaptability of the tools by testing them at another location, or securing further funding, consolidating partnerships, and so on.

FIT4FOOD2030 has laid down a general framework but actions on the ground were further adapted to local needs, the characteristics and expertise of the host institution, the nature of the local ecosystem and the partnerships they were able to form. In general, lab coordinators remarked that setting up a network is a challenging task that involves **various uncertainties**. In particular, it requires active listening, tapping into stakeholders own growing networks and being able to identify and exploit different windows of opportunity. Boxes 1 to 9 delve deeper into these reflections.

2.1.2. IMPACTS AND OUTCOMES

The impacts that the FIT4FOOD2030 City and Food Labs have achieved thus far can be divided into concrete products and outputs, and impacts that are more difficult to measure, but no less important.

Concrete outputs include the following.

- **A set of 18 skill-building modules**, of different durations, tackling a range of skills and targeting different audiences, offering a rich variety of options (see Figure 2). All modules were piloted in two locations and implemented with over 2 000 recipients. The modules use a range of methods to open up discussions of food systems, with a preference for hands-on approaches and learning.

BOX 1. EXAMPLES OF EDUCATIONAL MODULES DEVELOPED BY THE CITY LABS

Systems Thinking for Food System Sustainability. Developed by the Environmental Social Science Research Group (City Lab Budapest), Hungary.

Systems Thinking for Food System Sustainability is an intensive facilitated learning journey for higher education students and early career professionals working in research, policy, business or civil society organisations. The course develops food systems thinking and encourages participants to approach the food system holistically and critically and with multiple perspectives in mind while taking responsibility for their actions. Participants are guided through a co-creative, experiential learning-based process,

where they also engage with their local food environment through a specific challenge they identify.

The Environmental Social Science Research Group was able to turn the challenge presented by COVID-19 into an opportunity by translating the course to an online format, and in the process creating an e-learning platform that can further support the democratisation of knowledge by inviting local communities and civil society organisations to become collaborators.

This is one of five different approaches to understanding the food system that City Lab Budapest has experimented with in FIT4FOOD2030, engaging more than 280 participants between April 2019 and September 2020. All programmes aimed to support the shift from the current linear model towards encouraging systems thinking among various target groups, from primary school students to adult practitioners.

Food and Vacuum. Developed by Science Centre AHHAA (City Lab Tartu), Estonia.

This activity invites students and families to explore the phenomenon of vacuums first-hand, giving them the opportunity to make their own vacuum chamber to exemplify two methods of food preservation – vacuum packaging and freeze drying. This serves as the background for a discussion of how science and research are an integral part of the food system and introduces a method of food preservation with significant future potential – freeze drying. The module quickly became a fixture in AHHAA's programme, being a favourite among in-house explainer staff (who have some flexibility to choose the daily workshops and activities they offer to the public).

The popularity of this module both internally and among Estonian teachers taking part in teacher training led to further investment in student worksheets and teacher guidelines. Delivered to homes and schools in activity boxes containing the necessary materials, these resources allow for hands-on experimentation and discussions to continue even when many spaces for public engagement are closed, as is the case during the COVID-19 pandemic. The host of Food Lab Birmingham, Thinktank Science Museum, also collaborated with a local school to this effect, creating a mitigation measure to allow the project to continue to have an impact on communities.

Valuable Market. Developed by the Leonardo da Vinci National Science and Technology Museum (City Lab Milan), Italy.

This module covers the recovery of wasted food or produce at risk of becoming food waste in neighbourhood markets, and hands-on scientific experimentation to learn about its nutritional value and group reflection on solutions. The activity is cross-curricular, bringing together a wide range of subjects such as biology, chemistry and social studies, but is also attractive for adults and families with children, and introduces participants to a wide associative sector fighting food waste and food poverty through social innovation. The module emphasises the little choices everyone can make in everyday life, and links scientific content with personal habits and the perception of food, its quality and appearance, fostering a reflection on responsible and sustainable behaviour sustained by further knowledge of food properties and nutritional value.

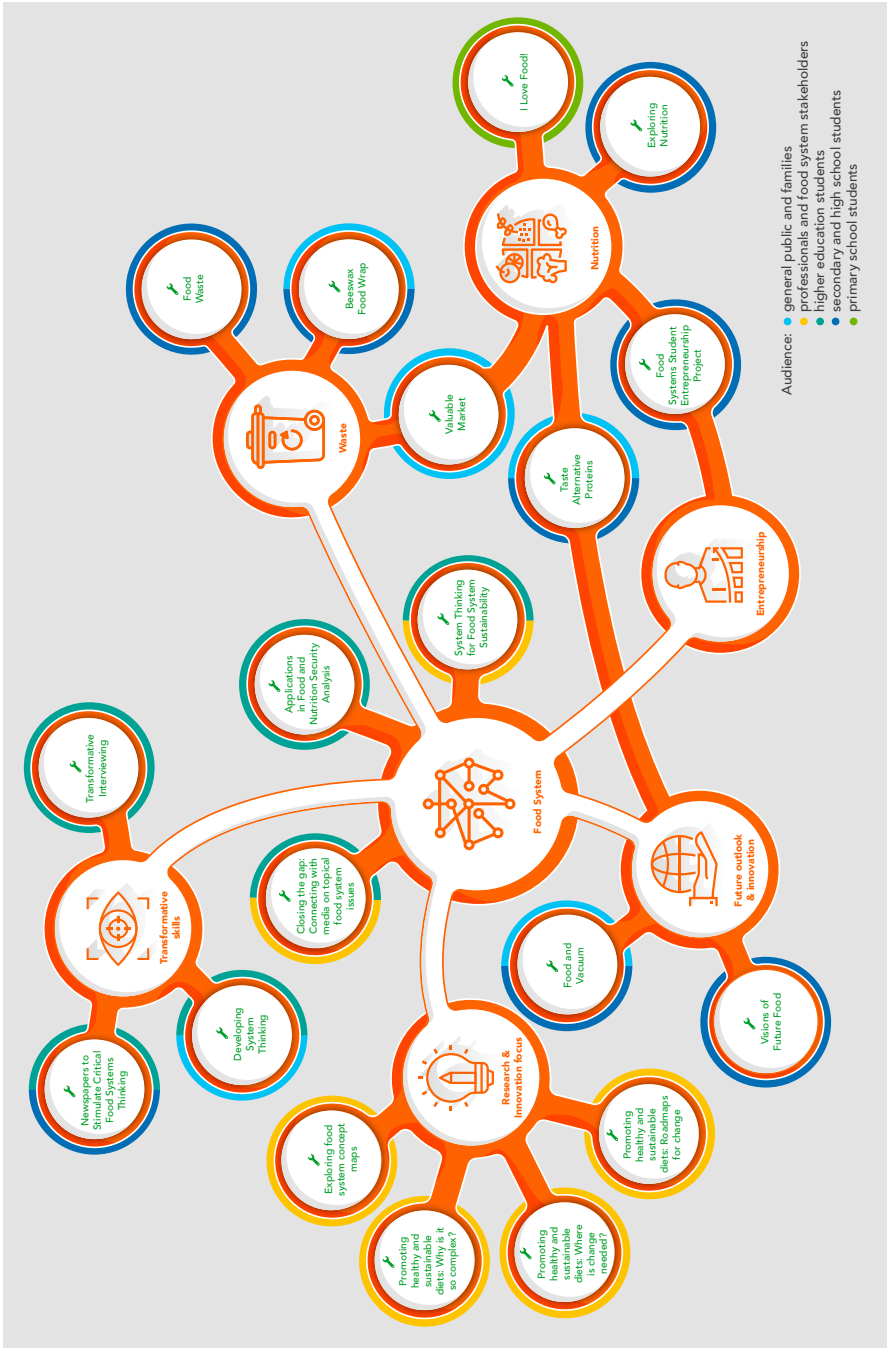


Figure 2. Overview of the different modules developed by the FIT4FOOD2030 City Labs, their audiences and their relations to different focal areas in food systems and to R&I.

- **Network building that empowers local R&I initiatives** (involving over 1 200 stakeholders), from networking opportunities and a meeting point, to the opportunity to explore in-depth systemic issues with multi-stakeholder perspectives around the table. Lab coordinators have recognised a change towards stakeholders showing greater awareness of the need to do the work together. Participants report favourable impressions of the methodology used and the collaborative nature of the meeting.
  - Food Lab Dublin, led by University College Dublin's Institute of Food and Health in partnership with other organisations based in the city, saw the consolidation of a stakeholder group, comprising funding agencies, policymakers, industry, research organisations and interested citizens, who have already worked together on developing various concept maps around transformation of food systems, and dived into exploring the barriers to urban food system transformation in Dublin. This has been met with overwhelmingly positive feedback.
  - There is a sense of belonging to a European CoP: for example, a lab stakeholder who attended a meeting in Italy later became a moderator in their home country of Lithuania in the activities of Food Lab Vilnius hosted by the Institute of Social Innovation.
- **R&I agendas and other local action plans** that embed FOOD 2030 aspirations and lab priorities into the local environment, in some cases with further funding secured to continue working on the priorities and strategic lines identified.
  - In Budapest, some of the priorities identified during the FIT4FOOD2030 workshops – sustainable healthy diets, state school food procurement, the situation of small farmers and a reduction in food waste – are being taken up by the lab host, Environmental Social Science Research Group, in a new EU-funded project with a particular focus on facilitating collaboration between farmers, consumers, local governments and other actors ([10]).
  - In Barcelona, an agreement between the lab host, IrsiCaixa Living Lab for Health, Barcelona City Council and Spain's largest banking foundation, 'la Caixa', provides for further cycles of workshops and a collective action plan for the promotion of healthy and sustainable diets (as Box 2 further details).
  - The City Lab based at the Athena Institute of VU Amsterdam is facilitating the building of a food-related R&I agenda for the municipality of Amsterdam via its participation in the 'academic workplace on food' ([11]) initiative (as Box 3 further details).
  - The Food Lab activities of Fondazione Edmund Mach brought together 60 stakeholders for joint knowledge production about Trentino's contributions to R&I: leverage points, what is already being done and future directions to prioritise, as Box 4 further explores.

