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Research and innovation gaps and needs for sustainable food systems

A portfolio analysis of EU-funded projects

Independent Expert Report

Research and Innovation

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A portfolio analysis of EU-funded projects

European Commission
Directorate-General for Research and Innovation
Directorate B — Healthy Planet]
Unit B2 — Bioeconomy and Food Systems

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A portfolio analysis of EU-funded projects

Independent Expert Report by
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Healthy Planet

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ABBREVIATIONS

CONNECT	Change the way we connect with food systems
EAT	Change the way we eat food
EC	European Commission
EU	European Union
FS	Food systems
FSOBS	Launching a Food systems observatory
GOVERN	Change the way we govern food systems
KNOHUB	Establishing a Food systems knowledge hub
KNOWSHSC	Knowledge sharing and scaling
POOLREPR	Pooling R&I resources and programming
P-SFS	Sustainable Food Systems Partnership
R&I	Research and Innovation
SCAR FS SWG	Standing Committee on Agricultural Research Food Systems Strategic Working Group
SCAR	Standing Committee on Agricultural Research
SRIA	Strategic Research and Innovation Agenda
SUPPLY	Change the way we process and supply food
TST	Thematic Support Team

1. INTRODUCTION

1.1 Background

The Standing Committee on Agricultural Research (SCAR) is an international multi-stakeholder network, chaired and financed by the European Commission. The aim of the SCAR is to support EU agricultural and wider bio-economy research, by the coordinated action of thematic working groups, and being a major catalyst for the coordination of national research programmes.

The SCAR Food Systems Strategic Working Group (SCAR FS SWG) supports the development of a new co-funded European Sustainable Food Systems Partnership (P-SFS) based on a Strategic Research and Innovation Agenda (SRIA), reflecting major knowledge and action needs, and guiding the formulation of the scope and topics for new joint calls.

The P-SFS is expected to become part of an evolving "partnership landscape" at EU level, sustaining the new Horizon Europe research programming, with the aim to avoid overlaps and building synergies in accompanying food systems transition, in accordance with the goals of the EU Green Deal and Farm-2-Fork Strategy and with the ambitions of the Food2030 policy.

1.2 Aims and scope

This work contributes to the realisation of a new strategic research and innovation agenda (SRIA) for the development of a Sustainable Food System Partnership (P-SFS) for the enhancement of EU Research and Innovation (R&I) goals and funding programmes.

Specific objectives are:

- the identification of EU funded R&I projects (Horizon2020 and beyond) focus areas and gaps for food systems transition, in the lens of a new food systems approach;

- the outlining of major R&I needs for future-proof food systems.

1.3 Theoretical approach

The conducted research is based on a Food Systems Approach.

Food systems (FS) are the combined and connected activities of primary agriculture and fisheries, including also the linked usage of inputs, the processing, transformation, distribution, and consumption of food (Zurek et al. 2018).

Adopting a FS approach allows the identification of different blocks and interconnections, underlying food systems sustainable transformation, and the assessment of their performance, sustainability, and resilience (Halberg and Westhoek 2019). Specifically, the latter is considered a valuable novel direction

for R&I, giving solutions to multifaceted sustainability challenges, across global to local scales, and various domains of investigation and disciplines (Achterbosch et al. 2019).

In line with that, the conceptual framework of this study is based on eight focus areas identified in the SRIA content reported in the P-SFS first draft proposal (European Commission 2022). These areas include both thematic areas and activities (Figure 1) that should be addressed by the P-SFS in order to support FS transformation.

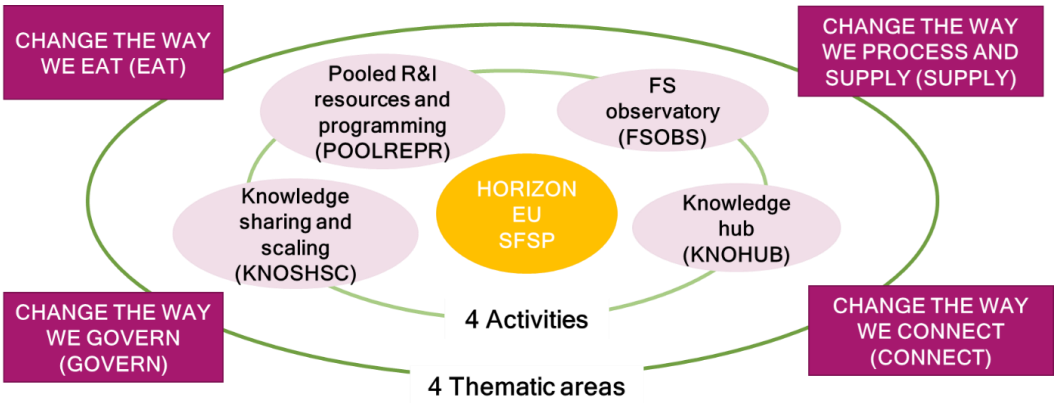

Figure 1. Conceptual framework for projects analysis: SRIA 8 focus areas.
Our elaboration on European Commission (2022).

Specifically, four thematic areas are considered:

- Change the way we eat food (EAT), including topics regarding safe, healthy, nutritious, affordable, accessible, equitable, and culturally acceptable tasteful foods, enabling dietary shifts, while tackling malnutrition and promoting health. Among these, plant-based diets and sustainable animal-based food are examples of drivers supporting food environment changes;

- Change the way we process and supply food (SUPPLY), concerning sustainable ways for processing and supplying, aiming to achieve carbon neutrality and circularity, and considering the sustainability potential of re-scaling supply chains. New recycling and processing methods are among the possible strategies for reorienting the food environment, together with a re-valorisation of short and direct channels;

- Change the way we connect with food systems (CONNECT), involving new tools for improving citizen engagement and consumer trust in European food systems. Innovating supply chains and business models, along with integrating digital technologies, like Artificial Intelligence and blockchain, are expected to redefine food systems interactions;

- Change the way we govern food systems (GOVERN), concerning inclusive governance settings for food systems sustainability transition. Enhancing collaboration across food policy councils and analysing governance impact on food systems are relevant topics in this field. This theme covers public, private, and civil society arrangements.

Besides that, a set of four inter-connected activities are identified as a way for the P-SFS to coordinate, align, and leverage European and national R&I efforts in the abovementioned areas, through the achievement of future-proof food systems.

- Pooling R&I resources and programming (POOLREPR), fostering joint transnational R&I support via project funding and alignment of funding priorities and mechanisms enabling multi-actor and systems approaches;

- Launching a Food systems observatory (FSOBS), considering the creation of platforms for sharing and co-creating metrics, data, and assessments on the sustainability performance of food systems;

- Establishing a Food systems knowledge hub (KNOHUB), with regard to the development of networks of transformative research and innovation labs (FS-labs) on systemic innovations at different scales;

- Knowledge sharing and scaling (KNOWSHSC), concerning the adaption of knowledge systems, innovation platforms, and science-policy-society interfaces for ensuring impact.

1.4 Methodology

This study is based on a participatory portfolio analysis of recent and representative EU funded R&I projects (Achterbosch et al. 2019; Silva et al. 2019), with the active collaboration of SCAR FS SWG competent experts, and the contribution of different stakeholders.

A co-designed process was realised for the identification and implementation of the portfolio analysis methodology (Emery 2013; Padilla and Ramos Filho 2012).

Specifically, four research steps were carried out:

1. Projects Mapping (purposeful sampling) (Snyder 2019): inventorying of 30 EU funded R&I projects that apply a FS approach, based on a review of projects published in the public domain;

2. Projects overview analysis and synthesis (quali-quantitative methods): identification of R&I projects relevant characteristics, achievements, and gaps, with reference to a list of 67 co-identified descriptors;

3. Case-projects selection and analysis: identification and in-depth thematic analysis of 10 illustrative project-cases in the SRIA focus areas;

4. Data gathering, elaboration, and narrative synthesis towards the identification of relevant R&I needs and contributing to the SRIA development and P-SFS implementation.

Research findings were discussed, enriched, and validated with SCAR FS SWG competent experts, and presented to the SCAR FS SWG 9TH Meeting on 30 November 2022 to gather comments and feedback from all SCAR FS SWG members and EC representatives. In addition, the sharing and discussion of research findings in both national and international conferences, seminars, and workshops, allowed receiving the opinion of different stakeholders in the FS sector, including jurists, food technologists and engineers, agricultural economists, rural sociologists, policymakers, farmers, and industry professionals[1].

[1] Research findings were presented at the following events: i. FOODPathS kick-off meeting, 29-30 June 2022, Paris, France; ii. EFFoST seminar series on Sustainable food systems, 23 September 2022, online; iii. Italian national conference "La sicurezza alimentare tra crisi internazionali e nuovi modelli economici" (Food security between international crisis and new economic models), Milan, Italy, 22 September 2022; LVIII Conference of the Italian National Society of Agricultural Economics (SIDEA) "Innovazione e conoscenza nei sistemi agroalimentari e ambientali: sfide ed opportunità in un tempo di ripresa e resilienza" (Innovation and knowledge in agri-food and environmental systems: challenges and opportunities in a time of recovery and resilience), Palermo, Italy, 29-30 September 2022; IX International Conference on Localize agri-food systems (SYAL), Vila Real, Portugal, 14-16 November 2022.

2. 30 R&I PROJECTS ANALYSIS

2.1 Selection and mapping of the 30 R&I projects

2.1.1 Projects mining strategy

The projects' mining activity was based on a selection of keywords identified in collaboration with SCAR FS SWG experts, in order to gather both food systems "labelled/non labelled" initiatives.

Among the several keywords, the following appeared as the most effective for finding eligible projects:

- Food systems;
- Food systems approach;
- Food systems transition;
- Food systems resilience;
- Food systems innovation;
- Food systems sustainability;
- Food systems governance.

The keywords were used to browse the most reliable, updated, and comprehensive databases for EU funded R&I projects. Specifically, the following databases were explored:

- CORDIS (https://cordis.europa.eu/en);
- KEEP.EU (https://keep.eu/);
- EIP – AGRI (https://ec.europa.eu/eip/agriculture/en/eip-agri-projects);
- ERASMUS + (https://erasmus-plus.ec.europa.eu/it/projects);
- SUSFOOD ERA-NET (https://susfood-db-era.net/main/);
- ERA LERN (https://www.era-learn.eu/);
- LEAP4FNSSA project database (https://library.wur.nl/WebQuery/leap4fnssa-projects?record-status=complete&wq_srt_desc=leap4fnssa/@isn);
- FOSC ERA-NET Cofund Food Systems and Climate (https://www.foscera.net/en/foscera/Projects.htm);
- ICT-AGRI-FOOD (https://ictagrifood.eu/).

A list of the 50 relevant projects, including their title, acronym, database, and funding source was realised, in order to subsequently extract projects for the requested sample (Annex A).

2.1.2 Projects selection criteria

The list of the most relevant projects was composed of a selection of 30 projects, guided by the following criteria identified with SCAR FS SWG experts.

A) Thematic criteria

With reference to the thematic criteria, each of them was given a level of priority (obligatory, priority, and excellence) in order to maintain the selection open-ended. Specifically, the projects were selected through:

- A1. An Obligatory thematic criterion:
  - Adopting a food system approach (either implicit or explicit).
- A2. Priority thematic criteria:
  - Targeting of the post-harvest phase (i.e., processing, distribution, marketing, consuming, digesting, recycling);
  - Considering representative and illustrative case studies;
  - Considering various building blocks (>1) of the food system;
  - Based on interdisciplinary research strategies;
  - Adopting multi-stakeholders' approach and participatory methods of research.
- A3. Excellence thematic criteria:
  - Providing novelties (theoretical, methodological, technical);
  - Providing new indicators of impact, sustainability, and resilience;
  - Developing scenario analyses;
  - Creating new datasets or inventories;
  - Having results available and accessible (at present).

B) Other criteria (other than thematic)

- B1. Temporal criteria:

- End date: from 01-01-2019 (and ongoing officially granted).

- B2. Project typology:
  - H2020 and beyond (i.e., Green Deal projects - last call of the H2020-, Marie Curie, ERA-NET ERASMUS+, INTERREG, etc.).

- B3. Geographical criteria:
  - Multi-regional projects, with preference to the ones involving Eastern countries or even non-member states.

2.1.3 Projects mapping

The project mapping results are reported in a database of 30 selected projects and related key information. Specifically, 67 descriptors were identified for each of the included projects.

2.2. 30 R&I projects overview analysis and synthesis

The following paragraphs report results from the analysis of the 30 selected EU R&I projects' characteristics, covered needs and gaps, considering the set of co-identified descriptors.

2.2.1 Adoption of a food systems approach (implicit/explicit)

All selected projects appear to adopt a food systems approach (obligatory thematic criterion). Among them, 17 projects explicitly self-identify this approach.

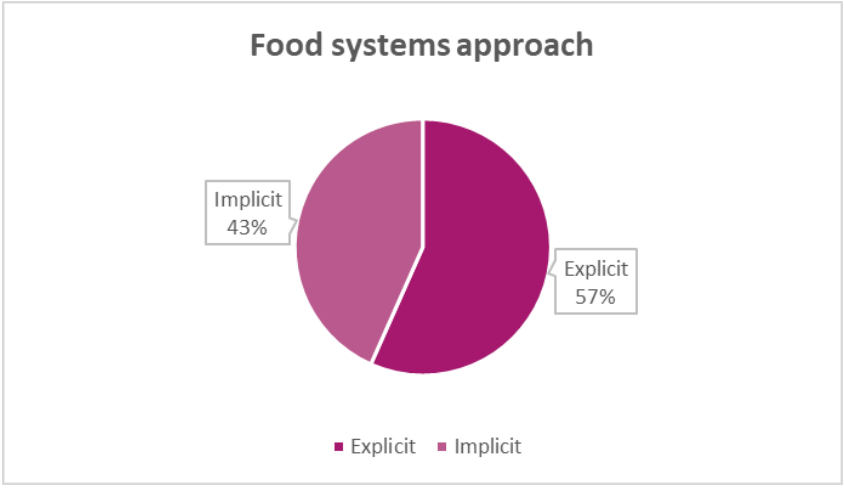

Figure 2. Adoption of a food systems approach.
Our elaboration on secondary data.

The data evidence a medium-high level of understanding of food systems complexity and awareness of the necessity of a new systemic and holistic approach for effective research and innovation in the field of food and agriculture.

2.2.2 Addressed food systems research themes

The following Figure presents the selected projects coverage of the set of FS research themes identified by the SCAR FS SWG portfolio analysis realised in 2019 (Achterbosch et al. 2019). As shown in the Figure, most of the selected projects cover more than one theme.

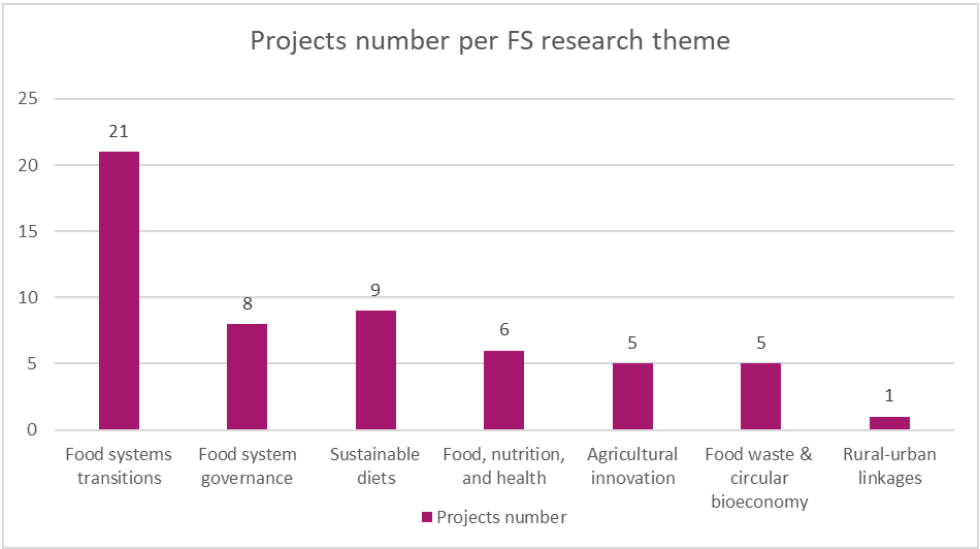

Figure 3. Covered FS research themes.
Our elaboration on secondary data.

2.2.3 Types of funding sources and actions

Numerous and diverse types of funding programmes were considered in the sample, including H2020 (22 projects), ERA-NET Cofund Calls (5 projects), and other types as Interreg and Erasmus+ (3 projects). The Figure below presents the number of projects per type of funding programme and action.

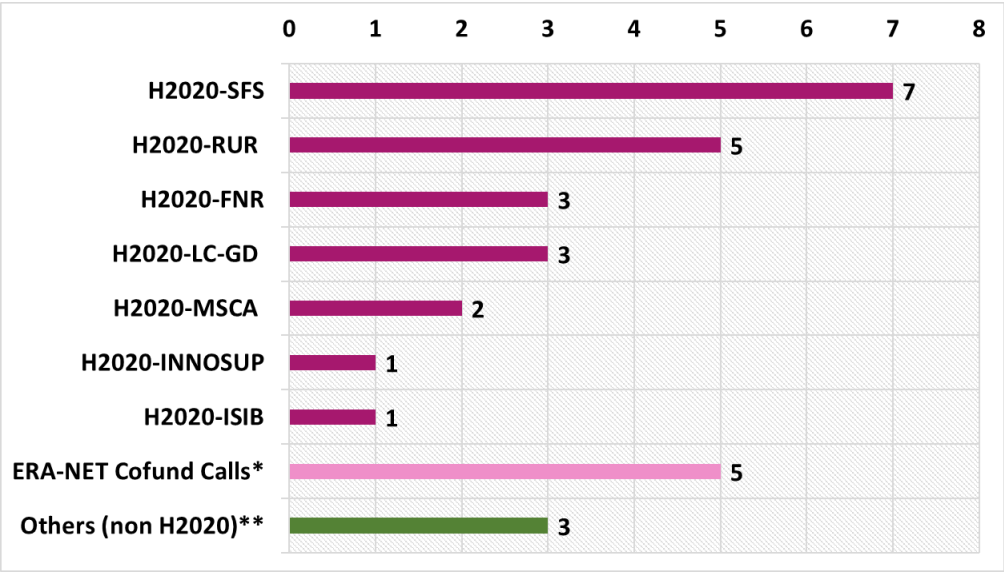

Figure 4. Number of projects per type of funding programme and action.
Our elaboration on secondary data. *ERA-NET Cofund calls include SUSFOOD2/CORE Organic; FOSC; ICT-AGRI-FOOD. **Other types include Interreg and Erasmus+.

Concerning H2020 programme, the Figure below identifies the share of projects per each funding scheme.

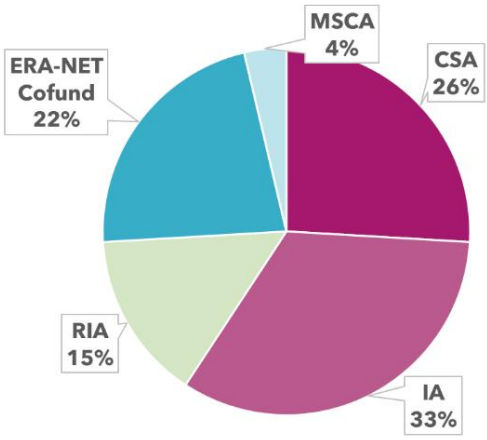

Figure 5. Share of projects per each funding scheme.
Our elaboration on secondary data.

2.2.4 Geographical distribution

Among the 30 selected projects, Italy and Germany count for the most of participations, respectively 23 and 20, followed by France (18), Belgium (18), and Denmark (17).

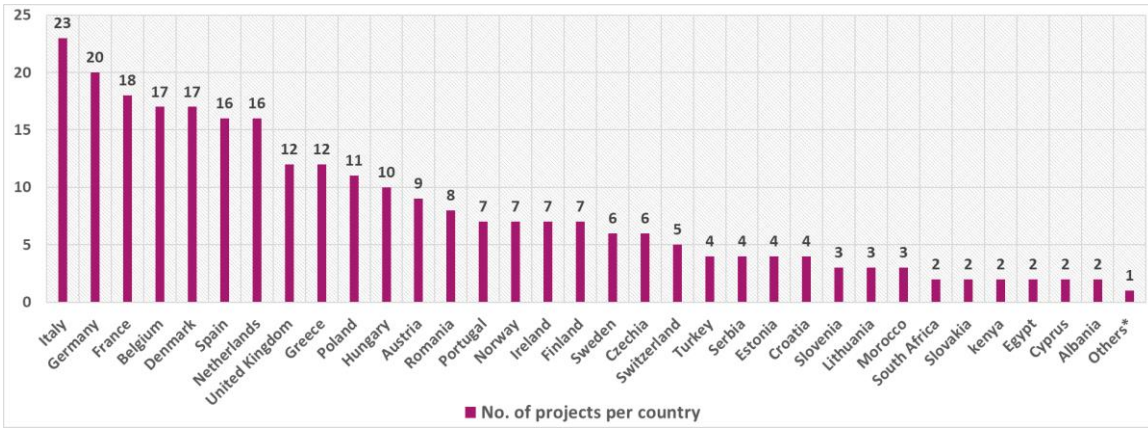

Figure 6. Geographical distribution.
Our elaboration on secondary data. *The category "others" includes: Vietnam; US; Uganda; Tunisia; Thailand; Senegal; Nigeria; New Zealand; North Macedonia; Luxembourg; Latvia; Israel; India; Iceland; Bosnia-Herzegovina; Ghana; Georgia; Ethiopia; China; Canada; Burkina Faso; Bulgaria; Brazil; Australia; Argentina; Algeria.

Projects in the sample count on wide and diversified partnerships, in geographical terms, and are characterised by a high degree of multi-regionality. In particular:

- Most of the projects include both Western and Eastern countries (23/30);
- Most of the projects combine EU with non-EU countries (22/30), with 12 projects including countries of Africa, Asia, Middle-East, America, and Oceania;
- The average number of countries per project is between 9 and 10.

2.2.5 Most represented characteristics and covered needs in R&I projects

Concerning the implementation of the FS approach, the sample evidences that:

- All projects consider multiple FS blocks with related interconnections;
- All projects adopt an interdisciplinary approach;
- Quite all the projects (27/30) adopt a multi-stakeholder approach.

Selected projects contribute to the advancement of R&I for sustainable transformation of FS, considering that:

- All of them target the post-harvest phase (more than others considering the stages of distribution and recycling);
- All of them provide significant novelties, both methodological and technical;

- 23/30 projects present illustrative and representative case studies from different countries, consisting mostly of pilot territories, supply chains, business models, multi-actor networks, and real-life experiments.

2.2.6 Less represented characteristics and gaps in R&I projects

Whit a view to the analysis of less represented characteristics, selected projects are characterised by:

- a lack of innovations and advancements in terms of theories and concepts, so that a major conceptualisation of sustainable food systems is needed;

- a lower interest for the "food environment" block in respect to the other FS blocks;

- a low provision of open data, methodologies, and tools for the assessment of R&I projects' impact, FS sustainability performance, as well as for the realisation of reliable forecasts:

  - very few projects (5/30) identify new indicators of impact and for the measurement of FS performance of sustainability;

  - very few projects (4/30) realise scenario analyses (the ones provided are intended to represent and anticipate FS environmental impact, possible climate change effects, food consumption and marketing trends);

  - just under half of the projects (11/30) provide new datasets and inventories.

Lastly, even if there is a medium-low level of availability and accessibility of project results, it could be possible due to the very recent start of almost all projects.

2.2.7 Projects analysis per focus areas of the SRIA

The 30 selected projects were also analysed according to the SRIA conceptual model (Paragraph 1.3). The intent was to evaluate the current level of implementation of both thematic areas and activities in the purposive project sample.

Accordingly, at first, the level of coverage of the 4 SRIA thematic areas was assessed (i.e., number of projects facing each of the areas) (Figure below). Significantly what emerged was that each of the projects covers more than one thematic area.

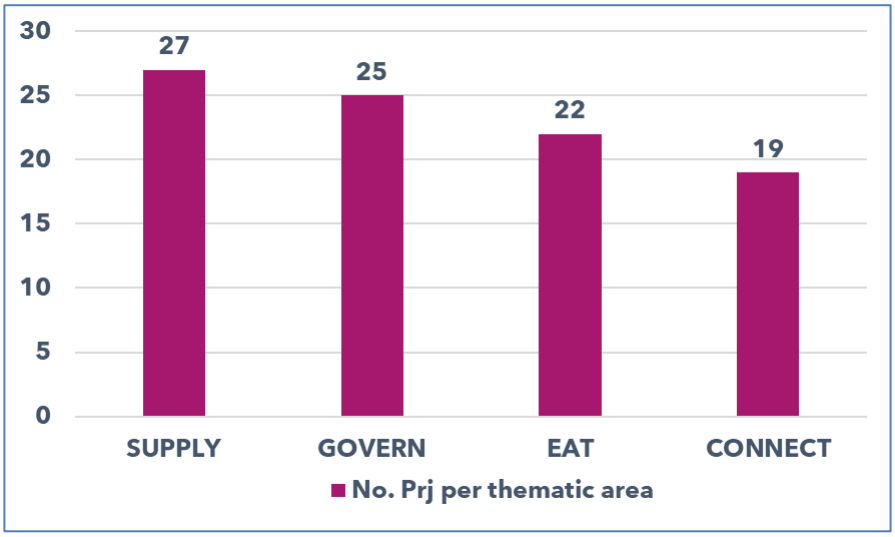

Figure 7. Level of coverage of SRIA thematic areas.
Our elaboration on secondary data.

As shown in the Figure above, the most covered area is "Change the way we process and supply food" (27 projects), followed by "Change the way we govern food systems" (25 projects). On the contrary, the less represented area is "Change the way we connect with food systems" with 19 projects.

Secondly, the same analysis was carried out with reference to the 4 SRIA activities (i.e., identification of the number of projects implementing each of the activities) (Figure below). Even in this case, the analysis evidenced that all the projects fronted more than one activity.

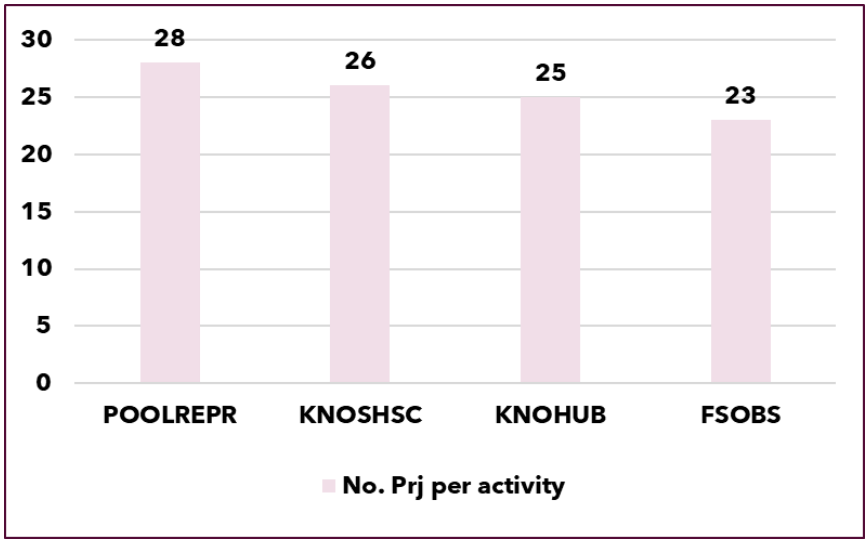

Figure 8. Level of coverage of SRIA activities.
Our elaboration on secondary data.

As shown in the Figure above, the most represented activity is "Pooling R&I resources and programming" (28 projects) followed by "Knowledge sharing and scaling" (26 projects); on the contrary, the less covered activity concerns the "Launching a Food systems observatory".

Thirdly, a further step of analysis was conducted referring only to the case of thematic areas. Specifically, the aim was to understand if for each of the projects a prevalent thematic area could be identified. To that regard, the area with the highest relevance in both project goals and results was considered as prevalent (i.e., number of topics faced in the area resulting from targeted objectives and activities).

This allowed to draw a different picture of the actual situation. While each of the thematic areas shows to be prevalent for at least one of the projects in the sample, a significant difference emerges in the number of projects prevalently facing the area (Figure 9): "Change the way we process and supply food" is the prevalent thematic area in more than a half of the projects (16), while "Change the way we eat food" and "Change the way we connect with food systems" are prevalent areas only for 3 and 6 projects respectively.

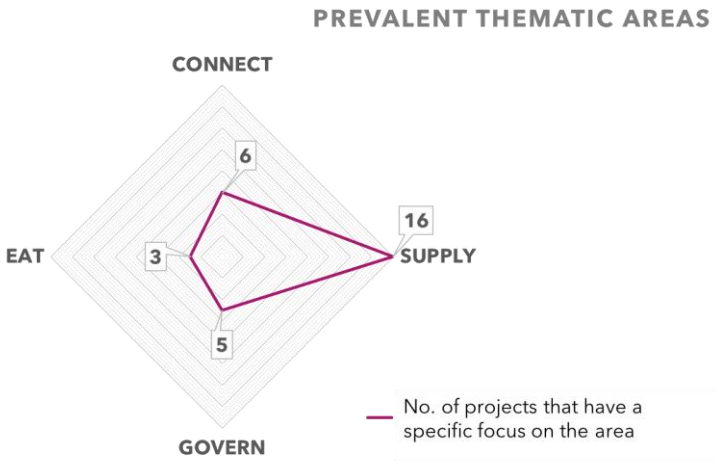

Figure 9. Projects distribution per prevalent SRIA thematic area.
Our elaboration on secondary data.

3. R&I NEEDS ANALYSIS

As part of this work, R&I needs were identified in each of the SRIA thematic areas based on the analysis of both covered and lacking R&I topics emerging from all the projects in the sample.

As a first step, the SRIA thematic areas narrations included in the P-SFS first draft proposal were analysed and coded (European Commission 2022). Accordingly, a comprehensive list of codes was realised and categorised (Saldaña 2021), where each of the areas (categories) were labelled to build a set of R&I topics. Secondly, the identified labels were used for the analysis of the selected R&I projects.

Specifically, for each of the 30 projects, the textual information concerning projects goals, objectives, and results was analysed. Those texts were then coded according to the predetermined labels present in the list. As a result, it was possible to identify which of the R&I topics included in the list were covered by the projects in the sample (and how many projects covered each of the R&I topics) and instead, which of them remained uncovered.

The findings of this process are reported in the following paragraphs. Each of them presents the covered and uncovered R&I topics identified per each of the SRIA thematic areas and the related R&I needs.

3.1 SRIA Thematic area: Change the way we eat food

The Figure below presents the covered and uncovered R&I topics in the SRIA thematic area "Change the way we eat food".

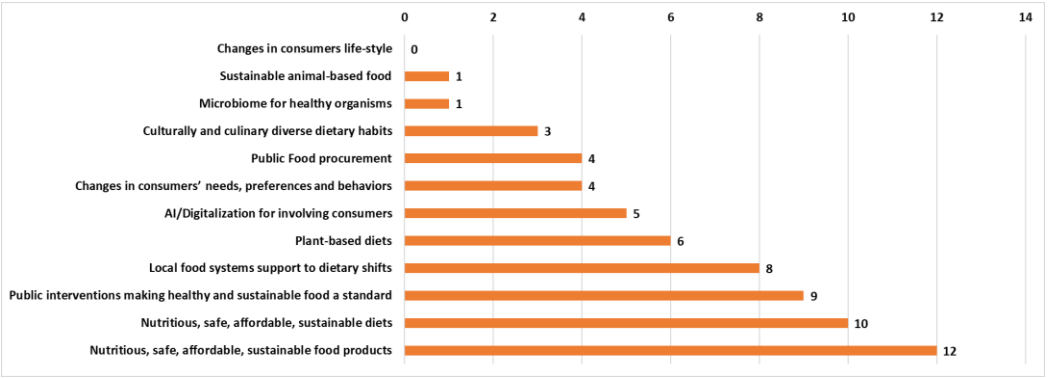

Figure 10. Covered and uncovered R&I topics in the thematic area: Change the way we EAT food. Our elaboration on secondary data.

In light of the identified covered topics and gaps, the need for further research and innovation efforts emerges in the EAT area regarding the following points:

- Changes in consumers' life-style, preferences, and behaviours;
- Sustainable animal-based food;
- Microbiome for healthy organisms;
- Public food procurement;
- Diversity in dietary habits;
- Artificial Intelligence/Digitalisation for involving consumers.

3.2 SRIA Thematic area: Change the way we process and supply food

The Figure below presents the covered and uncovered R&I topics in the SRIA thematic area "Change the way we process and supply food".