([10]) See EU-funded project 'collaborative agri-food chains: driving innovation in territorial food systems and improving outcomes for producers and consumers'.

([11]) An academic workplace (in Dutch: *academische werkplaats*) is an academic laboratory – a knowledge infrastructure in which people from practice, research, policy and education work together on resolving issues.

BOX 2. CITY LAB BARCELONA – HOSTED BY THE LIVING LAB FOR HEALTH AT IRSICAIXA

City Lab Barcelona is pursuing a transition towards a more systemic and collaborative model of promotion of sustainable healthy diets through a CoP, with collective strategies and leading to a redesign of organisations' strategies and individual strategies for change (from several approaches: changes in habits at an individual level, changes in the food environment and changes in the R&I system). The validation of a collective strategic plan identified a collective need for change along several key strategic lines: governance, education, communication and access to food products and services. A collective action plan, including the ideation of solutions along those strategic lines, took place in the autumn of 2020, and the first steps for changes in organisations' strategies were established. The next cycle of activities, planned for early 2021, begins implementation through concrete pilot projects and will continue the iterative cycle of systemic strategic reflections and monitoring. This will be complemented by events for mutual learning and new collaborations.

So far more than 48 organisations and 113 key stakeholders have participated in the CoP's workshops, where the lab has piloted innovative methodologies inspired by systems thinking, RRI, foresight and theories of change such as the multilevel perspective. Some of those methodologies can be explored in the project's Knowledge Hub.

BOX 3. CITY LAB AMSTERDAM – HOSTED BY THE ATHENA INSTITUTE AND SCIENCE SHOP, VU AMSTERDAM

To ensure long-term impact, FIT4FOOD2030 principles were embedded in the curriculum by transforming several existing bachelor's and master's degree courses towards more transdisciplinarity and deep learning, getting students working on real-life cases with real-life stakeholders from the food system. Since as early as 2018, the food council of the Amsterdam metropolitan region has acted as a research commissioner for first-year master's students, mapping bottom-up initiatives and the collaborative governance developed around them, and the role the local government could play.

Furthermore, there are hopes that practices can become even further anchored at VU Amsterdam. In parallel, the lab host is involved in a recent initiative by the municipality of Amsterdam, an academic workplace on the topic of food. Academic workplaces act as knowledge infrastructures in which practice, research, policy and education work together. The longer-term goal is to build a food-related R&I agenda for the Amsterdam metropolitan region via this workplace. A visioning workshop and a first meeting dedicated to 'the role of consumers in the transition towards a healthy and sustainable food system', both featuring representatives of the quadruple helix (research organisations, industry, policymakers and civil society organisations), were facilitated by City Lab Amsterdam in 2020. Both took place online.

BOX 4. FOOD LAB TRENTINO – HOSTED BY FONDAZIONE EDMUND MACH

Located in a both rural and mountainous region in the Italian Alps, the area of Trentino has developed cooperative approaches to counterbalance its fragmentation. Fondazione Edmund Mach's Food Lab activities fall into these efforts of mobilisation: 60 participants, representing primary producers, companies, cooperatives, citizens, young students active in climate change initiatives, non-governmental organisations, municipalities and local government actors, worked together on joint knowledge production about Trentino's contributions to R&I. The leverage points identified and discussed were:

- governance and system changes;
- biodiversity protection (in environmental, agricultural production and farming practices);
- reducing food waste and loss by half (through food waste recovery, valorisation and biodegradable packaging);
- consumer engagement, trust and consciousness – shifting towards new lifestyles.

Building resilience to global and climate changes, maintaining competitiveness in a mountainous environment in terms of technology, knowledge, capabilities, respect for values, ensuring training for excellence at all levels and acting as a CoP and a knowledge hub were considered the main pillars upon which a future-proof local food system would need to rest.

Other impacts achieved by the FIT4FOOD2030 City and Food Labs include the following.

- **Enhancing the lab hosts' own capacity to act as a resource hub, network builder and mediator.** The City Lab experience has pushed strong partners in the key RRI areas of public engagement and scientific education onto the radar of other food system actors, illustrating the benefits of such an approach and making complementary expertise more visible. The submission of joint funding applications, invitations to policy discussions and further collaboration were mentioned.
- **Catalysation, often in unexpected ways, of local developments.** In Sofia, the City Lab's collaboration with a partner school provided the impetus to establish a dedicated food club, setting an example for other schools to follow. The club secured funding from Junior Achievement Bulgaria to put its concrete plans for the school into practice (as Box 5 further details).
- **Synergies, especially in participatory processes, with an appreciation for the methodology developed by FIT4FOOD2030.** For example, by becoming a Food Lab, the iFOOD Aarhus University Centre for Innovative Food Research was able to build synergies and foster learning on methodologies and consolidating learning while running two EIT

FOOD projects on public engagement – 'future proteins' and V-Place – finding inspiration to reorient planning and make changes to citizen surveys.

- **Testing of project tools and experiences in different locations and in relation to various audiences.** This included vulnerable and socially marginalised groups in disadvantaged neighbourhoods, such as in Food Lab Graz, with strong involvement from local actors such as community centres (as Box 6 further details).

Further activities are still anticipated by most labs after the end of the project, be it immediately, thanks to the pragmatic embedding of activities into everyday settings, such as maintaining existing relationships and institutional changes, or through additional funding, or with longer-term pay-offs. One such example is Thinktank Science Museum, host of Food Lab Birmingham, which plans to use its work in FIT4FOOD2030 to explore food system sustainability in a new permanent gallery entitled 'Our Changing Planet' in the coming years.

The project leaves behind a CoP open to continuing the reflective spirit of the project and aware that the capacity-building objective is in its initial phase.

BOX 5. CITY LAB SOFIA – HOSTED BY THE CENTRE FOR RESEARCH AND ANALYSES

In Sofia, the City Lab's collaboration with a local school catalysed the establishment of a dedicated food club, setting an example for other schools to follow. A key aspect of the club was the opportunity it offered high school students to become mentors: they prepared and facilitated the delivery of the modules built as part of the project to younger pupils. Tackling food transformation topics while maintaining a focus on different skills that complement existing content and add further incentives for participation – such as running a website or building their entrepreneurial knowledge – is a theme that continued throughout the activities of the food club. Students put their research and statistical knowledge into action and won a national prize for their investigation of student eating habits, which also won recognition in an international statistics competition for students. Building on that knowledge, and with support from the City Lab in reaching local food system stakeholders, the students developed a business plan to establish green zones – eco-friendly corners in the school where students can eat home-made food, share a variety of information related to the food system and recycle. Two such zones have already been built, putting students' own plans for the school into practice, thanks to a variety of funding streams, including a national prize from Junior Achievement Bulgaria. The educational modules and practices have been widely disseminated in Sofia and beyond.

BOX 6. FOOD LAB GRAZ – HOSTED BY THE INTERDISCIPLINARY RESEARCH CENTRE FOR TECHNOLOGY, WORK AND CULTURE

Food Lab Graz chose to focus on socially deprived neighbourhoods, addressing issues of sustainable food systems with a strong social justice angle in two neighbourhoods in Graz. Trust building was fundamental to their success. Having to establish direct connections and trust with local residents, the lab coordinators worked closely with local community development centres that support the neighbourhoods in their daily functioning (such as offering opportunities to cook and eat together). It proved a challenging but rewarding task: such local actors are open to new ideas but also need to see the value in what the Food Lab brings to them in terms of articulating problems and needs. In line with the RRI approach, ideas and methodologies were brought to the table for co-creating with different partners. Moreover, linking the workshop to an event which is held regularly was very beneficial, since it enabled an easy way of communicating, familiarity and open-mindedness. The collaboration paid off and local participants – noting that it was the first time that somebody had been interested in their point of view on the topic – expressed an interest in seeing and contributing to changes towards a more sustainable food system. Based on the partnership with the two community centres, and in cooperation with the Regional Centre of Expertise at the University of Graz, a joint project proposal for follow-up Food Lab activities was submitted.

BOX 7. CITY LAB MILAN – HOSTED BY THE LEONARDO DA VINCI NATIONAL SCIENCE AND TECHNOLOGY MUSEUM

The lab coordination team of City Lab Milan emphasises the reflexivity necessary for the bottom-up processes: 'With both the satisfaction from the fulfilment of the action and the awareness of the crises passed, we feel that we learned a specific lesson: when setting a bottom-up process within such large domain as the food system, it is probable that different interests and mindsets will be present at the same table and that creating a common and authentic agenda will not be immediate, with consequences on stakeholder engagement. Therefore, the steps foreseen for such process should take into account different moment of stasis: longer phases that include time and resources for "trial and error" steps, in order to really have the chance to integrate all the feedback (implicit and explicit) that emerge.'

BOX 8. CITY LAB ATHENS – HOSTED BY ELLINOGERMANIKI AGOGI

In synergy with the European Commission's initiative on open schooling, City Lab Athens pursued the transformation of the lab host – a school with over 2 000 students – towards an open ecosystem where knowledge is made part of students' lives via projects responding to societal needs and in connection with real-life stakeholders. Innovative educational formats, developed with the input and collaboration of different stakeholders, were at the heart of this process; notably, a multidisciplinary project for student entrepreneurship around food and nutrition security was developed.

Ellinogermaniki Agogi's participation in two new EU-funded projects – as an accelerator lab for FoodSHIFT20230 and as the coordinator of 'schools as living labs' – will sustain activities and continue the expansion of the network. It is worth noting that two stakeholders of the City Lab, the municipality of Pallini and Draxis Environmental, have stepped into the roles of lab host and lab assistant in FoodSHIFT2030. Together, they seek to reconnect young people with the land and nature and use summer courses to promote healthy eating and plant-based foods. The transformation of school operations, for example through solutions for using leftovers in school canteens and kitchens, is also an ambitious next step.

BOX 9. FOOD LAB AZORES – HOSTED BY THE REGIONAL FUND FOR SCIENCE AND TECHNOLOGY OF THE REGIONAL GOVERNMENT OF THE AZORES AND THE AZORES ENVIRONMENT MONITORING CENTRE OF THE ANGRA SCIENCE CENTRE

An archipelago-wide debate on the pathways of 'food waste and resource efficiency' and 'food from the oceans' was fuelled by a programme of workshops, educational activities and events, both online and offline. The topics linked to the FOOD 2030 agenda resonated well with audiences and attracted diverse groups of citizens. The Food Lab highlighted as opportunities a number of local and national R&I initiatives such as biodegradable packaging materials that are already present in the Azores – pineapple 'leather' and banana and fungi fibres – and local know-how and traditions around seaweed collection and its use in food. The involvement of stakeholders such as researchers and companies brought different co-benefits to the fore, such as entrepreneurial opportunities. This programme culminated in the presentation of the results to an even broader audience at the European Researchers' Night of 2020, MacaroNight.

2.2. POLICY LABS

FIT4FOOD2030 has shown that R&I Policy Labs, as a novel instrument for system transformation, can be used effectively in different settings. The project supported **nine national and two regional Policy Labs** that aimed to increase the impact of R&I on food system transformation by **strengthening R&I policies**. This strengthening takes the form of aligning and innovating policies to achieve more policy coherence, which can be defined as designing policies to be mutually reinforcing across departments and agencies, creating synergies towards achieving agreed objectives. Policies in this context should be thought of in a broad sense, at different levels, including **governmental programmes and strategies**, but also **funding instruments and regulations**.

2.2.1. HOW DOES A POLICY LAB WORK?

System change is difficult to achieve inside established, routine policymaking structures and circles. It is a longer-term process of participation, discussion and experimentation, out of which a new, sustainable system can emerge. The Policy Labs are therefore set up as **participatory and experimental spaces**, offering a structure to bring stakeholders together in a **series of interrelated meetings with dedicated themes and methods**.

To achieve these changes, **Policy Labs build a network of diverse stakeholders** from different parts of the food system, making a point of including people who are not usually involved in policy discussions. Together, the stakeholders **analyse the current food system and related R&I system** in their country or region, identify barriers and opportunities and work on innovating R&I policies. Central aspects of this process are a holistic approach and **RRI**. Involving a wide range of stakeholders is important in order to create a comprehensive picture of current systems, benefit from diverse thinking power on solutions and build support for change.

The labs proceed in four main phases with key activities, as shown in Figure 3. First, the coordinator of the lab starts to build the stakeholder network in preparation for the first meeting.

Then, together, the stakeholders work on the following aspects.

1. **System awareness and analysis.**

- Understanding the food system in the local context.
- Understanding the stakeholders' main challenges and knowledge gaps.
- Mapping relevant research agendas, programmes and regulations.
- Ensuring no stakeholders have been missed out.

Figure 3. The Policy Lab 'honeycomb', showing the phases of the lab process.

2. **Visioning and pathways.**

   - Discussing and agreeing on a collective future vision of the food system.
   - Analysing the barriers and opportunities in the R&I system.
   - Starting to draft a roadmap to improve the R&I system, so that it can better support the realisation of the vision.

3. **Experimentation and innovation.**

   - Deciding on promising ideas and how to put these into action during the next year or so.
   - Agreeing on expectations, indicators and monitoring. When is an experiment a success? How can the outcome contribute to a sustainable change in food systems' R&I?
   - Who will be involved in the experiments and how?

4. **Continuity and legacy.**

   - Evaluating the impact of and lessons learnt from the lab so far.
   - Discussing what will or should happen with the outcomes. What needs to be done in terms of communication and dissemination?
   - How will the work of the lab continue, and what will happen to the stakeholder network?

This structure is necessarily quite abstract and really a general outline. As local contexts and starting points are very different, **there cannot be a blueprint**, and each lab has to figure out its own path to a high degree, **being responsive and adaptive** along the way. Boxes 10 to 13 further elaborate on reflections from the labs on these phases, as well as on outcomes, impacts and experiences of the Policy Labs.

BOX 10. REFLECTIONS ON THE DIFFERENT PHASES OF THE POLICY LABS

Policy Lab Estonia identified the following food system issues:

- significant public health concerns resulting from unhealthy eating habits and unbalanced diets: 50 % of adults are overweight;
- the lack of general consideration of the overall food system and possibilities for innovation in each step of the food chain (including food loss and long supply chains);
- a common discussion platform for all key players in the food system is lacking;
- planned activities are not always coordinated between ministries;
- scattered engagement events – different components of the food system are handled by different departments in different ministries.

Policy Lab Flanders on experimentation:

'Another experimental issue is that research policy in Flanders is mostly bottom-up. This means that there is hardly any top-down thematic steering, certainly not in basic research. To work towards a thematic research agenda, also for basic research, is very innovative for the Flemish government. In the meantime, the mission-oriented research and innovation policy is gaining ground and other thematic research programmes have recently been set up on the basis of a choice made by the policymakers.'

2.2.2. IMPACTS AND OUTCOMES

The impacts that the FIT4FOOD2030 Policy Labs have achieved thus far can be divided into concrete products and outputs, and impacts that are less tangible, but no less important.

Concrete outputs include:

- the development of **integrated food system research agendas**;
- launching **transdisciplinary calls** for projects on food system transformation;
- input from the Policy Labs being taken up in **national strategies**;
- **formalised mirror groups** for continued discussion on these topics.

BOX 11. EXAMPLES OF CONCRETE OUTCOMES OF THE POLICY LABS

Policy Lab Italy on their input on a strategic plan:

'Regarding the outcomes, a final report of the three meetings we had will be written, which will also contain the information from the consumer survey we are conducting. On the basis of this report, information will be taken, among other things, for the updating of the strategic plan for innovation and research in the agri-food sector for the 2021–2027 programming period.'

Policy Lab Hungary on a new mirror group:

'The work of the Hungarian FIT4FOOD Policy Lab has clearly demonstrated the need to continue the work started. With the support of the Hungarian Ministry of Agriculture, this will be in the form of a "food system mirror group". Deeper involvement of decision-makers is essential for the continuation, in which we count on the support of the Ministry of Agriculture. According to our plan, the work of the mirror group will also integrate the principles of international strategies (e.g. F2F [farm to fork]) and will take into account the opportunities of international collaborations (e.g. Horizon Europe, European partnerships).'

Policy Lab Netherlands on a new funding method:

'In our Policy Lab we experienced a new method: organising a "sandpit" meeting during 4 days, where experts from all kind of disciplines worked together on the policy question we had: How could we transform the Dutch food system to a value-based healthy, circular and sustainable food system? … Working with a sandpit helped to inspire, to involve, to work together, to share a common responsibility, because experts worked for a longer time on the transformation goals. The range of participants was diverse, from physical scientists and engineers to designers, social scientists, psychologists and healthcare specialists. Out of the sandpit came one consortium that submitted a proposal for a food system transition project. The project was recently funded.'

Policy Lab Basque Country on the stakeholder network and R&I strategy:

'During the project there has been a strong commitment of the participants to the lab, with great continuity in participation from the first to the third session of the members. In fact, and despite the pandemic caused by COVID-19, the lab has successfully concluded, preparing a shared proposal for the sustainable strategy of R&I for 2030 in the Basque Country.'

Other impacts include:

- **raising awareness** and a sense of urgency about the food system and the need for a systems approach;
- building **vibrant multi-stakeholder networks**, through which new people met and discussed these topics;
- establishing or improving contact or even **collaboration between ministries and/or governmental agencies**, as well as between other food system actors;
- gaining **political support** for food system transformation;
- **connecting existing national or regional initiatives** related to food systems.

Further activities are still anticipated by most labs after the end of the project, such as the development of an inter-ministerial agreement on holistic food systems research, and a position paper about bridging the gap between funding more fundamental research and research with higher technology readiness levels by a ministry of agriculture and governmental agency for businesses. Embedding the lab in existing national structures, along with the national implementation of European policy developments like the **Farm-to-Fork Strategy and the Safe and Sustainable Food Systems Partnership, could offer opportunities for continuation of the lab work**.

BOX 12. REFLECTIONS ON SOME OF THE IMPACTS OF THE POLICY LABS

Policy Lab Romania on integration of research:

'We started the process with the aim to realise a better connection and integration of policy decisions research on food systems with direct impact on society. I think that we have obtained more than what we have proposed: we have built something which will continue and which had impact on research programmes, on strategy development, on policymakers' views; we have established connections with stakeholders, different actors from the food chain that will go on.'

Policy Lab Lithuania on raising awareness:

'The main results of the Policy Lab are that we have significantly increased the awareness of the sustainable food system in Lithuania. In the range of research funded by the Ministry of Agriculture, research related to the implementation of a sustainable food system has become a priority.'

Policy Lab Norway on the established network:

'The most important impact from our work is of an intangible nature. We are setting the agenda, raising the awareness, involving and gathering stakeholders, establishing dialogue and interaction, building network(s), connecting new and existing networks. Creating synergies is arguably the most important [work] we are contributing to. … The most powerful catalytic force that is about to be activated is arguably the confidence between the societal actors, to such an extent that it is a transitional power in society.'