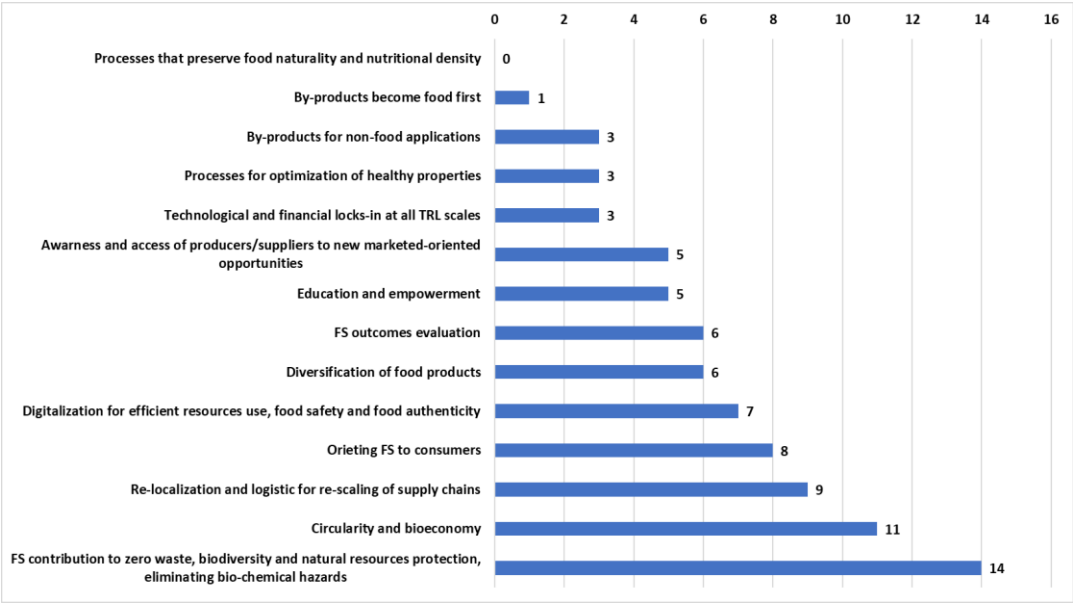

Figure 11. Covered and uncovered R&I topics in the thematic area: Change the way we PROCESS and SUPPLY food. Our elaboration on secondary data.

In light of the identified covered topics and gaps the need for further research and innovation efforts emerges in the area SUPPLY concerning the following points:

- Processes for preserving food naturalness, nutritional density, and optimizing healthy properties;
- By-products for food and non-food uses;
- Technological and financial lock-ins at all Technology Readiness Level (TRL) scales;
- Producers/suppliers awareness and access to new market-oriented opportunities;
- Enhanced education and empowerment;
- FS outcomes (social, environmental) evaluation;
- Food products diversification.

3.3 SRIA Thematic area: Change the way we connect with food systems

The Figure below presents the covered and uncovered R&I topics in the SRIA thematic area "Change the way we connect with food systems".

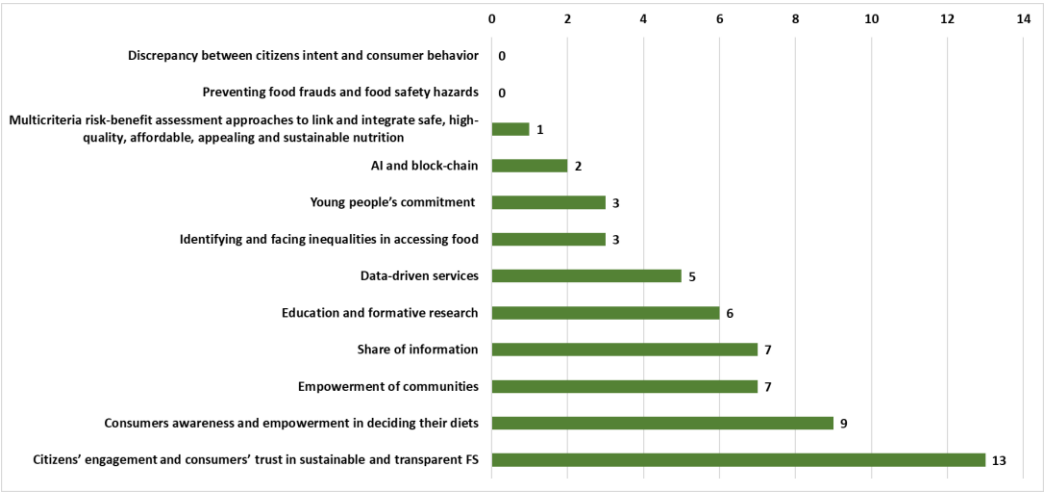

Figure 12. Covered and uncovered R&I topics in the thematic area: Change the way we CONNECT with food systems. Our elaboration on secondary data.

In light of the identified covered topics and gaps the need for further research and innovation efforts emerges in the area CONNECT, with regard to the following points:

- Discrepancy between citizens' intent and consumer behaviour;

- Preventing food frauds and food safety hazards;
- Multi-criteria risk-benefit assessment approaches to link and integrate safe, high-quality, affordable, appealing, and sustainable nutrition;
- AI and blockchain;
- Young people's commitment;
- Identification and facing of inequalities in accessing food;
- Education.

3.4 SRIA Thematic area: Change the way we govern food systems

The Figure below presents the covered and uncovered R&I topics in the SRIA thematic area "Change the way we govern food systems".

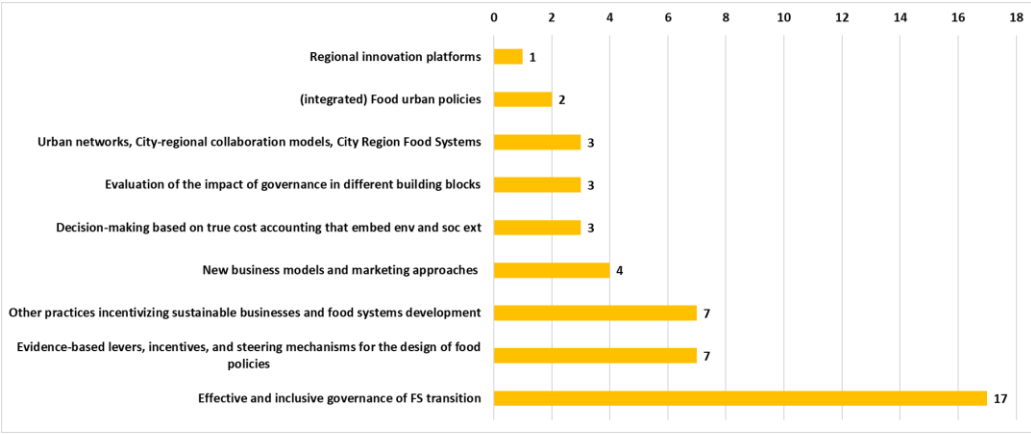

Figure 13. Covered and uncovered R&I topics in the thematic area: Change the way we GOVERN food systems. Our elaboration on secondary data.

In light of the identified covered topics and gaps the need for further research and innovation efforts emerges in the area GOVERN about the following points:

- Regional Innovation Platforms;
- Multi-level integrated food policies;
- Urban networks, City-regional collaboration models, City Region Food Systems;
- Evaluation of the impact of governance in different building blocks;

- Decision-making based on true cost accounting that embeds environmental and social externalities;

- New business models and marketing approaches.

3.5 R&I needs in SRIA thematic areas: an overview

The Figure below provides a synthesis of the R&I needs identified in all the SRIA thematic areas. These relevant topics are expected to contribute to SRIA grounding and development as well as to the realisation of the P-SFS. As an outcome, the latter could be capable to drive new R&I programmes and funding calls in the evolving Horizon Europe framework to respond to the actual necessities of food systems and agri-food sectors in facing challenging processes of inclusive and sustainable transformation.

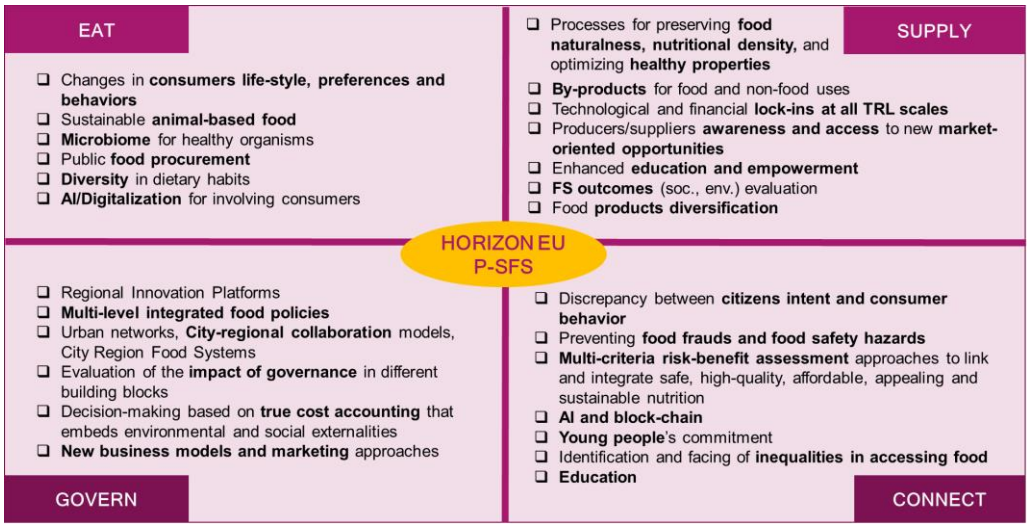

Figure 14. R&I needs in SRIA Thematic areas.
Our elaboration on secondary data.

4. 10 R&I PROJECTS IN-DEPTH ANALYSIS

4.1 Selection and mapping of the ten R&I projects

Within the 30 projects sample a purposive selection of 10 relevant R&I projects was made, in order to gather illustrative examples of SRIA thematic areas and activities in terms of both faced topics and actions. Specifically, projects were selected according to the following co-identified qualitative criteria:

- Projects illustrativeness of one or more of the SRIA thematic areas and activities;

- Projects results availability and accessibility.

The sample was built considering the necessity to create a mapping where all the SRIA focus areas were illustrated at least by one project.

To that regard, firstly, a smaller group of projects was selected and mapped. The early sample was presented at different conferences and seminars for obtaining feedback from SCAR FS SWG competent experts and other relevant stakeholders on both the relevance of the projects and their coherence with the SRIA focus areas (Paragraph 1.4). Based on the received inputs, the sampling process was finalised: 10 projects were selected, mapped, and presented to SCAR FS SWG experts for revision and validation.

As a result, Table 1 shows a map of the 10 projects final selection, including their title and acronym, together with their main R&I goal.

In addition, projects were mapped in the light of illustrated SRIA focus areas. Each of the SRIA thematic areas and activities could be exemplified by one or more of the 10 selected projects (Tables 2 and 3).

Table 1. Mapping of the 10 R&I projects

	Project Title	Acronym	Main R&I goal
1	Shifting school meals and schools into a new paradigm by addressing public health and territorial, social, and environmental resilience	Schoolfood4change	Sustainable and healthy diets of young people
2	Unlocking data-driven innovation for improving productivity and data sharing in mushroom value chain	Mushnomics	Introduction of digital technology solutions in the mushrooms supply chain
3	Towards coordinated microbiome R&I activities in the food system to support (EU and) international bioeconomy goals	MicrobiomeSupport	Establishment of a solid microbiome knowledge base
4	Co-creating resIlient and susTaInable food systEms towardS FOOD2030	Cities2030	Urban food systems transformation
5	Building pathways towards FOOD 2030-led urban food policies	Food Trails	Urban food systems transformation
6	Sense, Science and the Magic of Food	Sesam	Engagement of young people and citizens for food systems transformation
7	Transition paths to sustainable legume-based systems in Europe	True	Sustainable legume cultivation and consumption
8	Food System Hubs Innovating towards Fast Transition by 2030	FoodShift2030	Food systems transition towards a low carbon circular future
9	Towards Innovation - driven and smart solutions in short food supply chains	Smartchain	Shift towards collaborative short food supply chains
10	Strengthening European Food Chain Sustainability by Quality and Procurement Policy	Strength2Food	Improvement of EU food quality schemes, public sector food procurement and stimulation of Short Food Supply Chains

Source: our elaboration.

Table 2. Illustrative projects in the SRIA thematic areas

EAT	Schoolfood4change Strenght2Food FoodShift2030 True	**SUPPLY**	Strenght2Food Mushnomics Cities2030 Smartchain
CONNECT	Strenght2Food FoodShift2030 Sesam Cities2030	**GOVERN**	Strenght2Food Smartchain FoodShift2030 Food Trails MicrobiomeSupport Cities2030

Source: our elaboration.

Table 3. Illustrative projects in the SRIA activities

POOLREPR	Food Trails MicrobiomeSupport	**KNOSHSC**	Strenght2food FoodShift2030 Mushnomics Smartchain MicrobiomeSupport Schoolfood4change Food Trails True
KNOWHUB	Schoolfood4change Cities2030 Food Trails Sesam True Foodshift2030 Smartchain Strength2food	**FSOBS**	Cities2030

Source: our elaboration.

4.2 10 R&I projects in-depth analysis and synthesis

An in-depth qualitative analysis of the 10 projects was conducted, involving the following phases:

1. extraction of the information initially gathered for each of the projects (Paragraph 2.1) and included in the 30 projects database;

2. further in-depth reading of projects relevant deliverables (i.e., scientific, and grey literature produced within the project and accessible on online projects databases) for the extraction of additional information on projects activities, results, and contribution in terms of innovative tools, good practices, and research advancements;

3. the integration, elaboration and synthesis of the information gathered in the two previous phases (qualitative text analysis) (Patton 2002);

4. the fulfilment of 10 project fiches, one per each of the selected projects, including the findings of the qualitative text analysis.

The 10 projects' fiches are intended to give an overview of single projects details, summary, and results. Their relation with SRIA focus areas is also described, considering covered R&I topics and targeted actions. For an in-depth reading and analysis, projects fiches are available in Annex B to this report.

Considering that, a comparative analysis and integrated synthesis were made of the relationships showed by each of the 10 projects to the development of the SRIA focus areas. This resulted in a representation of the SRIA focus areas, R&I topics, and activities that are prevalently covered by the projects considered (Table 4).

Table 4. Covered SRIA focus areas, R&I topics, and activities in the 10 projects sample

Covered SRIA focus areas	All SRIA thematic areas and activities are covered by the projects in the sample. As seen for the 30 projects sample (Paragraph 2.2.8), "Change the way we govern food systems" and "Change the way we process and supply food" are confirmed as the prevalent thematic areas for the most of the examples in the 10 projects sample. "Knowledge sharing and scaling" and "Establishing a food systems knowledge hub" are the prevalent activities for the most of the examples in the 10 projects sample.
Covered R&I topics in SRIA thematic areas	R&I topics considered by the 10 projects in each of the SRIA thematic areas are: • Change the way we eat food – sustainable and healthy diets back in the schools menus – role of public food procurement in changing diets – transition to plant-based diets – fostering of sustainable legumes consumption – food quality designations sustainability – promotion of healthy and nutritious diets • Change the way we process and supply food

- full-chain systems-based approach, from producer to consumer and beyond
- digital technology solutions for value chain process control
- U-pick urban gardens
- transformation and restructuring of the way in which FS produce, transport, supply, recycle, and reuse food
- (collaborative) fostering of short food supply chains, even at local and bioregionalised scales
- block-chain tecnologies for accurate, almost real-time digital twin of the whole supply chain (blockchain-based data-driven management platform)

- Change the way we connect with food systems
  - young people's commitment
  - engagement of private and public stakeholders, at different levels, for making schools catalysts of sustainable food systems change
  - empowerment of consumers (even in cities), moving from being passive recipients to being motivated actively engaged agents of change
  - fostering of urban-rural territorial cohesion
  - enhancing of the understanding of the impact of research on citizens daily life
  - enhancing of supply chain operators relationships with end consumers
  - enhancing of supply chain operatiors job satisfaction
- Change the way we govern food systems
  - knowledge exchange across scientific and political communities (international forums)
  - setting up and triggering virtuous innovations both in policies and businesses
  - integrated urban food policies
  - food systems governance strategies

	– business and policy recommendations for unlocking of the potential of short food supply chains
Actions taken in SRIA activity areas	Actions considered by the 10 projects in each of the SRIA activity areas are: • Pooling R&I resources and programming – shaping funding programmes for the advancement of microbiome-related knowledge – establishing a pan-European investors' living lab to develop innovative financial instruments for sustainable urban food policies • Launching a Food systems observatory – creating an observatory as a decision support system for setting up and triggering virtuous innovations both in policies and businesses • Establishing a Food systems knowledge hub – developing co-creation cases with public-private organisations in national and regional contexts (comparable to fs-labs) – creating city region food systems labs and accelerator labs – co-designing and co-implementing pilot actions and participatory living labs for the development of urban food policies – creating food labs to foster young people's interest in science, research, and evidence-based solutions – using of excellent and practical models (as farm networks and supply chains) for highlighting the breadth of value-chain-wide know-how and capacities necessary for the home-grown legume transition – creating innovation and collaboration hubs as national communities of short food supply chains – creating virtual innovation hubs to facilitate stakeholder engagement and demand driven-innovations – stimulating the development of new quality markets and local food chains through pilot initiatives and innovative actions

- Knowledge sharing and scaling
  - developing joint protocols and methodologies
  - contributing to the innovation of educational programmes, training contents and methods, and competence building
  - sharing knowledge for transfer from science to policy and industry
  - supporting science-policy-society interfaces
  - creating data-driven ICT platforms that enable to build a stakeholder community
  - exchanging of knowledge and proactive dissemination across stakeholders, supporting engagement
  - creating thematic research databases, containing information on relevant funding opportunities, implemented projects, practical applications, organisations operating in the field, educational offer (e.g., Microbiome Research Database)
  - providing of summarised outputs of research projects in easy-to-digest formats
  - organising multi-stakeholder workshops

Source: our elaboration on secondary data.

5. CONCLUDING REMARKS

This work contributes to the development of a new strategic research and innovation agenda and the realisation of a Sustainable Food System Partnership for the advancement of both national and EU research and innovation purposes and funding programmes.

Specifically, by the adoption of an innovative co-designed portfolio analysis methodology this research led to: i. the identification of relevant EU-funded R&I projects' achievements and gaps, related to food systems transition; and ii. the outlining of R&I needs for future-proof food systems capable to feed the SRIA finalisation as a support to the design of new work programmes and funding opportunities.

Accordingly, presented findings are innovative in:

- highlighting the fundamental role that participatory portfolio analyses - realised in collaboration with researchers, experts, and stakeholders -, can play as an effective methodology for supporting integrative reviews and purposeful investigations of EU-funded R&I projects' characteristics, achievements and gaps, and the consequent co-design of new effective agendas, capable to meet concrete needs of research and action, and favouring an optimisation of R&I funding;

- identifying a trustable list of R&I topics that should require more efforts from both researchers and policymakers to be investigated and developed in work programmes and projects (feeding the new SRIA);

- pointing out the necessity of developing supporting actions that could feed the role of the new P-SFS for the coordination, alignment and leveraging of targeted R&I efforts.

As a result, these actions could become the basis for the planning and implementation of the SRIA Activity areas. Accordingly, the P-SFS should activate to provide support to: i. fostering a further food systems conceptualisation (both theoretical and methodological); ii. realising open shared and aggregated datasets and inventories; iii. developing methodologies and tools for assessing R&I projects' impact, FS sustainability performance, and making scenario analyses; iv. making new projects proposing and implementing inclusive and sustainable plans for the communication, dissemination, and exploitation of their findings.

Considering the abovementioned, the effective and grounded identification of R&I topics and activities to be pursued by the SRIA is expected to help the P-SFS become part of the evolving "partnership landscape" that will feed the realisation of future Horizon Europe work programmes. To that end, the partnership will play an essential role for the development of new funding opportunities dedicated to food systems, and capable to reduce overlaps and build synergies between past and future efforts. In that way the aim of green and digital food systems transition

could be promoted and sustained, in accordance to relevant EU policy goals and strategic frameworks.

6. REFERENCES

Achterbosch, T.J., Escudero A.G., Dengerink, J. D., van Berkum, S. (2019). Synthesis of existing food systems studies and research projects in Europe. Available at: https://ec.europa.eu/info/publications/synthesis-existing-food-systems-studies-and-research-projects-europe_en (accessed 23/06/2022).

Emery, M.; Gutierrez-Montes, I.; Fernandez-Baca, E. Sustainable Rural Development: Sustainable Livelihoods and the Community Capitals Framework, 1st ed.; Routledge: Abingdon, UK, 2013.

European Commission (2022). Draft proposal for a European Partnership under Horizon Europe Sustainable Food Systems for People, Planet & Climate. Available at: https://ec.europa.eu/info/sites/default/files/research_and_innovation/funding/documents/ec_rtd_he-partnership-sustainable-food-systems-april_2022.pdf (accessed 23/06/2022).

Halberg, N., Westhoek, H. (2019) The added value of a food systems approach in research and innovation: SCAR SWG Food systems Policy Brief, Publications Office. Available at: https://data.europa.eu/doi/10.2777/407145 (accessed 23/06/2022).

Padilla, M.C.; Ramos Filho, L.O. Participatory Action Research initiatives to generate innovations towards a sustainable agriculture: A case study in Southern Spain. In System Innovations, Knowledge Regimes, and Design Practices towards Transitions for Sustainable Agriculture; Barbier, M., Elzen, B., Eds.; INRA-Département Sciences pour l'Action et le Développement (SAD): Paris, France, 2012; Available at: https://hal.archivesouvertes.fr/hal-01191290 (accessed 26/06/2022).

Patton, M. Q. Qualitative Research & Evaluation Methods; 3rd ed.; SAGE: Thousand Oaks, USA, 2002. ISBN 9780761919711.

Saldaña, J. (2021). The coding manual for qualitative researchers. The coding manual for qualitative researchers, 1-440.

Silva, E. D. C., Silberglitt, R., Machado, L. C., Maia, J. M. F., & Cagnin, C. H. (2017). A portfolio analysis methodology to inform innovation policy and foresight. Technological Forecasting and Social Change, 115, 338-347.

Snyder, H. Literature review as a research methodology: An overview and guidelines. J. Bus. Res. 2019, 104, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039.

Zurek, M., Hebinck, A., Leip, A., Vervoort, J., Kuiper, M., Garrone, M., Havlík, P., Heckelei, T., Hornborg, S., Ingram, J., Kuijsten, A., Shutes, L., Geleijnse, J.M., Terluin, I., van't Veer, P., Wijnands, J., Zimmermann, A., Achterbosch, T. (2018). Assessing sustainable food and nutrition security of the EU food system-an integrated approach. Sustainability 10, 4271.

ANNEXES

Annex A – Complete list of identified R&I projects concerning food systems

N.	Project title	Project acronym	Database	Selected for sampling*
1	Food System Hubs Innovating towards Fast Transition by 2030	FOODSHIFT 2030	CORDIS (https://cordis.europa.eu/project/id/862716)	1
2	Strengthening European Food Chain Sustainability by Quality and Procurement Policy	STRENGHT2FOOD	CORDIS (https://cordis.europa.eu/project/id/678024)	1
3	Transition paths to sustainable legume-based systems in Europe	TRUE	CORDIS (https://cordis.europa.eu/project/id/727973)	1
4	Organic agro- food systems as models for sustainable food sys-tems in Europe and Northern Africa	SYSORG	SUSFOOD ERA NET (https://susfood-db-era.net/main/SysOrg); ERA LERN (https://www.era-learn.eu/network-information/networks/core-organic-cofund/core-organic-susfood-joint-call-2019/organic-agro-food-systems-as-models-for-sustainable-food-systems-in-europe-and-northern-africa)	1
5	Leverage points for organic and sustainable food systems	FOODLEVERS	SUSFOOD ERA NET (https://susfood-db-era.net/main/FOODLEVERS)	1
6	Global Interlinkages in Food Trade Systems	GIFTS	CORDIS (https://cordis.europa.eu/project/id/101029457)	1
7	Systemic Innovations Towards a Zero Food Waste Supply Chain	ZEROW	CORDIS (https://cordis.europa.eu/project/id/101036388)	1
8	Adding value in resource effective food systems	AVARE	SUS FOOD ERA-NET (https://susfood-db-era.net/main/content/avare)	0
9	MOuntain Valorisation through INterconnectedness and Green growth	MOVING	CORDIS (https://cordis.europa.eu/project/id/862739)	0

10	Teaching local and sustainable food systems	TESFI	ERASMUS + (https://erasmus-plus.ec.europa.eu/projects/eplus-project-details#project/2018-1-PL01-KA203-051124)	1
11	REmanufacture the food supply chain by testing INNovative solutions for zero inorganic WASTE	REINWASTE	KEEP.EU (https://keep.eu/projects/21361/REmanufacture-the-food-supp-EN/)	1
12	Inclusive Sustainable Food	AD-IN	KEEP.EU (https://keep.eu/projects/20191/Inclusive-Sustainable-Food-EN/)	1
13	Innovative technological, organisational and social solutions for FAIRer dairy and fruit and vegetable value CHAINs	FAIRCHAIN	EIP AGRI (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/innovative-technological-organisational-and-social)	1
14	CO-creating sustainable and competitive FRuits and vEgetableS' value cHains in Europe	CO FRESH	EIP AGRI (https://ec.europa.eu/eip/agriculture/en/news/making-agri-food-value-chains-more-sustainable) CORDIS (https://cordis.europa.eu/project/id/101000852)	1
15	Towards Innovation - driven and smart solutions in short food supply chains	SMARTCHAIN	EIP AGRI (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/smartchain-towards-innovation-driven-and-smart)	1
16	Value-added Innovation in fooD chAins	VIDA	CORDIS (https://cordis.europa.eu/project/id/777795/it)	1
17	Shifting school meals and schools into a new paradigm by addressing public health and territorial, social and environmental resilience	SCHOOLFOOD4CHANGE	CORDIS (https://cordis.europa.eu/project/id/101036763)	1
18	European food chain supply to reduce GHG emissions by 2050	ENOUGH	CORDIS (https://cordis.europa.eu/project/id/101036588)	1
19	Territorial circular systemic solution for the upcycling of residues from the agrifood sector	AGRO2CIRCULAR	CORDIS (https://cordis.europa.eu/project/id/101036838)	0

20	Systemic Innovations for a SusTainable reduction of the EuRopean food waStage	SISTERS	CORDIS (https://cordis.europa.eu/project/id/101037796)	0
21	Fostering Integration and Transformation for FOOD 2030	FIT4FOOD2030**	CORDIS (https://cordis.europa.eu/project/id/774088)	0
22	Sustainable Integrated Management FOR the NEXUS of water-land-food-energy-climate for a resource-efficient Europe	SIM4NEXUS**	CORDIS (https://cordis.europa.eu/project/id/689150; https://rural-urban.eu/)	0
23	Rural-Urban Outlooks: Unlocking Synergies	ROBUST**	CORDIS (https://cordis.europa.eu/project/id/727988)	0
24	Sustainable Integrated Management FOR the NEXUS of water-land-food-energy-climate for a resource-efficient Europe	SIM4NEXUS**	CORDIS (https://cordis.europa.eu/project/id/689150)	0
25	Operationalising telecouplings for solving sustainability challenges related to land use	COUPLED**	CORDIS (https://cordis.europa.eu/project/id/765408)	0
26	Cross-Border Climate Vulnerabilities and Remote Impacts of Food Systems of the EU, Turkey and Africa: Trade, Climate Risk and Adaptation	CREATE	LEAP4FNSSA project database (https://library.wur.nl/WebQuery/leap4fnssa-projects/312)	1
27	Socio-environmental shocks assessment and resilience empowerment in Mediterranean agri-food heritage systems: Italy, Morocco, Algeria FAO GIAHS sites	MEDAGRIFOODRESILIENCE	FOSC ERA-NET Cofund Food Systems and Climate (https://subsites.wur.nl/en/foscera/Projects/MedAgriFoodResilience.htm)	1
28	Collaborative Agri-food Chains: Driving Innovation in Territorial Food	COACH	CORDIS (https://cordis.europa.eu/project/id/101000918/it)	1

	Systems and Improving Outcomes for Producers and Consumers			
29	Building pathways towards FOOD 2030-led urban food policies	FOOD TRAILS	CORDIS (https://cordis.europa.eu/project/id/101000812)	1
30	Understanding food value chains and network dynamics	VALUMICS	CORDIS (https://cordis.europa.eu/project/id/727243)	0
31	Towards coordinated microbiome R&I activities in the food system to support (EU and) international bioeconomy goals	MICROBIOMESUPPORT	CORDIS (https://cordis.europa.eu/project/id/818116)	1
32	Controlling mIcRobiomes CircuLations for bEtter food Systems	CIRCLES	CORDIS (https://cordis.europa.eu/project/id/818290)	0
33	Co-creating 36ata36ds36b and 36ata36ds36ble food systEms 36ata36ds FOOD2030	CITIES2030	CORDIS (https://cordis.europa.eu/project/id/101000640)	1
34	FOODSAFETY4EU – MULTI-STAKEHOLDER PLATFORM FOR FOOD SAFETY IN EUROPE	FOODSAFETY4EU	CORDIS (https://cordis.europa.eu/project/id/101000613)	1
35	AN INNOVATIVE COLLABORATIVE CIRCULAR FOOD SYSTEM TO REDUCE FOOD WASTE AND LOSSES IN THE AGRI-FOOD CHAIN	FOODRUS	CORDIS (https://cordis.europa.eu/project/id/101000617)	0
36	Safer food through changed consumer behavior: Effective tools and products, communication strategies, education and a food safety policy reducing health burden from foodborne illnesses	SAFECONSUME	CORDIS (https://cordis.europa.eu/project/id/727580)	0
37	Support to the implementation of the Long-term EU-AU Research and Innovation Partnership for Food and Nutrition	LEAP4FNSSA	CORDIS (https://cordis.europa.eu/project/id/817663)	1

	Security and Sustainable Agriculture			
38	Translating knowledge for legume-based farming for feed and food systems	LEGUMES TRANSLATED	CORDIS (https://cordis.europa.eu/project/id/817634)	1
39	Cities Cooperating for Circular Economy	FORCE	CORDIS (https://cordis.europa.eu/project/id/689157)	0
40	Food quality and food innovative strategies to prevent reproductive and eating disorders	REAP-EAT	CORDIS (https://cordis.europa.eu/project/id/713714)	0
41	Co-constructing interactive short and mid-tier food chains to value agrobiodiversity in healthy plant-based food	DIVINFOOD	CORDIS (https://cordis.europa.eu/project/id/101000383)	1
42	Connecting Consumers and producers to Rebalance farmers' position through AmbassaDOrs trainings	COCOREADO	CORDIS (https://cordis.europa.eu/project/id/101000573)	0
43	Building bridges between consumers and producers by supporting short food supply chains through a systemic, holistic, multi-actor approach-based Toolbox	AGROBRIDGES	CORDIS (https://cordis.europa.eu/project/id/101000788)	1
44	Sense, Science and the Magic of Food	SESAM	CORDIS (https://cordis.europa.eu/project/id/955400)	1
45	Sensors and 37ata tRainiG towards high-performance Agri-food sysTEms	STARGATE	CORDIS (https://cordis.europa.eu/project/id/952330)	0
46	Unlocking data-driven innovation for improving productivity and data sharing in mushroom value chain	MUSHNOMICS	ICT AGRI-FOOD (https://ictagrifood.eu/node/44653)	1
47	Information agrifood quality estimation using hyperspectral techniques	SPECTROFOOD	ICT AGRI-FOOD (https://ictagrifood.eu/node/44658)	0

48	Releasing the potential of ICT for sustainable milk and beef cattle value chains	SUSTAINIT	ICT AGRI-FOOD (https://ictagrifood.eu/node/44660)	0
49	Sustainable and Resilient agriculture for food and non-food systems	FACCE SURPLUS	CORDIS (https://cordis.europa.eu/project/id/652615)	1
50	Centre of Excellence for Advanced Technologies in Sustainable Agriculture and Food Security	ANTARES	CORDIS (https://cordis.europa.eu/project/id/739570)	0
				30

Source: our elaboration.
*In the last column: 1 means selected; 0 means not selected; **Relevant projects that are already included in the SCAR FS SWG portfolio analysis realised in 2019 (Achterbosch et al. 2019).