BOX 13. REFLECTIONS FROM THE POLICY LABS ON NEW WAYS OF WORKING

Policy Lab Flanders on cross-departmental collaboration:

'We have raised this awareness not only within our own departments (Agriculture and Fisheries and Economy, Science and Innovation, Health and Well-being), but also at a higher level. In this way, we have succeeded in putting this point, transformation of the food system in an integrated food policy supported through a research agenda, on the political agenda of the new Flemish government (2019–2024). … We are quite proud that FIT4FOOD2030 was one of the stepping stones towards a new policy, and that we, as civil servants, were actually able to get this on the political agenda.'

Policy Lab Ireland on cross-departmental collaboration:

'The next step is increased and improved interdepartmental collaboration, working on a joint activity between the Ministry of Agriculture, Food and the Marine and Enterprise Ireland (EI). The Ministry works on more fundamental research, EI on higher technology readiness levels. We are developing a position paper on a more standardised way of engaging to bridge the gap and for better translation. This would probably not have happened without the lab.'

Policy Lab Hungary on multi-stakeholder workshops:

'Stakeholders agreed and considered the goals of the project as well as the Policy Lab important. The group workshops were especially favourably evaluated. On the one hand, stakeholders could express their opinions, listen to the thoughts of other areas, and on the other hand they build promising relationships with each other.'

Policy Lab Estonia on multi-stakeholder workshops:

'All events organised were highly appreciated by the participants. They were very active to express their opinions. The officials (mostly from the two organising ministries) were leading the discussions and presented the outcomes of the discussions. The direct connection between the policymakers and policy target groups was established. It was not easy task to convince public officials to lead the discussions, but at the end, they all were positively surprised how awarding was the experience when they were ready to step out from their comfort zone.'

Policy Lab Romania on using new tools and methods:

'During our meetings with the Policy Lab we have applied the techniques learnt in the FIT4FOOD2030 project to collect ideas from participants (trends exercise, visioning and drafting roadmap, etc.), which were new and challenging for the audience and for IBA Bucharest as organiser.'

The overall goal of the Policy Labs was to improve the impact of R&I on food system transformation by strengthening R&I policies. Have Policy Labs been able to make a lasting impact on policies and improve policy coherence? This is very difficult to achieve within the time frame of the project, as these tend to be long-term processes. Lab coordinators indicate there are few concrete examples so far of changes at the policy level – although in some places lab outcomes have been taken up in national strategies, which are part of the policy arena. However, all coordinators think **important (first) steps have been taken**. Policy innovation is a complex process: the people involved need to come to understand complicated concepts and take a number of consecutive steps together, along with getting to know each other and building trust, all while different interests may be at play. In the end, it is about **changing mindsets and enabling co-creation**, and according to the lab coordinators, the **structure, methods and tools of the Policy Labs and support from FIT4FOOD2030 were key** in working towards this.

3. PROCESSES AND LEARNING IN THE LABS

Large-scale transformation processes – like FIT4FOOD2030 – face complex challenges. Due to the **unpredictability of the process** and the multitude of actors involved, it must proceed exploratively, creatively and iteratively. This means that **learning and reflection must be continuous**. Moreover, learning and network building intersect in the idea that learning cannot be merely individual. It also has to be social, in the form of a **CoP**, where members learn from each other ([12]).

The FIT4FOOD2030 project, accordingly, was designed with learning at its core, and the learning was organised based on four major pillars.

1. **Training sessions (including webinars)** where participants met experts from the consortium for lectures, exercises and discussions.

2. The organisation of a **dynamic learning agenda (DLA)** centred on open digital learning dialogues.

3. **Informal and self-initiated forms of learning**, for instance bilateral dialogues between lab coordinators, or between lab coordinators and members of the consortium.

4. **Tools (such as handbooks, exercises and other materials)** specifically designed in and for the project. For details, see Section 4, 'Tools for transformation'.

3.1. A CHALLENGE-DRIVEN AND FLEXIBLE LEARNING DESIGN

The training and webinars sought in part to prepare the lab coordinators to handle the tasks and challenges that had been identified as relevant in advance, such as stakeholder management, workshop design and food system analysis – skills that all the coordinators had to master in order to successfully run a lab. Based on feedback from the coordinators, the training sessions were successively being **tailored to meet the learning needs expressed by the lab coordinators**. In the final year of the project, a series of webinars was organised

([12]) Van Mierlo, B. and Beers, P. J., 'Understanding and governing learning in sustainability transitions: A review', *Environmental Innovation and Societal Transitions*, Vol. 34, 2020, pp. 255–269; Van Poeck, K. et al., 'Opening up the black box of learning-by-doing in sustainability transitions', *Environmental Innovation and Societal Transitions*, Vol. 34, 2020, pp. 298–310.

to accommodate specific knowledge gaps, for instance on power and vested interests, conflict resolution and how to construct lab narratives for a greater audience.

A **high level of flexibility** also characterises the DLA (see Section 3.3). Each DLA session was dedicated to one or more learning questions that had been submitted in advance by the participants. For each learning question, a dialogue was organised where participants sought a better understanding of the problem that the question reflected, followed by a more solution-oriented phase. By including regular DLA sessions in the project, the lab coordinators had the opportunity to **continuously reflect on and discuss whatever questions and challenges they felt to be more acute** at any given time.

Although **stakeholder involvement was a particularly relevant challenge** in the first phase of the project, as the functioning of the labs required the involvement of local or national stakeholders, it continued to be a challenge throughout the project. Another challenge intimately connected with this was the question of the labs' focuses and priorities. Even though the labs were to support the Commission's FOOD 2030 policy framework, each lab was granted a **high degree of autonomy** in choosing which specific area to address and which specific goals to target. The decision that was made then defined the range of potential stakeholders. At the same time, stakeholders were expected to have some influence on the choices made.

This again made the coordinators aware of the need to learn more about **workshop design and facilitation** in order to work out how to organise workshops that would productively frame the dialogues needed to be the basis for the necessary decisions. In addition to the initial training sessions, a number of DLA sessions were dedicated to these questions.

The differences between the labs, both with regard to their aims and priorities and with regard to their geographical and cultural contexts, meant that they did not exactly develop *common* solutions to the challenges they faced. However, in the DLA sessions, those who had successfully handled a challenge **shared their experiences, which were then examined and discussed**. One lab, for instance, had been invited to hold a workshop during a major conference organised by a national industrial network. This helped them include more large and medium-sized enterprises in their lab activities. In discussing this example, the labs decided that organising workshops in association with other, project-independent events, targeted at stakeholder groups that they wanted to recruit, was a good approach. Another lab had positive experiences with organising large workshops with a dynamic mix of smaller group discussions and larger plenary sessions. This format both allowed them the benefit of including a large number of stakeholders, and enabled the higher-quality dialogue that thrives in more intimate settings.

A well-known dilemma when it comes to stakeholder involvement is that those **stakeholders who are more engaged are not always optimal in the sense of power or resources, while those with significant power and resources may not be easy to recruit**. This difficulty in recruiting may also apply to more marginalised stakeholders. How to handle this

challenge was a continuous discussion among the lab coordinators, and while **the motivation to engage a diverse group of stakeholders was high**, over time more coordinators decided to give a certain priority to those stakeholders that showed higher intrinsic motivation. The coordinators emphasised that these stakeholders were so useful as **supporters**, even if they were perhaps just motivational, that they were indispensable in keeping participants' spirits up. With a core group of such supporters, it might also be easier at a later stage to engage less-motivated stakeholders.

3.2. THE TRAINING

As already mentioned, the topics of the successive training sessions reflected the corresponding project phase and the main challenges of each phase. The first training session sought to establish an understanding of the theory behind the project, such as its systems perspective and its corresponding theory of change. **Stakeholder identification and involvement** and **workshop design** were also topics extensively dealt with early on. Towards the end of the project, more emphasis was given to topics such as **institutionalisation and continuation of activities**.

Looking back, several lab coordinators emphasised that the **training sessions had been useful by allowing them to try out in practice – in a safe environment – specific methods** that they would later use in the workshops they went on to organise. One Policy Lab coordinator stated, for instance:

> *If you do it in the training, it works a lot better than if you read about it in a book. … So, yeah, learning by doing is the method, it's the way to learn. For me, it has been very valuable.* (Policy Lab coordinator)

Another useful outcome of the training sessions emphasised by coordinators was that they offered an opportunity to get to know and discuss the great variety of strategies that each of the labs were developing.

> *I think that all the Policy Labs are different and they have chosen their own way of working that responds to the specific conditions of their country. And it's very interesting to listen to, and to understand, how differently the different countries relate to the food system, and what they want to achieve with their Policy Lab.* (Policy Lab coordinator)

3.3. THE DYNAMIC LEARNING AGENDA

A DLA is a method for **challenge-driven reflection** and learning centred on learning questions submitted and chosen by the participants themselves. Monitoring these questions can provide

a detailed overview of what the participants struggle with at any given phase in a project. The DLA questions for the FIT4FOOD2030 project belong to four main categories.

- **Questions regarding *focus.*** These concern the task of finding a vision or set of goals for the lab that also aligns with the interests of the stakeholders. These questions were more dominant in the beginning, and then receded into the background.
- **Questions regarding *stakeholders.*** These concern both the challenge of identifying stakeholders or deciding whom to contact, and the challenge of raising and retaining their interest and willingness to be involved in project activities. These questions were more prominent in the beginning, but continued at a lower frequency throughout the project.
- **Questions regarding *workshop issues.*** These concern how best to organise meetings and workshops with stakeholders.
- **Questions regarding lab *management.*** These were more diverse, for instance, 'How can we make sure to succeed in building and maintaining a network that is robust and well-functioning?' There were also questions related to time management and impact.