Annex B – 10 R&I projects' fiches

1) Shifting school meals and schools into a new paradigm by addressing public health and territorial, social and environmental resilience – SchoolFood4Change

Source(s)

CORDIS (https://cordis.europa.eu/project/id/101036763)
Project website: https://schoolfood4change.eu/

Funding details

Source of funding: H2020-LC-GD-2020 (SUB CALL: H2020-LC-GD-2020-4)
Type of project (+ cluster if relevant): IA - Innovation action
Contract number: 101036763
Project total budget: €12,332,128.13

Start and end date of the project

01/01/2022– 31/12/2025

Project summary

SchoolFood4Change (SF4C) project builds sees schools and school meals as catalysts for systemic change on a broad societal level. It will provide innovative solutions and tailored, locally adaptable good practices for schools, school meal providers, responsible public authorities, and policymakers, in line with the EU's Farm to Fork Strategy and the UN SDGs. The focus lies on the education and empowerment of children and adolescents. To achieve the ambitious goal of enabling community-wide food system change, SF4C follows a holistic multi-level approach, based on the cumulated expertise of established European organisations and networks, sustainable food procurement and nutrition specialists, scientists, chefs, and dietitians. This involves the development of **innovative and sustainable food procurement**, the promotion of planetary **healthy diets and cooking**, and the introduction of the so-called "**Whole School Food Approach**", a defined framework for municipalities and schools targeting the achievement of child-friendly food culture and **involving all related actors linked to the school environment**.
SF4C will create a shift to both sustainable and healthy diets on a broad societal scale by directly impacting over 3,000 schools and 600,000 school children in 12 EU

countries, providing a replicable good practice across the EU and beyond. The SF4C specific **objectives** (SO) are:

- SO1: To innovate and roll out sustainable healthy food procurement, sourced from land, inland water and sea, in line with the EU Farm to Fork Strategy and the SDGs;
- SO2: Through innovative "planetary health diets & cooking", linked to the identity of the territory, train and empower cooks and urban food enablers in the cities;
- SO3: To ensure an enabling educational environment through the innovative "whole school food approach" which is a method about achieving a healthy food culture in and around schools, contributing to community-wide whole systems change, and impacting on education, sustainability, inequalities, communities, and health;
- SO4: To assess the SF4C impact, demonstrate real life delivery ("business case"), particularly on health and behavioral change of vulnerable children, and prove that it can be cost-effective;
- SO5: To seek impact for all EU citizens, demonstrate swift EU replicability, also beyond schools, and engage with EC Services and projects on increased Farm to Fork impact toward 2030.

Food choices and eating habits are learned. This is why schools play a big role. All children go to school and are vulnerable to diet-related conditions and disadvantaged environments. In this context, the EU-funded SchoolFood4Change project will put sustainable and healthy diets back on the school menu. Specifically, the project will innovate and deploy **sustainable healthy food supply** in line with the EU's Farm to Fork Strategy and the UN Sustainable Development Goals, train and empower cooks and urban food enablers, and ensure a healthy food culture is realised in and around schools. SchoolFood4Change will assess its impact on the **health and behavioral change** of vulnerable children. SF4C views schools and children and young people (0-18 years of age) as catalysts for systemic change for the shift to sustainable and healthy diets of all EU citizens. The SF4C triple impact approach (SO1-3) will be implemented by 33 partners, mostly governmental partners that have the mandate over sustainable healthy school meals, including many pioneers from across the EU. With a focus on children, who are the adults of the future, and strong trust in youth action competence, SchoolFood4Change strives for a long-lasting impact on the whole food system that will benefit both the people and the planet.

Project results

At the moment, in the official website and in EU database there is a lack of information about results and deliverables. In the initial phase, the project produced a deliverable concerning the proposal of guidelines that schools and local and regional authorities can use to explain the different components of the "Whole School Food Approach" (WSFA) in a coherent way. The WSFA considers schools – from preschools to secondary schools – as catalysts for sustainable food system change. The approach integrates food and education: it focuses on the composition of school meals, practical teaching, learning activities and on the active participation of pupils and teachers. Moreover, it involves the whole school community (including caregivers, farmers,

businesses and civil society). This framework should be used in combination with tools. Specifically, the parts that constitute the model are:
1 - **Whole School Food Approach framework:** The WSFA is an intervention in schools to promote health and wellbeing, education for sustainable development, sustainability and equality. The WSFA consists of four mutually reinforcing *pillars*: (A) Policy & Leadership, (B) Food & Sustainability, (C) Education & Learning, and (D) Community & Partnership.
2 - **Implementing a Whole School Food Approach**: To implement the WSFA in a school, all actors in and around the school need to be involved and take on responsibility. This part of the document illustrates how to achieve that, explains how to develop a *Whole School Food Policy* and provides a step-bystep guide.
3 - **Role of local and regional authorities**: Local, regional and national *authorities* can support the implementation of a WSFA in schools through tailored guidance and coaching, and by facilitating joint projects and partnerships with other local actors.
4 – **The three levels of the WSFA**: Schools that are doing excellent work in terms of school food and food education can go for the next level. Schools that take on the task to work in a structured way on a WSFA, also decide what *level* they want to reach: *bronze, silver, or gold*. This way they can showcase their efforts to the wider school community.

Lead partner
ICLEI EUROPEAN SECRETARIAT GMBH (ICLEI EUROPASEKRETARIAT GMBH), Germany, Governamental organizations

Other partners
CLEI - LOCAL GOVERNMENTS FOR SUSTAINABILITY EV (Germany), UNIVERSIDAD DE ALCALA (Spain), SIHTASUTUS STOCKHOLMI KESKKONNAINSTITUUDI TALLINNA KESKUS (Estonia), RIKOLTO BELGIE (Belgium), UNIVERSITA DEGLI STUDI DI SCIENZE GASTRONOMICHE (Italy), SLOW FOOD ITALIA ASSOCIAZIONE, STIFTELSEN VARLDSNATURFONDEN WWF (Sweden), WWF DEUTSCHLAND (Germany), INTERNATIONAL FEDERATION OF ORGANIC AGRICULTURE MOVEMENTS EUROPEAN UNION REGIONAL GROUP (Sweden), ASOCIACION ECOVALIA (Spain), BIOFORUM (Belgium), VALLALATGAZDASAGI TUDOMANYOS ES OKTATASI ALAPITVANY (Hungary), RISTECO LA VILLE QUI MANGE (France), FUNDACIO EURECAT (Spain), FONDAZIONE ECOSISTEMI (Italy), DANACHDA - BILDUNG FUR NACHHALTIGKEIT (Austria), STICHTING FAIR TRADE ADVOCACY OFFICE (Netherlands), WORLD FAIR TRADE ORGANIZATION EUROPE (Belgium), MENSA CIVICA (Spain), SPEISERAUME F+B GMBH (Germany), SKUTECNE ZDRAVA SKOLA, ZS (Czechia), SKUTOCNE ZDRAVA SKOLA OZ (Slovakia), BUDAPEST FOVAROS ONKORMANYZATA (Hungary), ETKEZTETESI SZOLGALTATO GAZDASAGI SZERVEZET (Hungary), KOBENHAVNS KOMMUNE (Denmark), STADT ESSEN (Germany), STAD GENT (Belgium), STAD LEUVEN (Belgium), COMMUNE DE LYON (France), DELICE (France), MALMO STAD (Sweden), COMUNE DI MILANO (Italy), MILANO RISTORAZIONE SPA (Italy), COMUNE DI NUORO (Italy), STADT

NURNBERG (Germany), TALLINNA LINN (Estonia), UMEA KOMMUN (Sweden), STADT WIEN (Austria), EUROVIENNA EU CONSULTING MANAGEMENT GMBH (Austria), VIIMSI VALD (Estonia), DEPARTEMENT DE LA DORDOGNE (France), GENERALITAT VALENCIANA (Spain)
13 countries represented by **42 partners** coming from Germany, Estonia; Spain; Belgium; Italy; Sweden; Hungary; France; Austria; Netherlands; Czechia; Slovakia; Denmark.

Contacts

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Relevant links

https://iclei-europe.org/projects/?c=search&uid=sbvLcWAM

Relation to the SRIA development

In relation to the SRIA, the analysis of SF4C description and objectives evidenced that the project mainly focuses on two Thematic areas and develops two Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 1 "**Change the way we eat food**", SF4C intends to include sustainable and healthy diets back on the school menu.
- Thematic Area 3 "**Change the way we connect with food systems**", SF4C involves young people's commitment and intends to engage all actors in and around schools for implementing the WSFA approach, including local, regional and national authorities.
- Activity Area C "**Establishing a Food systems knowledge hub**", the WSFA triple impact approach (SO1-3) will be implemented by 33 partners, mostly governmental partners that have the mandate over sustainable healthy school meals, including many pioneers from across the EU. The development of co-creation cases with public-private organisations in national & regional contexts is comparable to FS-Labs, object of Activity Area C.
- Activity Area D **"Knowledge sharing and scaling"**, considering: the sharing of existing knowledge and co-creation of new knowledge through joint protocols and methodologies; the contribution to educational programmes, training and competence building, the transfer of knowledge for scaling to policy and industry; the support of science-policy-society interfaces.

Overlaps and gaps in the content compared to the other projects

SF4C focuses on a relevant theme, **sustainable and healthy diets of young people**. Regarding to the SRIA, Areas 2 and 4, and Activity Areas A and B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided.

2) Unlocking data-driven innovation for improving productivity and data sharing in mushroom value chain – Mushnomics

Source(s)

ICT AGRI-FOOD (https://ictagrifood.eu/node/44653)

Funding details

Source of funding: H2020 ERA-NET Cofund ICT-AGRI-FOOD 2019 1st Joint Call
Type of project (+ cluster if relevant): Research and Innovation
Contract number : 862665
Project total budget: NA

Start and end date of the project

01/02/2021– 31/01/2024

Project summary

The aim of the project is to demonstrate the feasibility of dynamic data-driven analytics for multi-domain mushroom production environments in order to optimise yield, lower costs and improve the economic viability of this agri-food sector. The specific objectives are to: Develop best-performing artificial intelligence (AI)-driven algorithms for yield prediction of mushrooms in a prototype MUSHNOMICS module with IoT (Internet of Things) devices for real time production management and demonstration in our end-user (PILZE), Hungary by 2022; Develop an ICT platform to **exchange data and information from production to points of sale along the entire value chain of mushrooms** by 2023; Co-develop innovative **business models** based on container retrofitted MUSHNOMICS Module for informed decision making by mushroom growers/entrepreneurs by 2024.

The project takes a **full-chain systems-based approach**, from producer to consumer and beyond (valorisation). MUSHNOMICS mobilises a balanced and meaningful research-practice partnership (50-50 research-business split), including research-intensive academics with strong industry involvement.

MUSHNOMICS recognises the pivotal role of the consumer in 'driving' the market for food. Therefore, it will perform a multiperspective analysis of the mushroom value chain with the active participation of key stakeholders from the beginning in the project. From the industry perspective, it will carry out mushroom production trials and optimisse yields under real commercial settings by the synergistic use of "key" smart sensor solutions, Internet of Things (IoT) and artificial intelligence algorithms (AI). MUSHNOMICS will also evaluate ways for the further **use of the by-product** generated during the proposed activities i.e. spent cultivation mushroom substrate

(SMS) in line with the **zero-waste strategy**. Technology will be applied for gathering data from vast networks in real-time using the MUSHNOMICS Module transmit these data to MUSHNOMICS Cloud, develop large data banks, undertake data analytics to deliver mined and collated data to the relevant stakeholders in real-time. This will be enabled through the MUSHNOMICS Digital **Platform**, a portal to the global community. MUSHNOMICS will lead to advancements in the application of digital technologies to harness data for **improving the performance of the mushroom value chain** towards achieving sustainable and resilient agri-food systems. The MUSHNOMICS project will deliver practical, commercially viable digital technology solutions for **value chain process control from production to end of life** while including a variety of actors along the entire chain. The MUSHNOMICS practical solutions will lead to the development of new paradigm in the mushroom value chain, which will be demonstrated at TRL7 for post-project exploitation by the SME partners.

Project results

At the moment, in the official website and in the ICT AGRI-FOOD database there is a lack of information about results and deliverables. Still in its second year (out of four), the project has produced deliverables reporting the dynamics of mushroom value chain and the gaps on demand and supply of mushroom produce and substrate. Concerning the production phase, a deliverable reported an overview on potential substrates and their lab analysis. Moreover, a publication reports how all data and AI algorithms will be integrated into the platform.

Lead partner
Holisun SRL, Romania, SME

Other partners
Department of Plant and Environmental Sciences, University of Copenhagen (Denmark), PIlze-Nagy Ltd (Hungary), University College Dublin (Ireland).

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Relevant links

https://mushnomics.org/

Relation to the SRIA development

In relation to the SRIA, the analysis of MUSHNOMICS description and objectives evidenced that the project mainly focuses on one Thematic areas and develops one Activity Area, both considered from a food systems lens. Specifically, with regard to:

- Thematic Area 2 "**Change the way we process and supply food**", MUSHNOMICS adopts a full-chain systems-based approach, from producer to consumer and beyond (valorisation). Specifically, the project aims to provide **digital technology solutions** for value chain process control from production to end of life throught the involvment of a variety of actors along the entire chain. MUSHNOMICS intends to create a **platform** to exchange data and information along the entire value chain of mushrooms. This platform will enable **consumers** to pick up freshly harvested food from the MUSHNOMICS Module in cities.
- Activity Area D "**Knowledge sharing and scaling"**, MUSHNOMICS intend to implement data-driven ICT **platforms** that enable to build a stakeholder community, facilitate engagement, communicate, exchange knowledge and disseminate results across stakeholders.

Overlaps and gaps in the content compared to the other projects

MUSHNOMICS focuses on a relevant theme, introducing digital technology solutions in the mushrooms supply chain from producers to consumers. Regarding to the SRIA, Areas 1, 3 and 4, and Activity Areas A, B, and C are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

3) Towards coordinated microbiome R&I activities in the food system to support (EU and) international bioeconomy goals – MicrobiomeSupport

Source(s)

https://cordis.europa.eu/project/id/818116

Funding details

Source of funding: H2020-SFS-2018-2020 (SUB CALL: H2020-SFS-2018-1)
Type of project (+ cluster if relevant): CSA - Coordination and support action
Contract number : 818116
Project total budget: € 3,520,466.25

Start and end date of the project

01/11/2018– 31/10/2022

Project summary

The MicrobiomeSupport project will reduce the overlap and fragmentation between EU and other national/international funding in microbiome research by a coordinated approach **to reinforce collaboration and knowledge exchange** within international networks, including the International Bioeconomy Forum (IBF). The MicrobiomeSupport consortium will maintain a dialogue between multiple stakeholders, actors and the public and disseminate the know-how in microbiome research through a series of communication and promotion activities. The proposed Coordination and Support Action (CSA) MICROBIOMESUPPORT intends to establish an **international network** of experts and stakeholders in the field of microbiome food system research, elaborating microbiomes from various environments such as terrestrial, plant, aquatic, food and human/animal and **assess their applicability and impact on the food system**. MICROBIOMESUPPORT follows the approach of **food system** and integrate actors and experts from all stages in this circular economy of food. The main concept behind MICROBIOMESUPPORT is to boost the bioeconomy and the FOOD 2030 strategy, by focusing on the new avenues generated by microbiome R&I efforts. MICROBIOMESUPPORT will have a main impact on the **coordination of commonly defined R&I agendas** which will be incorporated into regional, national, European but also **global funding programmes** related to microbiomes in food systems. MICROBIOMESUPPORT will create a collaborative international network and integrate know-how in plant, terrestrial, animal, human and aquatic microbiome R&I as well as expertise in **bioeconomy applications**. MICROBIOMESUPPORT has integrated international partners form Brazil, Canada,

South Africa, China, Argentina, Australia, New Zealand, India and USA in order to improve the **international cooperation** and coordination of common bioeconomy research programmes and set a basis for common microbiome R&I agendas.

The MicrobiomeSupport consortium supports the set-up of an internationally agreed microbiome definition, best practices and standards, as well as consistent protocols in research. Based upon the jointly developed research and innovation (R&I) agendas, the project will build a basis for **joint international action in research programmes.** The improvement of the following **5 key policy challenges** can lead to innovative applications in the promising microbiome field. The MicrobiomeSupport project will **educate the public** about microbiomes and microbiome applications, discuss potential risks and communicate realistic expectations. The MicrobiomeSupport project aims to maximise its outreach and impact through effective targeted dissemination of project outputs via represented partners, as well as, targeted communication with multi-level stakeholders to support a sustainable mobilisation of a wide diversity of actors. The project has **6 objectives**: 1) Identification and **mapping of microbiome activities** in the EU and worldwide, including programmes and facilities, along the food chain and beyond. 2) Creation of a **platform** for scientists, regulatory experts, industry, funding and policy organisations as well as support of the International Bioeconomy Forum to implement the 'Food Systems Microbiome' working group. 3) **Improve use of existing data** to allow comparability and improved mining of microbiome data, including microbiome standards and best practices. 4) Define **strategic agendas** to enable joint international microbiome applications in the food sector and beyond. 5) Collaboration and coordination in support of a sustainable **bioeconomy** in Europe and beyond, in line with the FOOD 2030 policy goal to support the global food system. 6) Raising awareness and **exchange of knowledge** across scientific and political communities, including the International Bioeconomy Forum (IBF), and the general public.