A frequently cited outcome of the DLA sessions, in addition to problem-solving and strategy development, was the more subtle but **highly significant experience of being part of a CoP, and how this generated a climate that promoted learning**, for instance by offering social support and empowerment. One coordinator stated, for instance:

> *We realised that all of us faced these struggles and that was also a first thing that was nice to think about. You're not the only one having that problem. Things are not easy and smooth.* (City Lab coordinator)

Another point made was that of how listening to the ongoing discussions, and especially noticing the different strategies chosen by the labs – typically as a response to local conditions – triggered highly productive reflections. One coordinator stated:

> *And then … listening to other approaches and practices can get you [to] problematise … enrich things that you have in mind in order to proceed with your activities*. (City Lab coordinator)

3.4. OTHER LEARNING ARENAS AND ACTIVITIES

In a complex project like FIT4FOOD2030, the learning taking place – and **the learning that needs to take place – goes beyond the learning in organised learning arenas**. Important types of learning include individual reading of relevant literature and websites, or attending workshops external to the project. Another is the informal dialogue between lab coordinators and/or consortium partners, for instance during breaks and shared meals. These informal discussions are often more open, one coordinator emphasised, and therefore more productive.

Quite a large number of coordinators also emphasised how much they had learnt through discussions with stakeholders. As one coordinator said:

> *They [our stakeholders] contributed by giving us examples of actions that could be taken. … For example, we had a teacher, I mean, she explained the problems in the current education in regard to food, and the difficulties that students have regarding food education.* (City Lab coordinator)

Finally, there is the learning gained from trying things out in practice, i.e. **learning by doing**. This was an ongoing type of learning happening whenever an activity was implemented. One coordinator stated:

> *How I learnt or acquired competencies during this project? By doing things, mostly [laughs]. The learning by doing was very much present. Looking back to how I felt when I was doing the first workshop and then all the next ones – yeah, I definitely gained experience.* (City Lab coordinator)

3.5. GENERAL OVERVIEW OF LEARNING ARENAS/ ACTIVITIES AND LEARNING OUTCOMES

In a survey in September 2020, the coordinators were asked to evaluate the relative usefulness of the various forms or arenas of learning in the project. This included both learning by doing and the printed material produced by the project. Moreover, respondents could also evaluate informal dialogues with other coordinators and with project partners ZonMw and the European Network of Science Centres and Museums acting as main contact points for the City and Food Labs respectively. Each of the learning forms or arenas can be roughly sorted into two categories: (1) the learning that was designed and organised by the project, such as the training sessions and the DLA sessions, and (2) learning that occurred more spontaneously, or where the initiative came from the lab coordinators themselves, such as in the informal dialogues or learning by doing. **Learning by doing** received the highest scores of all the learning forms. All the coordinators expressed that it had been useful to either a high or a very high degree. For the Policy Labs the same applies to the written material made available through the project, including both more practically oriented guides and manuals and, for instance, food system trend analyses. Slightly below in perceived usefulness came the organised training sessions. Interestingly, the dialogue with local stakeholders and the more informal dialogues with the project management received equally high scores.

The coordinators were also asked about **learning outcomes**. The question was 'To what degree have you improved your knowledge or skills on the following topics?' Top scores were here given to **lab management**, the art of running a City, Food or Policy Lab. Food system analysis came second for the Policy Labs, while for the City Labs workshop design and/or facilitation came second.

A notable observation is how interconnected the learning is. In interviews, the coordinators explained that one learning topic, such as food system analysis, can be elaborated upon in multiple learning arenas. For instance, after having listened to a lecture on food system analysis, coordinators will discuss it informally over a meal with other coordinators, then once they have returned home they will discuss it with local stakeholders, while perhaps also searching for more related knowledge on the internet. Finally, in actually producing an analysis of the local food system, there occurs learning by doing. Thus, even if not all learning forms or arenas received equally high scores in terms of perceived usefulness, they are all necessary as part of the overall learning design.

In all of this, subtler – but still significant – forms of learning also occurred. In the interviews from 2019, one of the lab coordinators gave an example:

> *I think I sort of have learnt to see opportunities. By talking with people and then reflecting on it with people internally at my workplace. Strategic thinking, I guess.* (City Lab coordinator)

The learning outcome illustrated here and in other, related quotes goes beyond the mere acquisition of knowledge and skills. It has to do with **creativity, imagination, analysis and engagement**, which are all **crucial in a transformation process** like the one represented by FIT4FOOD2030.

3.6. CONCLUSION

The learning taking place in the project has mainly been challenge driven and problem oriented. This fits well with the original idea that learning and reflection would be essential in order to handle the unexpected challenges that a project like FIT4FOOD2030 must necessarily involve. A further point to be noted is the productive interaction between the more organised training sessions and dialogues, and the informal, spontaneous or self-initiated dialogues and learning activities taking place. What is essential here is the dependence of the latter relative to the first. The **informal, spontaneous or self-initiated dialogues may be seen as extensions of the more formally organised dialogues, constituting a reflexive space** that allows the learning outcome of the first to be further elaborated. In future projects, this insight may be used even more systematically, by giving more attention to the facilitation of self-initiated learning forms.

One should also take into account that building a well-functioning CoP may take time, especially when its members are not acquainted with each other in advance, and come from different backgrounds and settings. By spending time together in dialogue, however, participants do not merely benefit from the insights produced in the immediate dialogue; each dialogue also builds the relations that the CoP needs for its establishment and further development.

In the organisational learning literature, a significant distinction is drawn between first-, second- and third-order learning. While much of the explicit learning focus in the project was directed at first-order learning, such as how to organise a workshop, or how to approach a stakeholder, the data we have collected indicate continuously ongoing second- and even third-order learning among the coordinators. This has to do with the high degree of autonomy that the labs were granted in setting up, and the visions and priorities of the labs within the larger context of FIT4FOOD2030 and the FOOD 2030 policy framework. This autonomy forced the labs to continuously reflect on the consistency – or lack thereof – between this larger framework and their own priorities **('Are we doing the right things, and are we doing the things right?')**, and even third-order reflection **('How do we decide what is right?')**.

4. TOOLS FOR TRANSFORMATION

In order to support a wide variety of stakeholders in contributing to food system transformation, **FIT4FOOD2030 has developed methods and tools that help create understanding of and change in food systems**.

The project has developed 80 different tools, which are available on the Knowledge Hub. These tools can be used in the processes of visioning, experimentation, system understanding and learning in the context of multi-stakeholder collaboration. Therefore, they can be used by a **wide variety of stakeholders, such as researchers, policymakers, educators, innovators and students**. They can be filtered by user aims, target audience, keywords and type **(short exercises, training programmes, hands-on materials, educational modules and communication tools)**.

Some of the tools (such as the educational modules) were **created explicitly by the project labs** and tested in other labs, while other tools were developed by consortium partners and **piloted and implemented within the labs**.

In this section, the different tools, their roles in the project and their practical value and application are highlighted in Section 4.1 ('Tools for understanding the system') and Section 4.2 ('Tools for transforming the system'). In Section 4.3 the Sustainable Food Systems Network (SFSN) is introduced as a multilevel, multi-stakeholder platform that is coupled with the repository of tools for transformation on the FIT4FOOD2030 Knowledge Hub.

4.1. TOOLS FOR UNDERSTANDING THE SYSTEM

When developing the tools for the FIT4FOOD2030 project some major questions were raised by the different project partners and stakeholders in the labs: **how can we best understand the dynamics of food systems? How can we conceptualise the role of R&I breakthroughs?** What are showcases or best practices? How do trends influence the future development of the food system? How do they benefit our effort to shape our future the way we want it to be?

Not only were those questions critical for the right execution of the project, but they also showed the lack of common ground regarding the existing definitions and the understanding of abstract concepts. In order to provide a **conceptual model to better understand the dynamics in the food system**, the multilevel perspective as developed by Geels and Schot (2007) ([13]) was adapted for the FIT4FOOD2030 context. Though there are other conceptualisations in literature that could also help to better conceptualise systemic dynamics, the adapted multilevel

([13]) Geels, F. W. and Schot, J., 'Typology of sociotechnical transition pathways', *Research Policy*, Vol. 36, No 3, 2007, pp. 399–417.

perspective allows for a better grasp of the interactions between concepts such as 'trends', 'showcases' (also named 'niche experiments') and 'breakthroughs' (also understood as 'radical changes in society'). Figure 4 describes the understanding of these concepts within the FIT4FOOD2030 project.

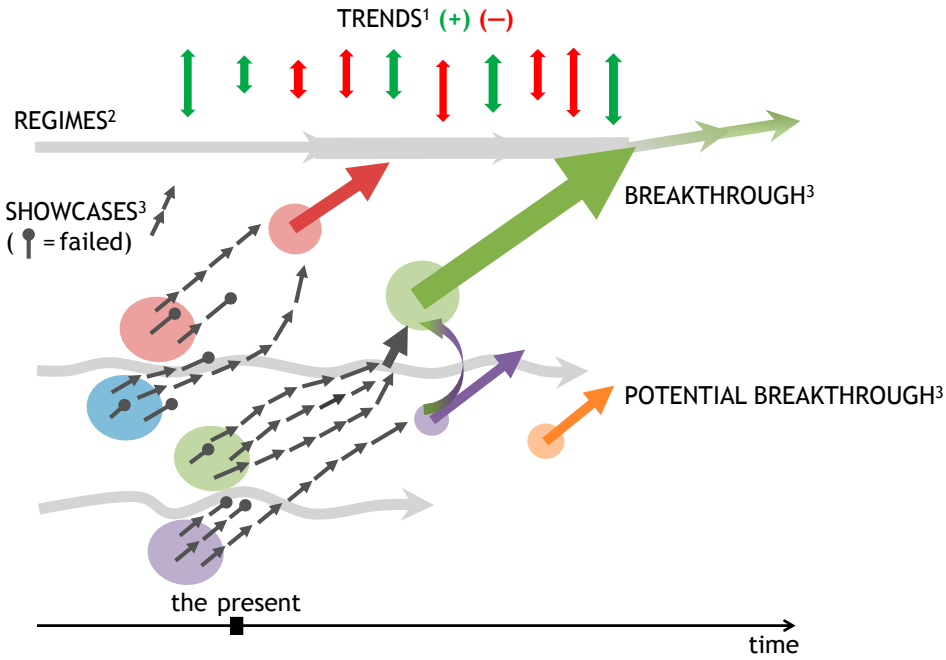
Trends are a general tendency or direction of a development or change over time related to macroscale social or natural processes. Trends are therefore the landscape where showcases and breakthroughs emerge. Examples of trends are climate change, urbanisation and population growth.