Project results

MicrobiomeSupport implemented a survey and mapping exercise to establish the '**Microbiome Research Database'** containing relevant information on microbiome-related funding programmes, research projects as well as organisations involved in research, education and product/application development. The microbiome research landscape was assessed, and conditions needed to ensure that the microbiome potential is exploited in support of sustainable and resilient (food) systems identified. Great importance was attributed to involving relevant stakeholders in the elaboration of different topics. Numerous workshops addressing technical, regulatory and strategic issues pertinent for the further development of the microbiome R&I landscape have been implemented. Several major publications (Berg et al., 2020; Ryan et al., 2020; Ryan and al., 2021) were developed from these workshops and published as open access in recognised, peer-reviewed journals. MicrobiomeSupport executed broad and far-reaching informational and educational campaigns, ensuring an establishment of a solid microbiome knowledge base in different stakeholder groups that allow educated decision making allowing for full exploitation of the microbiome potential.
The project raises the need to **shape funding programmes** that advance microbiome-related knowledge to fully understand the systems in which microbiomes function. Researchers need to take a multidisciplinary approach and practice

international cooperation involving multiple partners and stakeholders for success. Moreover, public educators can help create public awareness and foster trust in future microbiome innovations. Finally, **policymakers** need to ensure transparency in national laws and provide clarity on legal requirements for the application of microbiome-based innovations.

Lead partner
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH, Austria, Research Organisation

Other partners
New Zealand Forest Research Institute LTD New Zealandl, BATTELLE MEMORIAL INSTITUTE NON PROFIT CORPORATION United States, INSTITUT NATIONAL DE RECHERCHE POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT France, AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS Spain, VLAAMSE GEWEST Belgium, FORSCHUNGSZENTRUM JULICH GMBH Germany, TEAGASC - AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY Ireland, TALLINNA TEHNIKAÜLIKOOL Estonia, GEOPONIKO PANEPISTIMION ATHINON Greece, UNIVERSITA DEGLI STUDI DI TORINO Italy, Instytut Rozrodu Zwierzat i Badan Zywnosci Polskiej Akademii Nauk Poland, EUROPEAN FOOD INFORMATION COUNCIL Belgium, HELMHOLTZ ZENTRUM MUENCHEN DEUTSCHES FORSCHUNGSZENTRUM FUER GESUNDHEIT UND UMWELT GMBH Germany, CAB INTERNATIONAL United Kingdom, WAGENINGEN UNIVERSITY Netherlands, DEUTSCHES ZENTRUM FUR LUFT - UND RAUMFAHRT EV Germany, RTD SERVICES OG Austria, FFOQSI GMBH Austria, TECHNISCHE UNIVERSITAET GRAZ Austria, LANGE LENE Denmark, UNIVERSIDADE ESTADUAL DE CAMPINAS Brazil, UNIVERSITY OF WATERLOO Canada, UNIVERSITY OF PRETORIA South Africa, INSTITUTE OF MICROBIOLOGY, CHINESE ACADEMY OF SCIENCES China, WESTERN SYDNEY UNVERSITY Australia, PONDICHERRY UNIVERSITY India, STICHTING WAGENINGEN RESEARCH Netherlands, MINISTERIO DE CIENCIA, TECNOLOGIA E INNOVACION Argentina

Countries represented by **28 partners** coming from: Austria, New Zeland, United States, France, Spain, Belgium, Germany, Ireland, Estonia, Greece, Italy, Poland, United Kingdom, Netherlands, Denmark, Brazil, Canada, South Africa, China, Australia, India, Argentina

Contacts

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Relevant links

- https://www.microbiomesupport.eu/

Relation to the SRIA development

In relation to the SRIA, the analysis of MicrobiomeSupport description, objectives, and results evidenced that the project mainly focuses on one Thematic areas and develops two Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 4 '**Change the way we govern food systems'**, MicrobiomeSupport aims to raise awareness and exchange of knowledge across scientific and political communities, including the International Bioeconomy Forum (IBF), and the general public.
- Activity Area A '**Pooling R&I resources and programming',** MicrobiomeSupport raises the need to shape funding programmes that advance microbiome-related knowledge to fully understand the systems in which microbiomes function.
- Activity Area D "**Knowledge sharing and scaling**", MicrobiomeSupport created the 'Microbiome Research Database' containing relevant information on microbiome-related funding programmes, research projects as well as organisations involved in research, education and product/application development.

Overlaps and gaps in the content compared to the other projects

MicrobiomeSupport focuses on a relevant theme, the **establishment of a solid microbiome knowledge** base in different stakeholder groups that allow educated decision making allowing for full exploitation of the microbiome potential. Regarding to the SRIA, Areas 1, 2 and 3, and Activity Areas B, and C are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

4) Co-creating resIlient and susTaInable food systEms towardS FOOD2030 – Cities2030

Source(s)

CORDIS (https://cordis.europa.eu/project/id/101000640)

Funding details

Source of funding: H2020-FNR-2020 (H2020-FNR-2020-1)
Type of project (+ cluster if relevant): IA - Innovation Action
Contract number : 101000640
Project total budget: € 12,513,955.75

Start and end date of the project

01/10/2020– 30/09/2024

Project summary

The main goal of CITIES2030 is to create **a future proof and effective urban food systems and ecosystems** (UFSE) via a connected structure centered in the citizen, built on **trust**, with partners encompassing the entire UFSE. CITIES2030 commit to work towards the transformation and restructuring of the way systems **produce, transport and supply, recycle and reuse food** in the 21st century. CITIES2030 vision is to connect short food supply chains, gathering cities and regions, consumers, strategic and complement industry partners, the civil society, promising start-ups and enterprises, innovators and visionary thinkers, leading universities and research across the vast diversity of disciplines addressing UFSE, including food science, social science and big data. CITIES2030 actively **encourage the participation of citizens** by delivering a trusted UFSE, moving consumers from being passive recipients to active engagement and motivated change agents. This objective is achieved via multiple tools delivered by CITIES2030 such as the **CRFS Alliance**, a community of practice supported by a digital platform, reaching all over Europe and beyond. This approach will enable policy developments, innovation actions within result-driven **Labs**, and enhancements on a pan-European scope with a global reach. Cities and regions will improve resilience and sustainability, and their leadership will create **short food supply chain** and ecosystems enabling local investments, trans-borders and transnational deployment. A **blockchain-based data-driven UFSE management platform** will secure intelligence and coordination actions by delivering an accurate, almost real-time digital twin of the whole supply chain, e.g. from production to waste management, but also on key enablers of resilience and sustainability.

Project results

The first 18 months of the project have been mostly characterised by the engagement of stakeholders and experts and by prototyping the Labs. CITIES2030 has activated 12 pilots and 8 multiplayer CRFS **Labs**.
The project is developing the CRFS Alliance, which in month 18 had a framework of almost 100 stakeholders. The challenge is to involve more than 500 organisations at the end of the project in September 2024 (month 48). The Multi-stakeholders' platform is under improvement and it will be integrated with the CRFS intelligence platform, notably the Cities2030 **Observatory** in September 2022. The Observatory is intended to be a **decision support system**, setting up and triggering virtuous **innovations** both in **policies** and **businesses**, but also rooting fertile social, environmental and cultural context of exchange of the key actors of the food system.
The project has produced documents about the **impact** assessment compendium and **the System Thinking Methodology**, and a handbook to develop **living labs** and the **Community platform**, encompassing a collection of 100+ sustainable food innovative practices.
In its second year out of four, CITIES20230 has produced four reports, four conference proceedings, one thesis dissertation, and three peer reviewed articles.

References

Ferraiolo, D. F., Defranco, J. F., Kuhn, D. R., & Roberts, J. (2021). A New Approach to Data Sharing and Distributed Ledger Technology: A Clinical Trial Use Case. IEEE Netw., 35(1), 4-5.
Kap, B., Aleksandrova, M., & Engel, T. (2021, November). The Effect of Noise Level on the Accuracy of Causal Discovery Methods with Additive Noise Models. In Benelux Conference on Artificial Intelligence (pp. 120-140). Springer, Cham.
Bordel, B., Alcarria, R., & Robles, T. (2022). Lightweight encryption for short-range wireless biometric authentication systems in Industry 4.0. Integrated Computer-Aided Engineering, (Preprint), 1-21.

Lead partner
UNIVERSITA CA' FOSCARI VENEZIA, Italy, Higher or Secondary Education Establishment

Other partners
EPC - EUROPEAN PROJECT CONSULTING -SRL Italy, STAD BRUGGE Belgium, MINTUS Belgium, RUDDERSSTOVE Belgium, KATHOLIEKE HOGESCHOOL VIVES ZUID Belgium, ISTANBUL AVRUPA ARASTIRMALARI DERNEGI Turkey, INAGRO, PROVINCIAAL EXTERN VERZELFSTANDIGD AGENTSCHAP IN PRIVAATRECHTELIJKE VORM VZW Belgium, EREVNITIKO IDRIMA P.L., Cyprus, RAZVOJNA AGENCIJE GRADA VELIKA GORICA - VE-GO-RA Croatia, INVENTIVNA RJESENJA DOO Croatia, VEJLE KOMMUNE Denmark, QUANTITAS SRL Italy, INTO SEINAJOKI OY Finland, PROAGRIA ETELA-POHJANMAA RY Finland, SMART & LEAN HUB OY Finland, STADT BREMERHAVEN Germany, VEREIN ZUR FORDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN EV

Germany, BIOZOON GMBH Germany, AYUNTAMIENTO DE QUART DE POBLET Spain, FUNDACION SOCIALINNOLABS Spain, UNIVERSIDAD POLITECNICA DE MADRID Spain, WATERFORD INSTITUTE OF TECHNOLOGY Ireland, MATIS OHF Iceland, FUTURE FOOD INSTITUTE Italy, VIDZEMES PLANOSANAS REGIONS Latvia, LATVIJAS LAUKU FORUMS Latvia, ZDRUZENIE PLATFORMA ZA ZELEN RAZVOJ SKOPJE North Macedonia, AG FUTURA TECHNOLOGII DOOEL SKOPJE North Macedonia, MUNICIPIUL IASI Romania, ACADEMIA ROMANA FILIALA IASI Romania, ITC - INOVACIJSKO TEHNOLOSKI GROZD MURSKA SOBOTA Slovenia, CORRELATE AS Norway, COMUNE DI VICENZA Italy, ASSOCIAZIONE CENTRO DI CULTURA E CIVILTA CONTADINA BIBLIOTECA INTERNAZIONALE 'LA VIGNA' Italy, STICHTING VU Netherlands, MESTNA OBCINA MURSKA SOBOTA Slovenia, UNIVERSITE DU LUXEMBOURG Luxembourg, ENOSI KINOTITON KIPROU Cyprus, PRIMELAYER LDA Portugal, UNIVERSITA IUAV DI VENEZIA Italy, RIGAS TEHNISKA UNIVERSITATE, Latvia, CITE DE L'AGRICULTURE France, GEMEENTE HAARLEM Netherlands

Countries represented by **43 partners** coming from: Italy, Belgium, Turkey, Cyprus, Croatia, Denmark, Finland, Germany, Spain, Ireland, Iceland, Latvia, North Macedonia, Romania, Slovenia, Norway, Netherlands, Luxembourg, Portugal, France

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Relevant links

https://cities2030.eu/

Relation to the SRIA development

The project is related to **urban food system transformation**. The main themes of CITIES2030 focus on food waste and circular bioeconomy and food systems transitions. In relation to the SRIA development, the analysis of CITIES2030 description, objectives and preliminary results evidenced that the project mainly

focuses on **three** Thematic areas and develops **two** Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 2 "**Change the way we process and supply food**", CITIES2030 aims to transform and restructure the way systems produce, transport and supply, recycle and reuse food. Moreover, CITIES2030 intends to foster short food supply chains, gathering cities and regions, consumers and the stakeholders of food systems. A **blockchain**-based data-driven management platform will secure intelligence and coordination actions by delivering an accurate, almost real-time digital twin of the whole supply chain, e.g. from production to waste management, but also on key enablers of resilience and sustainability.
- Thematic Area 3 "**Change the way we connect with food systems",** CITIES2030 encourage the participation of citizens by delivering a trusted urban food systems and ecosystems, moving consumers from being passive recipients to active engagement and motivated change agents.
- Thematic Area 4 '**Change the way we govern food systems',** CITIES2030 intends to set up and trigger virtuous innovations both in policies and businesses.
- Activity Area B '**Launching a Food systems observatory',** CITIES2030 is creating an Observatory as a decision support system, with the aim of setting up and triggering virtuous innovations both in policies and businesses.
- Activity Area C "**Establishing a FS Knowledge Hub**", CITIES2030 has activated 12 pilots and 8 multiplayer CRFS **Labs.**
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Overlaps and gaps in the content compared to the other projects

CITIES2030 focuses on a relevant theme, urban food system transformation. Regarding to the SRIA, Thematic Area 1 and Activity Areas A, and D are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

5) Building pathways towards FOOD 2030-led urban food policies – Food Trails

Source(s)

CORDIS (https://cordis.europa.eu/project/id/101000812)

Funding details

Source of funding: H2020-FNR-2020 (SUB CALL H2020-FNR-2020-1)
Type of project (+ cluster if relevant): IA - Innovation action
Contract number : 101000812
Project total budget: € 12.185.827,14

Start and end date of the project

16 October 2020– 15 October 2024

Project summary

The project aims at transforming integrated urban food policies into measurable and long-term progress towards sustainable food systems. Their goal is to help ensure that all EU citizens have access to affordable, balanced and healthy food. The idea is to create City Region Food Systems – an approach that aims to foster the **development of resilient and sustainable food systems within urban centres**. The four priority areas of the FOOD2030 European research framework (nutrition and healthy diets, climate and the environment, circularity and resource efficiency and innovation and empowerment of communities) will be addressed. Food 2030 intends to empower Cities as agent of food system transformation through the co-designing and co-implementation of **Pilot Actions**, and **participatory Living Labs**, as a leverage point for the development of Urban Food Policies in 11 European city-regions: Bergamo (IT), Birmingham (UK), Bordeaux (FR), Copenhagen (DK), Funchal (PR), Grenoble (FR), Groningen (NL), Milan (IT), Thessaloniki (GR), Tirana (AL) and Warsaw (PL).
Meeting the challenges of providing European citizens with affordable, safe and nutritious food and of creating healthier and more sustainable City Region Food Systems raises the need for the development of **integrated urban food policies** that are able to engage with the complexity of the food system. Today's leading **platform** for this endeavour is the Milan Urban Food Policy Pact, a powerful global network of **learning cities experimenting around**, and advocating for, the implementation of a holistic approach to food system transformation.
FOODTRAILS, a four-year project led by the City of Milan, brings together a Consortium of 19 partners (including 11 EU cities, 3 universities and 5 prominent food system stakeholders), which will be followed by another 21 worldwide cities, to translate the MUFPP's shared vision and collective commitment to **integrated urban food policies**

into measurable and long-term progress towards sustainable food systems. Building on the momentum created by the recent emergence of cities as key sites to reimagine, enact and engage with food system transformation, FOOD TRAILS will provide city and regional governments and other agents of change with evidence-based policy narratives, co-designed and verified through the activities of 11 multi-objective and **multi-actor Living Labs** committed to addressing the 4 priority areas of the flagship FOOD 2030 framework. Using the existing knowledge on innovations for food system transformation, the Living Labs will co-design pilot projects that minimise the trade-offs between the 4 priorities of FOOD 2030 and that can function as an entry point for the development of integrated urban food policies. FOODTRAILS will also establish a pan-European **Investors' Living Lab** to develop innovative **financial instruments that will attract new resources** to sustain the urban food policies developed during the project, maximise their visibility and support their replicability across the EU.

Project results

At the end of the second year out of four, FOODTRAILS produced **deliverables** about food system actions, urban food policies, and food-based urban participatory policies. The reports provide an overview on the innovative urban food practices and their contribution to the FOOD 2030 pillars. A key aspect of a systemic and transformative approach to food relates to a greater involvement and inclusion of all food system actors in the innovation process. In terms of **horizontal interactions**, in a number of cities **grassroot organisations** were able to forge strong links and wide networks of alliances. The reason for setting up these alliances ranges from the need to share information, organise joint action, increase the impact of the organsation's activities, to advocacy and political action. In terms of **vertical interactions**, links were forged with different **municipal departments/actors** in a number of ways. In some cases, the relationship was the result of a series of awareness raising, campaigning, advocacy and, civil disobedience actions. In a number of cases, **local government** played a proactive role in setting up multi-actor platforms that could stimulate ideas and actions around innovative food practices. Overall there have been limited and piecemeal attempts at connecting food to other sectors/policy priorities in the framework of reaching urban sustainability goals. In some cases, city actions can be **facilitated (or obstructed) by regulations or funding policies** designed at the regional or State level. In some cases, local, regional and State level policies had a "disabling" effect on potentially transformative urban food actions. Examples here include the existence of "grey" areas in urban land access legislation that makes it difficult to fully develop urban agriculture or stringent food safety regulations that make food sharing initiatives more difficult to implement. Namely, while the approaches to building participatory approaches to the development of food-based urban policies vary considerably in their more technical and operational details, **Food Policy Councils** do seem to be emerging as the most prominent medium for their implementation.