Showcases are initiatives, key findings, social movements, good practices, networks, (nationally or internationally funded) projects, case studies, demonstrations, technological inventions, process/procedure improvements (e.g. in logistics/distribution), innovative educational approaches, new business models, etc., which offer opportunities for learning and inspiration (even if they might have ultimately failed to deliver on initial expectations) and have contributed to, or affected, the food system in some way. Examples of showcases are start-up companies that produce innovative new protein foods, social innovations that tackle food waste and new policy instruments on nutrition.

Breakthroughs are potential, significant achievements that may lead to an increased impact of the current initiatives in the field of food and nutrition security and a step towards radical change in the food system, making it more sustainable and resilient. Examples of breakthroughs could be smart farming and new approaches to logistics.

The understanding of the concepts of trends, showcases and breakthroughs helped to transform them into materials and tools that could be used in workshop activities, most of them conducted in the City and Policy Labs.

Once an understanding of the food system had been established, an inventory of **trends** was compiled at the beginning of the project to serve as a reference point during the processes of vision development, system understanding, roadmapping and action planning in the FIT4FOOD2030 project and beyond. The description of the trends identified can be found in the Knowledge Hub, along with the drivers and barriers behind the trends and consequences for society, challenges and needs for R&I strategies. For workshop settings, short descriptive trend cards were designed and made available.



1 Trends affect the system in two ways, positive and negative: push (red) and pull (green). Trends influence the development of showcases and potential breakthroughs.

2 In the food system there are different regimes, each has several components of the context in which the regime operates: culture, infrastructure, practice, science, policy, technology, etc.

3 Showcases and potential breakthroughs differ in time and scale of the impact in the food system. They happen in different areas of activity (in the graph above, this is shown as different colours).
Showcases are concrete initiatives, social movements, good practices, networks, projects, etc. that have positively affected the food system. They have limited duration and limited impact. Some succeeded, some failed. All of them are inspiring examples, there is a learning capacity in them.
Breakthroughs are potential pathways for system transformation in the future. They change the existing regime into a new regime. They have long duration (continuity) and big impact, being even disruptive. They can also 'jump' over fields of activity.

Figure 4. The multilevel perspective applied to the FIT4FOOD2030 project. Different areas of activity are represented by different colours.

Another tool was developed to explore possible R&I breakthroughs. The aim of this tool is to provide a setting in a workshop to visualise and explore possible R&I breakthroughs of the future, which could in turn be transformed into local, regional or national R&I agendas. It was aimed at policymakers, researchers, businesses, funders, non-governmental organisations / civil society organisations and professionals willing to explore the key topics needing to be discussed in order to have an impact on their food system's context. This tool was the result of activities in the different FIT4FOOD2030 City Labs. Exploring future R&I breakthroughs was much supported by the trend cards and to some extent the showcase examples. One of the outcomes of these

workshops was the development of an inventory of breakthroughs. The inventory can also be found as a web-based tool, which can be used for workshops aiming to understand the diversity of topics existing in research and, for example, how to prioritise them.

4.2. TOOLS FOR TRANSFORMING THE SYSTEM

In the FIT4FOOD2030 project, a **carefully designed multiphase process was used to facilitate and support the work of the project's 25 labs**. This stepwise approach to transformation meant that the FIT4FOOD2030 labs were guided through the following phases:

1. system understanding and stakeholder analysis;
2. visioning for the future system;
3. designing pathways for change;
4. experimenting with the envisioned and planned change;
5. working towards sustainability and upscaling.

Figure 5 depicts an artist's impression of this multiphase lab process.

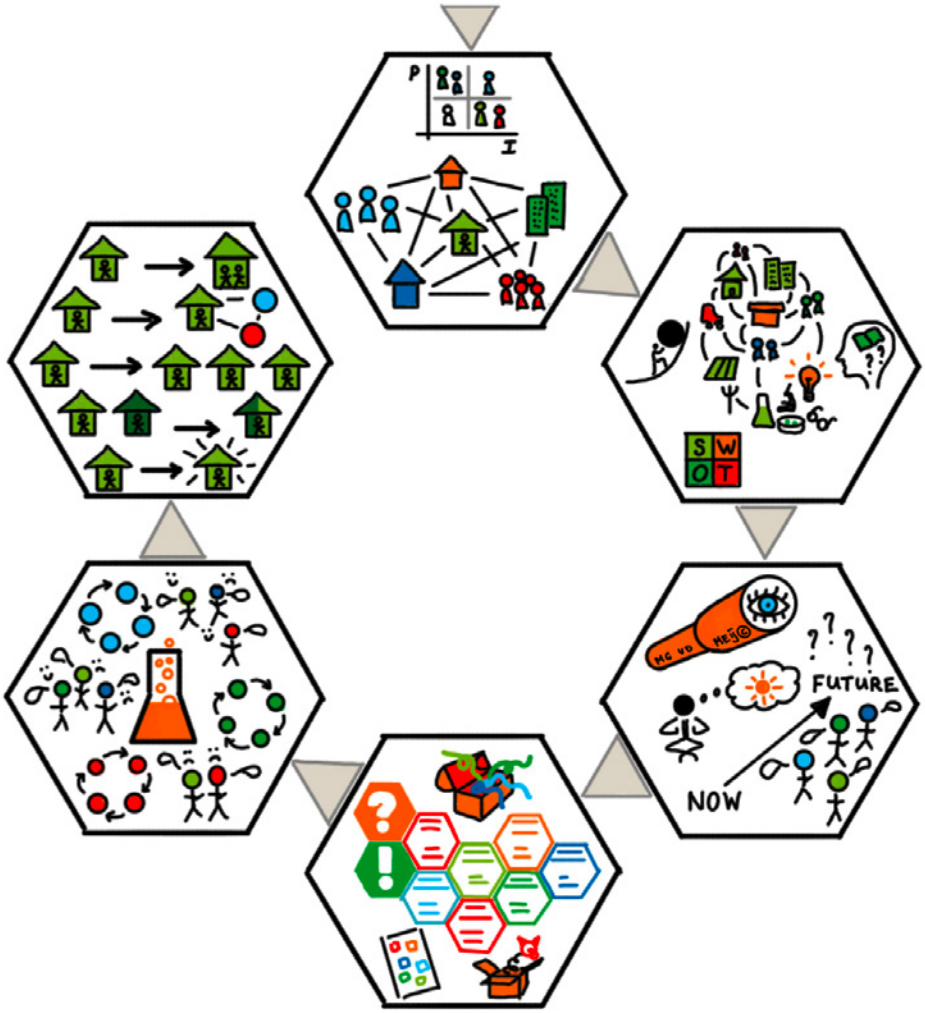


Figure 5. An artist's impression of the multistep lab process through which food system transformation in a specific region can be incited and realised. Starting with the hexagon at the top and moving clockwise, the steps are: stakeholder identification (and engagement), food system analysis and understanding, visioning on transformation in the food system and R&I, (policy) action planning, active experimentation, and anchoring and/or scaling to realise lab sustainability.

In addition, **learning and reflection should take place continuously** in each phase. In reality the different phases of a lab will overlap and have different themes or focus areas, but the multiphase approach in the labs serves to **provide structure** to processes of change perceived as chaotic, by pointing to concrete actions to realise the envisioned system transformation in a specific context.

In addition to the overall approach, FIT4FOOD2030 created tools to support each individual phase and several tools that support all the lab phases (see Figure 6). For food system transformation facilitators wanting to achieve (R&I) policy coherence and alignment, the R&I Policy Lab handbook and the training for setting up a transformative network provide a clear overview of principles and exercises to walk the reader through each step. The DLA tool suggests formats for (multi-stakeholder) learning and reflection on actions and achievements when going through the steps. A selection of tools for different lab phases is described below.

Figure 6. Knowledge Hub tools suitable for each phase of the lab process.

For food system and stakeholder analysis and understanding, apart from the trends, showcases and breakthrough tools described above, various other tools were created. The mapping EU food system policies tool provides a script for the analysis of policies along with numerous examples of policies related to the four FOOD 2030 priorities (nutrition, climate, circularity and innovation) in the form of policy cards on goals, actors and instruments. The stakeholder analysis tool supports a co-creative process through which food system actors are mapped and further investigated in a specific region. The lab design tool triggers brainstorming about and the realisation of a lab strategy and a set-up suitable for the local stakeholder and food system context. The designing a communication strategy tool offers exercises to generate stakeholder engagement with

a (new) lab, while the multi-stakeholder event design tool provides an overview of principles and practicalities to consider when organising multi-stakeholder events with transformative aims.

FIT4FOOD2030 developed various tools for the visioning phase. The visioning on future-proof food systems tool supports labs in organising events in which multiple stakeholders create a commonly desired future food system, including an analysis of the current food system and reflection on the underlying principles for a future food system. The visioning on the role of R&I for future-proof systems tool offers guidelines for events in which multiple stakeholders define (policy) actions and capabilities required from and within R&I, regarding a commonly desired future food system and the transition needed to realise it.