Lead partner

COMUNE DI MILANO, Italy, Public bodies

Other partners
MILANO RISTORAZIONE SPA Italy, FONDAZIONE POLITECNICO DI MILANO Italy, POLITECNICO DI MILANO Italy, AGENZIA PER LA PROMOZIONE DELLA RICERCA EUROPEA Italy, EUROCITIES ASBL Belgium, SLOW FOOD ASSOCIAZIONE Italy, EAT FOUNDATION Norway, STOCKHOLMS UNIVERSITET Sweden, CARDIFF UNIVERSITY United Kingdom, STICHTING WAGENINGEN RESEARCH Netherlands, ROSKILDE UNIVERSITET Denmark, CARIPLO FACTORY SRL Italy, FONDAZIONE CASSA DI RISPARMIO DELLE PROVINCIE LOMBARDE Italy, BIRMINGHAM CITY COUNCIL United Kingdom, BORDEAUX METROPOLE France, KOBENHAVNS KOMMUNE Denmark, CAMARA MUNICIPAL DO FUNCHAL Portugal, Universidade da Madeira Portugal, GRENOBLE-ALPES-METROPOLE METRO France, GEMEENTE GRONINGEN Netherlands, COMUNE DI BERGAMO Italy, DIMOS THESSALONIKIS Greece, BASHKIA TIRANE Albania, MIASTO STOLECZNE WARSZAWA Poland, SWPS UNIWERSYTET HUMANISTYCZNOSPOLECZNY Poland.
Countries represented by **19 partners** coming from: Italy, Belgium, Norway, Sweden, UK, Netherlands, Denmark, France, Portugal, Greece, Albania, Poland.

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Relevant links

https://foodtrails.milanurbanfoodpolicypact.org/

Relation to the SRIA development

The project is related to **urban food system transformation**. The main themes of FOODTRAILS focus on the development of resilient and sustainable food systems within urban centres. In relation to the SRIA development, the analysis of FOODTRAILS description, objectives and preliminary results evidenced that the project mainly

focuses on one Thematic area and develops three Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 4 "**Change the way we govern food systems**", FOODTRAILS focuses on the development of integrated urban food policies that are able to engage with the complexity of the food system.
- Activity Area A '**Pooling R&I resources and programming',** FOODTRAILS intends to establish a pan-European Investors' Living Lab to develop innovative financial instruments that will attract new resources to sustain the urban food policies developed during the project, maximise their visibility and support their replicability across the EU.
- Activity Area C "**Establishing a FS Knowledge Hub**", FOODTRAILS intends to empower Cities as agent of food system transformation through the co-designing and co-implementation of Pilot Actions, and participatory Living Labs, as a leverage point for the development of Urban Food Policies in 11 European city-regions.
- Activity Area D **"Knowledge sharing and scaling"**, FOODTRAILS involves activities for knowledge transfer for scaling and policy coherence and fosters the role of science-policy-society interfaces

Overlaps and gaps in the content compared to the other projects

FOODTRAILS focuses on a relevant theme, **urban food system transformation**. Regarding to the SRIA, Thematic Areas 1, 2, and 3, and Activity Area B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

6) Sense, Science and the Magic of Food – Sesam

Source(s)

CORDIS (https://cordis.europa.eu/project/id/955400)

Funding details

Source of funding: H2020-MSCA-NIGHT-2020
Type of project (+ cluster if relevant): CSA - Coordination and support action
Contract number : 955400
Project total budget: € 160,785

Start and end date of the project

1 August 2020– 31 March 2021

Project summary

The EU-funded SESAM project aims to **bring together young people, citizens and scientists involved in food and sustainability studies**. SESAM is a four-school science event that uses the concept of **Young Minds Food Lab** to foster interest in science, research and evidence-based solutions, with a particular emphasis on attaining young people's commitment to tackle societal challenges. SESAM's **Young Minds Food Lab approach** covers subjects such as biology, chemistry, math, home economics, technology understanding and physics, as well as digital principles and skills taught at school including Artificial Intelligence, Virtual and Augmented Reality, Robotics, Biometrics, Coding and Data Science.
The purpose of the SESAM is to **create interest among young people at school and among citizens about the role of science in society** by using the call for food systems transformation that is created by the climate crisis as the science case. The SESAM aims to demonstrate how young people and citizens by working together with academia and science can **contribute to solving some of the urgent and complex sustainability challenges across global to local scales** and multiple domains facing societies. The SESAM will be built around the idea of live Young Minds Food Lab that will form the physical frame for the events. The Young Minds Food Lab has been tested in several contexts at science and food festival as a way to highlight the commitment and importance of young peoples solutions to societal challenges. It builds on the idea of creating 21st century skills in **learning workshops** where pupil are challenged to address some of most important food and bio-economy relevant SDG´'s. The **YouMiLa** functions at the same time as a catchy and attention creating backdrop for the activities at the SESAM. The YouMiLa acts as a **temporary science centre** and includes a number of specific learning stations all manned by groups of 2.4 pupils all coached by a science teacher. All learning stations are involves one or

more specific science principles from biology, chemistry and/or physics as well as one or more digital principles such as Artificial Intelligence, Virtual and Augmented Reality, Robotics, Biometrics, Coding and Data Science.

Project results

SESAM organised one-day event involving 4 schools. The main objectives of SESAM event were: 1. To highlight how current **food systems challenges can be addressed through research and innovation** and hereby increase public support and recognition of researchers; 2. To enhance **understanding of the impact of researchers' work on citizens' daily life**; 3. To **encourage young people to embark on a research career**; 4.Creating 21st century skills in **learning workshop**s where pupil are challenged to address some of most important food and bio-economy relevant SDG´'s.

As part of the **European Researchers Night**, SESAM highlighted how current food systems challenges can be addressed through research and innovation. By using examples from the food & agricultural domain SESAM **aimed to increase public support and recognition of researchers**. By showing tangible experiments, science shows, mock- ups, installations and workshops and by mixing these with talks and debates, **SESAM brought research and science from the labs and offices of universities out to local communities** where it used the school to meet up with young people and citizens around the topic of research.

SESAM used a broad range of **communication tools** such as web-communication, various SoMe channels, conference contributions, local news media and web based video streaming. Didactically SESAM was based on the idea of creating 21st century skills in **learning workshops** where pupils were challenged to address some of most important food and bio-economy relevant SDG's. The messages conveyed unfolded around the **3 main NIGHT objectives**: increase the **interest** among young people in a **research career**, increased **understanding** among citizens of the **role of research** in society and counteraction of traditional stereotypes about researchers and research. This was achieved by the development of the SESAM as a **temporary school-based science center**. It worked with 2 main science communication tools: i) a number of **specific learning stations** all taken care of by groups of 2-4 pupils and all coached by a science teacher, ii) a serious of **science & sofa talks**. All learning stations involved one or more specific science principles from biology, chemistry and/or physics as well as one or more digital principles such as Artificial Intelligence, Virtual and Augmented Reality, Robotics, Biometrics, Coding and Data Science. SESAM used a range of promotional materials including **Screen casted auto-looped video messages** about the MSCA and Night program and examples of EU funded research, SESAM Nights, SESAM badges, T-shirts, hoodies, roll- ups and banners.

SESAM found that students **improve their understanding of sustainability** and the role of science and research both by preparing the event based on **action and construction** but also through the process of **preparing the event itself** and by being forced to think and reflect on how research and science can be communicated. The results show that students benefited greatly from the **practice-based teaching** and from seeing the **transfer of a theory to practice** in their work with installations, labs and workshops. The students benefited greatly from the SESAM **excursions** that were held as part of the Night preparation. The data was collected as pre & post SESAM

and it shows that SESAM had a **clear impact on the perception of research as judged by pupils**. Results from the same survey also showed that the increase was more pronounced among the girls. Overall, for the impact at the level of young people it can be concluded that the SESAM Night as a considerable interest on young peoples' in science and STEM subjects.

Lead partner
KOBENHAVNS UNIVERSITET, Denmark, Higher or Secondary Education Establishments

Other partners
None.

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Relevant links

https://ign.ku.dk/english/sesam/

Relation to the SRIA development

The project is related to the **creation of interest among young people at school and among citizens about the role of science in society by using the call for food systems transformation**. In relation to the SRIA development, the analysis of SESAM description, objectives and results evidenced that the project mainly focuses on one Thematic area and develops two Activity Areas, both considered from a food systems lens. Specifically, with regard to:

- Thematic Area 3 "**Change the way we connect with food systems**", SESAM aims to engage young people and citizens in sustainable food systems and enhance understanding of the impact of researchers' work on citizens' daily life.
- Activity Area C '**Establishing a Food systems knowledge hub',** SESAM created food Labs to foster interest in science, research and evidence-

based solutions, with a particular emphasis on attaining young people's commitment to tackle societal challenges.

- Activity Area D **"Knowledge sharing and scaling"**, SESAM involves activities for knowledge transfer and training on FS awareness; development of educational programmes and competence building approaches, and supporting science-society interfaces

Overlaps and gaps in the content compared to the other projects

SESAM focuses on a relevant theme, **young people engagement and education on food system's sustainability**. Regarding to the SRIA, Thematic areas 1, 2, and 4, and Activity Areas A and B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

7) Transition paths to sustainable legume based systems in Europe – True

Source(s)

CORDIS (https://cordis.europa.eu/project/id/727973)

Funding details

Source of funding: H2020-SFS-2016-2017 (SUB CALL: H2020-SFS-2016-2)
Type of project (+ cluster if relevant): RIA - Research and Innovation action

Contract number : 727973
Project total budget: 4,999,927.5

Start and end date of the project

1/04/2017– 30/09/2021

Project summary

The project aims at identifying the best routes, or "transition paths" to increase **sustainable legume cultivation and consumption** across Europe. Specific objectives are: 1.Identifying key factors that demonstrate successful use of legumes in a range of production systems with related quality chains, and the historical drivers that supported the transition; 2. Combine data generated from Farm Case Studies into a final Decision Support Tool for primary producers, agronomists, processors, associated businesses and decision makers to **determine a range of options for successful transitions** that include a range of legume species to match the pedo-climatic zones and farm network types.
TRUE is a 22-partner consortium covering business and society actors from legume commodity production, processing, and citizens. TRUE is underpinned by science excellence in the natural and social sciences, and humanities. The main aim of TRUE is to identify and enable transition paths to realise successful legume-supported production systems and agri-feed and -food chains. This is achieved via: a true **multi-actor approach** that balances environmental, economic- and social-securities by minimizing environmental impact; optimizing diversity and **resilience in commercial and environmental terms** throughout the supply chain; and delivery of excellent nutrition to ensure the highest possible states of health and wellbeing for people and animals. TRUE achieves this using a series of **15 farm networks and 7 supply chains** focused innovation Case Studies to characterised key mechanisms and associated ecosystem services indicators. This is intended to empower the production of popular and novel legume-based products on the basis of improved market

perspectives and capabilities, including **short supply chains**. Advanced mathematical approaches using Life Cycle Analysis, and socioeconomic and multi-attribute modelling are intended to create unique Decision Support Tools to identify optimal transition paths to ensure legume supported systems are profitable from 'the push', of production, to 'the pull' of upstream supply chains, markets and consumers. Critically, the TRUE approach also advises and **empowers policy amendments** that promote uptake of new farming, processing, manufacturing and retailing practices, in line with the societal considerations of the Responsible Research and Innovation model: *policy decision making with state-of-the-art science-based information*. The TRUE approach is also augmented by an Intercontinental Advisory Board of 10 international experts in legume supply chain and policy from around the world.

Project results

The project produced numerous deliverables including 38 reports, 30 peer reviewed articles, one book, and 17 datasets. TRUE has established the **Legume Innovation Network**, from the projects inclusive approach, and strong dissemination activities. Content includes: an extensive peer-reviewed evidence-base covering all food system aspects from production to policy; Practice Abstracts; methods (termed SOPs, or Standard Operating Procedures); plus data from experimental trials of TRUEs innovative Work Packages and Case Studies (**CS**). The **24 CS** have served as excellent and practical models, highlighting the breadth of **value-chain wide know-how** and capacities necessary for the home-grown legume transition. The CS insights have been compiled into key reports, including the TRUE-Innovation Catalogue, ebook, and Brochure. These resources are allied to key peer-reviewed scientific reports on socioeconomic- and market-conditions, plus **policy recommendations**, that will facilitate home-grown legume-based cropped systems. The LCA (Life Cycle Assessment) tools developed and implemented by TRUE have also accounted the environmental and nutritional impacts and benefits of novel legume-based products. Critically, and collectively, TRUE's efforts have highlighted the absence of sufficient capacities for the processing of home-grown legumes, and especially across different regions, and to human food grade. TRUE also highlights that greater effort is urgently required to ensure that innovations and facilitative measures are integrated, or combined, across value chains. Also, that this effort includes the identification of **indicators** of home-grown legume-based food systems function, at national and sub-national (or bioregional) scales. Baseline values for these indicators should identify current states and acceptable thresholds, out-with which interventions are necessary. TRUEs **Pathfinder Decision Support System** can assist here, as it has been developed to **guide businesses, scholars, and policy-makers** on the factors determining the extent to which legume-based value chains are truly sustainable.
TRUE has gone beyond the simple identification of transition paths to enable and facilitate home-grown legume-supported food- and feed-systems across Europe. Many of the innovations are being implemented, and span from novel precision-agriculture equipment and -inputs to clear policy recommendations, identified by multi-stakeholder consultation. Improving legume performance through improved crop breeding and agronomy should remain a focus. However, we should safeguard against an over-focus on production elements of the system, relative to ex-farm gate factors. Greater incentivisation of legume-processing facilities must be encouraged, including

the availability of more-affordable smaller-scale capacities, such as **empower the short-value chains** at local or bioregionalised scales. There is also a dearth of **facilities for processing legume** to grades which meet minimum recommendations for human food consumption. Nevertheless, the accounting tools, insights, and products which have been established and developed have already impacted positively, commercially, and environmentally. From the early project stages, TRUE has recognised that, 'sustainability is the language of **responsible food marketing**'. Despite this, the depth of **consumer understanding** of legumes, is low and this situation is compounded by the current inadequate nature of (school) educational provisions, value-chain labelling and categorisation regimes (e.g. among wholesalers), and marketing. Greater effort must be made to ensure all consumers are fully aware of the significance of legumes, local legume cultivation, and legume-based products. This foundation is essential if home-grown legume-based systems are to be realised in tandem with resilient local businesses, and good-food cultures. Allied to this, robust **monitoring tools** are necessary to validate claims regarding the environmental and/or nutrient-density benefits of legume-based food systems and products. Life Cycle Assessment is an important facilitative tool in this, and TRUEs LCA tools will move beyond environmental impact assessments, to account key indicators of ecosystem functions (or 'ecosystem services') at practical scales - such as that of the catchment, or even farm/field. This will empower **improved consumer awareness**, **positive consumer choice**, and consequent benefits for responsive and responsible businesses.

Lead partner
The James Hutton Institute, UK, Research Organisations

Other partners
COVENTRY UNIVERSITY United Kingdom, STC RESEARCH FOUNDATION United Kingdom, SRUC United Kingdom, KENYA FORESTRY RESEARCH INSTITUTE Kenya, UNIVERSIDADE CATOLICA PORTUGUESA Portugal, UNIVERSITAET HOHENHEIM Germany, GEOPONIKO PANEPISTIMION ATHINON Greece, IFAU APS Denmark, REGIONALNA RAZVOJNA AGENCIJA MEDIMURJE REDEA DRUSTVO S OGRANICENOM ODGOVORNOSCU ZA REGIONALNI RAZVOJ I POSLOVNE USLUGE Croatia, BANGOR UNIVERSITY United Kingdom, THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD, OF THE COLLEGE OF THE HOLY & UNDIVIDED TRINITY OF QUEEN ELIZABETH NEAR DUBLIN Ireland, PROCESSORS & GROWERS RESEARCH ORGANISATION LBG United Kingdom, INSTITUT JOZEF STEFAN Slovenia, IGV INSTITUT FUR GETREIDEVERARBEITUNG GMBH Germany, ESSRG NONPROFIT KFT Hungary, AGRI KULTI NONPROFIT KORLATOLT FELELOSSEGU TARSASAG Hungary, ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FUR POLAR- UND MEERESFORSCHUNG Germany, SLOW FOOD DEUTSCHLAND EV Germany, ARBIKIE DISTILLING LIMITED United Kingdom, TEAGASC - AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY Ireland, SOCIEDADE AGRICOLA DO FREIXO DO MEIO LDA Portugal, EUREST (PORTUGAL)-SOCIEDADE EUROPEIA DE

RESTAURANTES LDA Portugal, SOLINTAGRO SL Spain, JAVNA USTANOVA ZA RAZVOJ MEDIMURSKEZUPANIJE REDEA Croatia.