FIT4FOOD2030 also created tools for action planning and active experimentation for R&I policy and education contexts. The co-creation of policy pathways tool provides a means to creatively develop pathways for transitioning towards a commonly desired future food system in collaboration with multiple stakeholders. The co-creation of educational modules tool provides formats for multi-stakeholder brainstorming on capabilities needed for a future food system, as well as an out-of-the-box format for creating educational programmes to build such capabilities (see Figure 7). The citizen consultation tool offers a format by which citizens can be (further) consulted on a particular food system change, taking a dietary shift as an example transition pathway.

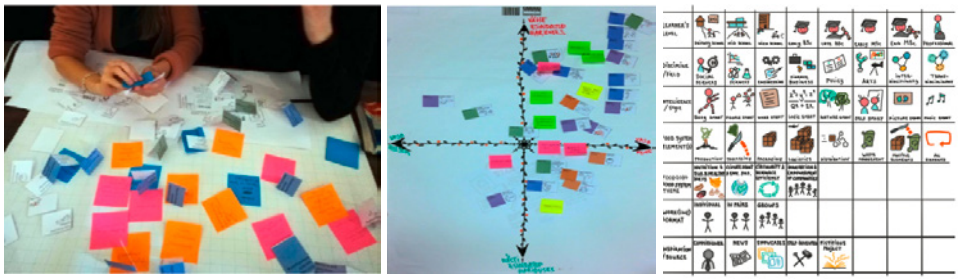


Figure 7. Examples of steps to undertake in designing an educational module, from brainstorming and clustering necessary capabilities to generating ideas by means of a morphological matrix.

Many tools for transformation found in the Knowledge Hub contain exercises in which principles of design theory and methodology are applied. The reason for doing so is rooted in the idea that transformation **requires out-of-the-box thinking** in order to search for, find and implement actions that are radically different. It is one of the tasks of the lab coordinators to nurture such a design mentality in themselves, and to help lab stakeholders to do the same. The experience of doing this is best described in a quote from FIT4FOOD2030 project partners, presented in Box 14.

BOX 14. USER EXPERIENCES OF THE FIT4FOOD2030 CITIZEN CONSULTATION TOOL

'When the coordinators were asked at one point during the last year of the project what had surprised them, several replied that they had not expected that some of the often quite creative methods and tools offered by FIT4FOOD2030 for use in the Policy Lab meetings would be well received by their participants, who were sometimes quite high-level people. Therefore, they were pleasantly surprised that the participants were in fact enthusiastic about the new methods and actively engaged, leading to lively, interactive sessions.'

4.3. THE SUSTAINABLE FOOD SYSTEMS NETWORK

Impactful communication and collaboration among a wide range of stakeholders at local, regional, national and EU levels is a prerequisite for transforming food systems. Evolving out of the project's FOOD 2030 Platform, and consisting of City, Food and Policy Labs and the EU Think Tank, the SFSN aims to mobilise food system actors and stakeholders beyond the scope and duration of FIT4FOOD2030 (i.e. after December 2020) to ensure the **sustainability and continued engagement of the networks** that were formed and to build upon them.

In short, the SFSN is an **engaging and easy-to-use digital platform** that brings together people who affect, are affected by and are interested in food system transformation. The SFSN gives its members the opportunity to **connect, interact, collaborate and engage in online discussions**, through a discussion board, promotion of events, opportunities, webinars and resources. In doing this, the network enables valuable cross-sharing of knowledge and resources, including amplifying the reach of the tools for transformation. The SFSN aims to function as an accelerator of change by stimulating stakeholders at multiple levels to experiment with and distribute tools for food system transformation. Importantly, the **friendly and accessible nature of the platform**, with profiles and pictures resembling those of a social media platform, might take away some of the barriers that people perceive when reaching out to strangers.

In its first months, the network has reached **over 1 000 members, from different stakeholder groups**, including research/education/knowledge institutions (46 %), businesses (11 %), non-profit/non-governmental organisations (10 %), policymakers (3 %) and people who described themselves as belonging to more than one category (17 %). When the members were asked about what they were most interested in on the SFSN platform, the top three answers from the poll (completed by 143 people) were past and upcoming events (22 %), collaboration opportunities (17 %) and scientific articles (14 %).

Although the SFSN is managed by the European Food Information Council, which will keep investing in it after the project's lifetime, **the platform is open to everyone**, including members of current and future projects that aim to bring together, build and engage communities of stakeholders.

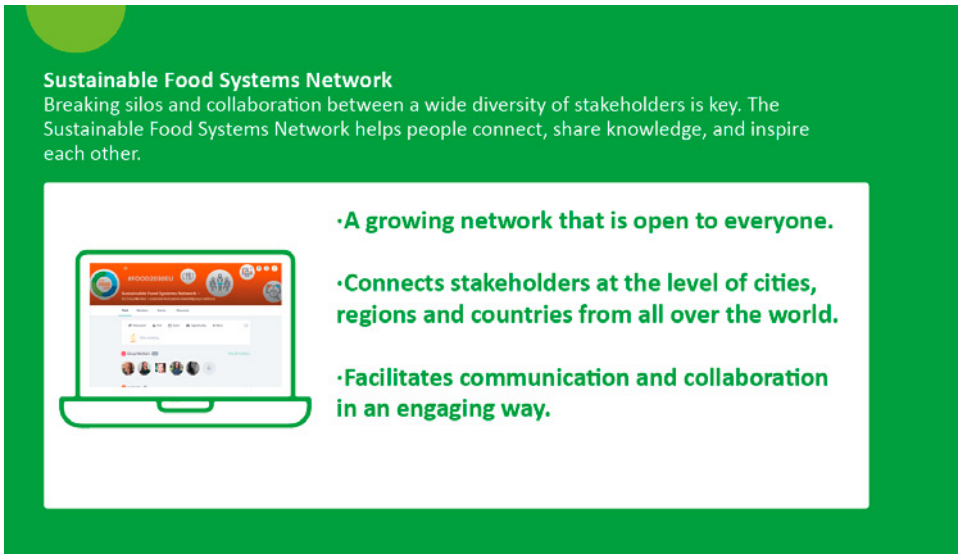


Figure 8. Sustainable Food Systems Network infographic.

5. IMPLICATIONS AND RECOMMENDATIONS

Based on the work of the FIT4FOOD2030 project conducted by the consortium as well as the labs, there are **several recommendations and implications** for (EU) R&I policymaking, R&I funding, R&I projects and aligned efforts to increase the impact of R&I in collaborative partnerships. In particular, the EU Think Tank of the FIT4FOOD2030 project has addressed a number of critical issues and recommendations in a series of policy briefs, concerning a number of topics, as follows.

- Policy Brief 1. A Systems Approach to Research and Innovation for Food System Transformation.
- Policy Brief 2. Key Research and Innovation Questions on Engaging Consumers in the Delivery of FOOD 2030.
- Policy Brief 3. Research and Innovation Supporting the Farm-to-Fork Strategy of the European Commission.
- Policy Brief 4. Governance of Research to Accelerate Innovation, Deliver Transformation and Demonstrate Flexibility at the Time of Shocks.

In addition to these policy briefs, the work of FIT4FOOD2030 includes implications and recommendations for some ongoing developments in EU food systems' R&I, which are elaborated on in this section.

5.1. IMPLICATIONS FOR THE EUROPEAN COMMISSION'S 10 R&I PATHWAYS

The European Commission has recently moved to operationalise the FOOD 2030 policy framework by identifying **10 R&I pathway areas** where targeted action can have deep and multiple impacts on EU food systems' transformation.

The 10 FOOD 2030 pathways are:

- governance and systems change;
- urban food system transformation;
- food from the oceans and freshwater resources;
- alternative proteins and dietary shift;
- food waste and resource efficiency;
- the microbiome world;

- healthy, sustainable and personalised nutrition;
- food safety systems of the future;
- food systems Africa;
- food systems and data.

For World Food Day, which took place on 16 October 2020, the European Commission published a booklet on the FOOD 2030 pathways, highlighting the systemic challenges, the expected co-benefits, barriers to and enablers of change, and potential R&I areas meriting further consideration and investment.

In parallel, FIT4FOOD2030 produced an **independent, in-depth report on the FOOD 2030 pathways**, designed to reflect on and expand the analytical framework unveiled by the European Commission (Deliverable 3.3). The report occupies a strategic position in the FIT4FOOD2030 project ecosystem. It takes into account the catalogue of showcases previously identified by the project research team to build its own selection of cases for each pathway area. In terms of project structure, it is a bridge between the analysis of the trends, barriers to and enablers of food system transformation and the potential social, economic and technological R&I breakthroughs. In terms of project outcomes, **the report builds its analysis on the experience of the policy alignment process** emerging from Policy Labs and the research findings delivered by EU Think Tank policy briefs, as well as the **mapping of social and educational needs, barriers and enablers** emerging from the educational modules implemented by the seven City Labs and seven Food Labs.

FIT4FOOD2030 has further complemented the analysis carried out in the report on the FOOD 2030 pathways with Deliverable 3.4, containing a list of **key policy recommendations for each pathway area**. These recommendations are built on the findings of the previous in-depth report, along with on the input provided by the replies to a FIT4FOOD2030 public survey distributed to participants about the World Food Day event organised by the European Commission. The main peculiarity of the recommendations provided by FIT4FOOD2030 is the analytical framework chosen. FIT4FOOD2030 policy recommendations are in fact clustered across **five dimensions: social, technological, organisational, managerial and policy innovation**. This way, it is possible to identify cross-cutting R&I needs so as to design cost-effective, co-beneficial R&I initiatives. The cross-pathway recommendations provided include: the **adoption of transdisciplinary approaches to R&I to facilitate cross-fertilisation between all food system actors** and better understand the political economy of food and the data economy; **the expansion of public–private partnerships where public authorities provide guidance** and some level of funding with a view to positive returns on investments; and the development of talent essential to realise the innovation capital through capacity building.

In light of the ongoing policy developments and historical events that will shape the future of EU food systems, the project's work on the FOOD 2030 pathways has the ambition to **provide policymakers at European and Member State levels with a comprehensive outlook on**

the most pressing issues and relevant levers to enable the sustainable transition to the EU food systems of tomorrow.

5.2. RECOMMENDATIONS FOR R&I PROGRAMMING AND FUNDING

Today there is an ever-increasing focus on research with impact. But what does that mean? And how do we get there? **R&I can have impact if it is perceived as responding to a societal need** – and that means understanding what society is asking for.

National authorities responsible for research programming and funding **play a key role in promoting research with impact** on a sustainable and resilient food system through the application of systems thinking and RRI principles. They can provide incentives to apply such principles if it becomes the norm for excellence. This has also been described in the FIT4FOOD2030 EU Think Tank's most recent policy brief.

In addition, through a questionnaire distributed to funders and an interactive workshop, it became apparent that not all funders are aware of RRI principles and, in any case, these principles are only partially taken into account. Based on FIT4FOOD2030's workshops with public and private funders, the following recommendations (see also Figure 9) can be made to programming and funding authorities to address the steps throughout the programming cycle.

- Define the scope of the problem and of the call for proposals – examine the problem from different levels and from high-level political goals, e.g. sustainable development goals and climate commitments from the 21st Conference of the Parties on the 1992 United Nations Framework Convention on Climate Change, down to need for on-the-ground solutions. **Work with stakeholders** to ensure that the needs of society are the starting point, then define the disciplines and approaches required – avoid silos.
- **Expand the definition of excellence to include societal relevance**. This means broadening 'scientific quality' to include e.g. practice-oriented research, transdisciplinarity and diversity in approaches and research content. Integrity and efficiency must be taken into account as well.
- **Set evaluation criteria to reflect RRI** and inform researchers of what is expected.
- Hold dialogues with / **train evaluators** to take into account new definitions of excellence and impact, and include RRI specialists in evaluation panels.
- Hold dialogues with / **train researchers on RRI** and why it is important.
- **Incentivise RRI** by making it a requirement for 'good research' that gets funding.

Figure 9. Overview of recommendations to increase RRI in funding efforts by highlighting where in the R&I funding process changes could be made.

These steps require a change in culture, which will be gradual, but could be promoted through appropriate training/awareness-raising sessions within funding agencies. It entails:

- a change in the definition of excellence and impact – taking societal concerns into account;
- a change in corresponding evaluation criteria – with evaluators who adopt these standards.

This in turn will lead to a greater awareness and implementation by researchers and greater impact for society.

5.3. RECOMMENDATIONS FOR FUTURE TRANSFORMATIVE R&I PROJECTS

When it comes to (future) R&I projects that aim to engage a wide variety of stakeholders, adopt a lab approach and implement systems thinking and RRI principles, there are several recommendations to be made. The recommendations are specifically targeted at those actors involved in (the management and coordination of) transformative R&I projects, but can also be considered for R&I projects more generally.

- **Building transformative capacity in the project.** This is an important aspect that requires co-creation of visions and developing shared system understanding, building trust between the stakeholders in the project and enhancing mutual learning and capacity development within the project. In order to effectively build this potential for transformation, the inclusion of different stakeholders (including marginalised actors and perspectives) should form a key element of the entire R&I process.
- **Increasing integration and alignment to maximise impact.** Though this may seem straightforward, in practice it is a challenging endeavour. In order to be adaptive and reflexive as a project, as well as to avoid 'isolated' work in parts of the project, continuous integration should be actively pursued. It might also require the construction of novel structures – such as the FIT4FOOD2030 Taskforce for Impact established mid project – to identify and act upon opportunities to increase impact beyond the designated key performance indicators in the project proposal.
- **Being adaptive and reflexive.** In order to foster transformation and seize windows of opportunity, R&I projects need to be adaptive to changing contexts (e.g. policy developments, emerging concepts and discourses, socioeconomic shocks and the political climate), as well as responsive to the bottom-up needs of the stakeholders they aim to engage. This is challenging, and requires constant attention to shared reflexivity about the project, its environment and its goals and vision: are we doing the right things and are we doing them right?
- **Combining flexibility, rigour and methodology.** Multi-stakeholder approaches to transformation need local experimentation: there is no blueprint for the trajectories of living labs or transformative R&I projects as a whole. This means the project should design and foster flexibility and constantly respond and adapt to local needs and contexts. In parallel, however, especially for fostering meaningful collaboration that has the potential to scale up sustainable initiatives, transformation processes require a rigorous and stepwise methodology. This also requires adequate tools and training to equip stakeholders with the skills to engage in such processes.

5.4. IMPLICATIONS FOR (FOOD SYSTEMS) PARTNERSHIPS

The European Commission, through the Horizon Europe programme, will launch multi-stakeholder partnerships to provide long-term financial and institutional support for transformative R&I efforts within the EU. These partnerships span multi-sector, multidisciplinary boundaries and aim to involve a wide variety of stakeholders in their development and implementation. In particular, the **European Safe and Sustainable Food Systems for People, Planet and Climate Partnership** is set to start in 2023. There is ample opportunity to incorporate some of the findings of FIT4FOOD2030 into its design and implementation. Implications and lessons for the establishment of the Safe and Sustainable Food Systems Partnership involve the need to do the following.

- **Ensure meaningful multi-stakeholder collaboration.** In line with the principles of RRI, it is important to include all the relevant voices, perspectives and knowledge (especially the ones not usually included in the process, including those of local communities) in the design, development and implementation of pan-European partnerships. It is especially important to ensure their meaningful inclusion in transformation processes. The use of living labs (such as the City and Food Labs) has proven to be a meaningful instrument to achieve this goal, addressing a variety of stakeholders such as citizens, school teachers, entrepreneurs, small business owners and local policymakers in different European countries.
- **Boost capacity development.** The partnership could be exceptionally well positioned to give a boost to capacity development and to build skills in both public and private sectors. In particular, this means (financially supporting) education and training for students, researchers, entrepreneurs, small and medium-sized enterprise owners, policymakers and other professionals in transformation labs (for instance on systems thinking and multi-stakeholder collaboration) in order to enhance actors' transformative capacities.
- **Support transformative spaces.** As long-term policy instruments, partnerships could provide the much-needed long-term financial, institutional and political support for building, maintaining and scaling up spaces for transformation (such as local/national Food, City and Policy Labs or other living labs for transformation). This in particular is relevant for bridging the gap towards mainstreaming and scaling of innovative practices, as well as for achieving joint innovations and impact during the lifespan of the partnership.
- **Foster a dual transformation.** The Safe and Sustainable Food Systems Partnership is well positioned to become a true agent for dual-system transformation, meaning the change of R&I systems as well as food systems. In this way, the partnership could contribute to R&I systems that serve as catalysts for making European food systems more sustainable.
- **Use already developed materials and tools.** The partnership could benefit from the materials and tools developed through the FIT4FOOD2030 project. Some materials, such as the trend cards or the inventory of breakthroughs, as well as the many tools for running labs and multi-stakeholder workshops at local, regional, national and EU levels, could help to guide both understanding and actions for changing food systems through R&I.

6. CONCLUDING REMARKS

This publication can be seen as a **snapshot** of some key features, findings and outcomes of the FITFOOD2030 project. More information on the project and its outcomes is available from the project website, the Knowledge Hub and the SFSN. During its lifetime (2017–2020) the FIT4FOOD2030 project has engaged thousands of stakeholders from different levels in Europe, who all came together for the purpose of transforming Europe's food systems for the better. The project has contributed **to building vibrant networks across the EU**, provided **tools and training** to boost capacity development, **raised awareness** at local levels as well as at (inter) national policy levels and **sowed the seeds of change**.

Though this is exciting and promising, there is much more to do. Therefore, **let the end of this project be a new beginning, where we continue to work together for sustainable and healthy food systems in Europe**.

Getting in touch with the EU

In person
All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email
Europe Direct is a service that answers your questions about the European Union. You can contact this service:
– by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
– at the following standard number: +32 22999696 or
– by email via: https://europa.eu/european-union/contact_en

Finding information about the EU

Online
Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications
You can download or order free and priced EU publications at: https://publications.europa.eu/en/publications. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU law and related documents
For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

Open data from the EU
The EU Open Data Portal (http://data.europa.eu/euodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.

The FIT4FOOD2030 project (2017–2020) was key to supporting the European Commission implement its Food 2030 Research and Innovation Policy Framework throughout Europe. In this publication some of the key outcomes, lessons and recommendations arising out of the project are presented. A particular emphasis is placed on the findings and learnings of the project's seven City Labs, seven Food Labs and eleven Policy Labs. These 25 labs built vibrant multi-stakeholder networks, developed visions for future food systems and experimented with new ways of carrying out research and innovation for food system transformation. Building on the principles of responsible research and innovation (RRI), the City and Food Labs co-developed and piloted educational modules at the local level, while the Policy Labs worked on policy innovations at the national and regional levels. The labs were supported by a flexible, reflexive and rigorous approach to setting up and running a lab for transformation, including training sessions, methodologies and practical tools. Important learnings from the lab coordinators and an overview of the practical tools for transformation are also presented. Finally, recommendations from and implications of the project's work are spelt out in the 10 Food 2030 Pathways for Action of the European Commission, and will serve to inspire future R&I agenda, projects, R&I funders and the evolving Horizon Europe Partnership entitled "Safe and Sustainable Food Systems for People, Planet and Climate".

Studies and reports

Publications Office
of the European Union