Countries represented by **24 partners** coming from: United Kingdom, Kenya, Portugal, Germany, Greece, Denmark, Croatia, Ireland, Slovenia, Hungary, Spain

Contacts

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Relevant links

https://www.true-project.eu/

Relation to the SRIA development

The project is related to **sustainable legume cultivation and consumption** across Europe. The main aim of TRUE is to identify and enable transition paths to realise successful legume-supported production systems and agri-feed and -food chains. In relation to the SRIA development, the analysis of TRUE description, objectives and results detected that the project mainly focuses on two Thematic areas and develops two Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 1 "**Change the way we eat food**", TRUE focuses on sustainable legume consumption across Europe.
- Thematic Area 2 "**Change the way we process and supply food**", TRUE aims to foster short supply chains at local or bio-regionalised scales.
- Activity Area C "**Establishing a FS Knowledge Hub**", TRUE used a series of 15 farm networks and 7 supply chains that have served as excellent and practical models, highlighting the breadth of value-chain wide know-how and capacities necessary for the home-grown legume transition.
- Activity Area D **"Knowledge sharing and scaling"**, TRUE involves activities for supporting science-society interfaces

Overlaps and gaps in the content compared to the other projects

TRUE focuses on a relevant theme, the identification of "transition paths" to **increase sustainable legume cultivation and consumption across Europe.** Regarding to the SRIA, Thematic Areas 3, and 4, and Activity Areas A and B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

8) Food System Hubs Innovating towards Fast Transition by 2030 – FoodShift2030

Source(s)

CORDIS (https://cordis.europa.eu/project/id/862716)

Funding details

Source of funding: H2020-SFS-2018-2020 (SUB CALL: H2020-SFS-2019-1)
Type of project: IA - Innovation action
Contract number : 862716
Project total budget: € 8.291.148,62

Start and end date of the project

01/01/2020– 31/12/2023

Project summary

The FoodSHIFT2030 aims to launch a citizen-driven transition of the European food system towards **a low carbon circular future, including a shift to less meat and more plant based diets**. By utilizing and supporting the transformative power of citizens already engaged in developing sustainable innovative food system solutions in European city-regions, FoodSHIFT2030 will deliver an **increase in food sector jobs and SMEs**, an increase in **citizen empowerment** and **urban-rural cohesion**, and a **lasting positive impact on food system sustainability** that will continue beyond the project lifetime.

A fast citizen-driven food system transition will be achieved by creating a framework and efficient mechanisms for maturing, combining, upscaling and multiplying existing food system innovations through the operationalisation of **nine citizen-driven FoodSHIFT Accelerator Labs** and **twenty seven FoodSHIFT Enabler Labs** established in existing and emerging city-region food system hubs distributed across Europe.

The benefits of existing and accelerated food system innovations will be benchmarked against state-of-the-art food system innovations by assessing their effects on a set of FoodSHIFT **Indicators**. Strategies and advisory plans for citizen-driven **food system governance** will be co-created in the FoodSHIFT Accelerator Labs to support food system transition and foster market uptake of new food system innovations in the **participating city-regions**.

A further transition of the food system beyond the FoodSHIFT2030 project will be obtained by creating a snowball effect starting with targeted knowledge transfer via a number of **city and region networks** working on facilitating the food system

transition and continuing the establishment of FoodSHIFT Enabler Labs in other European and global city-regions.

Project results

At the end of the third year out of four, the project produced the following results. FoodSHIFT 2030 has established what could be considered its own multi-actor network embedded within a single project. Substantial works have focused on establishing the **nine labs** in WP1. Alongside this focused energy on FoodSHIFT **Accelerator Lab** development has been establishing the **broader multi-actor network** with activities being conducted simultaneously across a total of 22 project work areas, including nine specific work packages, nine FoodSHIFT Accelerator Labs each with unique innovation goals and four Impact Pathways operating in a tangential manner ensuring key collaboration across all work areas.

By establishing open innovation **FoodSHIFT Accelerator Labs** in nine European city-regions with **active participation from key food chain actors** representing private companies, local governments, research institutions and the civil society, FoodSHIFT has successfully created a strong framework for developing and implementing a ground-breaking mechanism for maturing, combining and upscaling existing food system innovations in an **iterative innovation process based on multidisciplinary collaboration**. In each of the nine FoodSHIFT Accelerator Labs, 10+ food system **innovations** have been identified. These will be further developed during the project period through a citizen-driven and expert-supported increase of their Technological, Societal and Innovation Readiness Levels towards being highly competitive within an operational technological environment and towards achieving stronger societal adaptation. By identifying and combining complementary food system innovations, the overall resilience of the food system will be increased by applying **design thinking and circular economy principles** while optimizing resource use efficiency and ensuring **regional food security**. By establishing FoodSHIFT Enabler Labs (FELs) in twenty-seven follower city-regions, and subsequently additional city-regions, we will exploit the full potential for upscaling the food system innovations at the wider regional, national and global market.

The interdisciplinary expertise within the project is a strength when supporting such diverse and lasting economic, social and environmental impacts: The WP teams combined are covering the following key aspects; establishing **multi-actor networks**, supporting and promoting **food system innovators**, **tools and indicators to monitor impacts**, development **food system governance strategies**, targeted **knowledge sharing**, summarised outputs in easy to digest formats and proactive **dissemination**. This is coupled with specialised 'on the ground actors' within the FAL leveraging extensive networks of food chain actors centred around the nine city regions.

Lead partner
University of Copenhagen, DK, Higher and Secondary Education Establishments.

Other partners
FONDEN KOBENHAVNS MADHUS Denmark, LEJRE KOMMUNE Denmark, CIRCULAR FOOD TECHNOLOGY Denmark, STAD OOSTENDE Belgium, EIGEN VERMOGEN VAN HET INSTITUUT VOOR LANDBOUW- EN VISSERIJONDERZOEK Belgium, COMMUNE D'AVIGNON France, INSTITUT NATIONAL DE RECHERCHE POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT France, ERNAHRUNGSRAT BERLIN E.V. Germany, THF.VISION GUG Germany, LEIBNIZ-ZENTRUM FUER AGRARLANDSCHAFTSFORSCHUNG (ZALF) e.V. Germany, AGRATHAER GMBH Germany, ELLINOGERMANIKI AGOGI SCHOLI PANAGEA SAVVA AE Greece, DIMOS PALLINIS Greece, DRAXIS ENVIRONMENTAL SA Greece, CITTA' METROPOLITANA DI BARI Italy, UNIVERSITA DEGLI STUDI DI MILANO Italy, CENTRO INTERNAZIONALE DI ALTISTUDI AGRONOMICI MEDITERRANEI Italy, FUNDACJA EKOROZWOJU Poland, WROCLAW MIASTO Poland, UNIWERSYTET PRZYRODNICZY WE WROCLAWIU Poland, HIGHCLERE CONSULTING SRL Romania, AGENTIA METROPOLITANA PENTRU DEZVOLTARE DURABILA BRASOV ASOCIATIA Romania, ICEBERG PLUS SRL Romania, INSTITUT D'ARQUITECTURA AVANCADA DE CATALUNYA Spain, NEXTFOOD IVS Denmark, SUSMETRO EU BV Netherlands, RECHERHE ET EVALUATION DE SOLUTIONS INNOVANTES ET SOCIALES France, INTERNATIONAL FEDERATION OF ORGANIC AGRICULTURE MOVEMENTS EUROPEAN UNION REGIONAL GROUP Sweden, SUSTAIN:THE ALLIANCE FOR BETTER FOOD & FARMING United Kingdom, PLANT JAMMER APS Denmark, EAT FOUNDATION Norway, VEREIN ZUR FORDERUNG EINER NACHHALTIGEN URBANEN KULTUR EV Germany, COPENHAGEN FOOD SYSTEM CENTER APS Denmark.

Countries represented by **33 partners** coming from: Denmark, Belgium, France, Germany, Greece, Italy, Poland, Romania, Spain, Netherlands, Sweden, United Kingdom, Norway.

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Relevant links

https://foodshift2030.eu/
https://twitter.com/foodshift2030

Relation to the SRIA development

The project is related to the **transition** of the European food system towards a **low carbon circular future**, including a shift to **less meat and more plant based diets**. The main aim of FoodShift 2030 is to increase in food sector jobs and SMEs, increase citizen empowerment and urban-rural cohesion, and a lasting positive impact on food system sustainability. In relation to the SRIA development, the analysis of FoodShift 2030 description, objectives and results evidenced that the project mainly focuses on three Thematic areas and develops two Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 1 "**Change the way we eat food**", FoodShift 2030 focuses on the transition to plant-based sustainable diets.
- Thematic Area 3 "**Change the way we connect with food systems**", FoodShift 2030 intends to increase jobs in food sector and SMEs and to increase citizen empowerment and urban-rural cohesion.
- Thematic Area 4 "**Change the way we govern food systems**", FoodShift 2030 aims to develop food system governance strategies.
- Activity Area C "**Establishing a FS Knowledge Hub**", FoodShift 2030 created FoodSHIFT Accelerator Labs in nine European city-regions with active participation from key food chain actors representing private companies, local governments, research institutions and the civil society. This framework has the aim to implement a ground-breaking mechanism for maturing, combining and upscaling existing food system innovations in an iterative innovation process based on multidisciplinary collaboration.
- Activity Area D "**Knowledge sharing ands scaling**", FoodShift 2030 intends to implement knowledge sharing by providing summarised outputs in easy to digest formats and proactive dissemination.

Overlaps and gaps in the content compared to the other projects

FoodShift 2030 focuses on a relevant theme, **transition** of the European food system towards a **low carbon circular future.** Regarding to the SRIA, Thematic Areas 2 and Activity Areas A and B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

9) Towards Innovation - driven and smart solutions in short food supply chains – Smartchain

Source(s)

https://cordis.europa.eu/project/id/773785

Funding details

Source of funding: H2020-SFS-2016-2017 (SUB CALL: H2020-SFS-2017-2)
Type of project (+ cluster if relevant): RIA - Research and Innovation action

Contract number : 773785
Project total budget: 5,998,373.75

Start and end date of the project

1/09/2018– 31/08/2021

Project summary

SMARTCHAIN is intended to **stimulate demand-driven innovation in short food supply chains** to improve competitiveness and foster **rural development** using a **multi-actor approach**. Specific objectives are: 1. Strengthen partnership among stakeholders in and between short food supply chains by creating a **network for cooperation**, co-creation and innovation; 2. Generate innovative and practical solutions to barriers that restrict the scaling up of short food supply chains; 3. Develop a conceptual framework for the **measurement of social innovations** adapted to different types of short food supply chains; 4. Understand **consumer perceptions** to promote greater acceptance of short food supply chains; 5. Assess the environmental, economic and social **impacts** of short food supply chains and their role in circular economy; 6. Develop, operate and maintain the **interactive innovation platform** which will offer a range of services to key stakeholders and end-users on short food supply chains; 7. Support the long-term viability and competitiveness of short food supply chain practitioners by proposing new **business models** and opportunities for agri-food supply chains; 8. Provide **policy recommendations** based on existing policies and regulatory requirements influencing sustainable food production and consumption; 9. **Disseminate the project findings** at large following an extended exploitation and dissemination plan that will be active throughout the project and beyond as well as to ensure project's sustainability through its link with EU wide initiatives, especially the EIP-AGRI and its Operational Groups.
SMARTCHAIN aims to develop an operational framework for the comparative analysis of **case studies** of short food supply chains, a **multi-perspective analysis** of case studies (technological & non-technological innovations, social innovations, consumer perceptions, environmental impact and their regional regulatory contexts). An

operational **definition of social innovation in SFSCs** has been provided and validated with the organisation of **12 Community of Practice**. The project also intends to provide **business and policy recommendations** to unlock the potentials of SFSCs in Europe and align the regulatory framework.
SMARTCHAIN is an ambitious, 3 year project with 43 partners from 11 European countries including key stakeholders from the domain of short food supply chain as actors in the project. The central objective is **to foster and accelerate the shift towards collaborative short food supply chains** and, through concrete actions and recommendations, to introduce new robust business models and innovative practical solutions that enhance the competitiveness and sustainability of the European agri-food system. Using bottom-up, demand-driven research, the SMARTCHAIN consortium i) will perform a multi-perspective analysis of **18 case studies** of short food supply chains in terms of technological, regulatory, social, economic and environmental factors, ii) will assess the linkages and interactions among all stakeholders involved in short food supply chains and iii) will identify the key parameters that influence sustainable food production and rural development among different regions in Europe. The project aims to **establish 9 national communities of short food supply chains** (**Innovation and Collaboration Hubs**) in different partner countries (France, Germany, Greece, Hungary, Italy, Netherlands, Serbia, Spain and Switzerland) and a virtual innovation hub in order to facilitate stakeholder engagement, bringing farmers and consumers together in a trust-enhancing environment enabling them to generate demand driven-innovations. Combination of scientific and practical knowledge and the use of innovation workshops will enable the development of practical innovative solutions as well as the promotion of a framework for different forms of **collaborative short food supply chains in urban and rural areas**. SMARTCHAIN will generate concrete actions for **knowledge transfer**, through the organisation of multi-stakeholder workshops and training activities for farmers and short food supply chain entrepreneurs.

Project results

The project has produced several deliverables including 13 websites, 19 reports, 1 peer reviewed article, 1 book chapter, and 5 datasets. In particular, **technological & non-technological innovations for SFSCs** have been identified, analysed and collected in an inventory. An operational definition of social innovation in SFSCs has been provided and validated with the organisation of 12 Community of Practice in 9 countries. Moreover, an exploratory research on **consumer attitudes and perceptions** has been accomplished through the implementation of 8 consumer focus groups in Germany, Spain, Greece and Hungary and 32 interviews with EU expert stakeholders.
In the deliverable "**Best practice guide for the implementation of innovative solutions in SFSCs**", SMARTCHAIN has provided: a) the meaning and key aspects of SFSCs, b) an overall description of the SFSC context in Europe (general characteristics of SFSCs from a business perspective, types of SFSCs, regulation context, typical bottlenecks and successful factors of the SFSCs, etc.), c) the definition and types of innovation (including the general characteristics of successful innovations and the role of the stakeholders in the innovation process), d) examples of successful innovation, e) general recommendations for implementing innovation, f) a step-by-step guide to

help the practitioner on the road to innovation, maximising the probability of successful implementation (includes 6 steps with over 300 questions and more than 60 recommendations), g) a tool for using innovation for redesigning SFSCs to face off SARS-CoV-2 pandemic. The guide is also a tool for identifying opportunities and strategies to enable successful regional technological, non-technological and social innovations. Basically, it is designed to help SFSCs in the practical implementation of technological, non-technological and social innovative solutions.

Lead partner
UNIVERSITAET HOHENHEIM, Germany, Higher or Secondary Education Establishments

Other partners
ORGANIC SERVICES GMBH Germany, ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA Italy, UNIVERSITA DEGLI STUDI DI TORINO Italy, CENTRO INTERNAZIONALE DI ALTISTUDI AGRONOMICI MEDITERRANEI Italy, LEGA REGIONALE DELLE COOPERATIVE E MUTUE Italy, CONFEDERAZIONE GENERALE DELL AGRICOLTURA ITALIANA Italy, UNIVERSITEIT UTRECHT Netherlands, WAGENINGEN UNIVERSITY Netherlands, STICHTING NEDERLANDS BAKKERIJ CENTRUM Netherlands, ASSOCIATION DE COORDINATION TECHNIQUE POUR L'INDUSTRIE AGROALIMENTAIRE France, PANEPISTIMIO KRITIS Greece, CAMPDEN BRI MAGYARORSZAG NONPROFITKFT Hungary, KISLEPTEKU TERMEKELOALLITOK ES SZOLGALTATOK ORSZAGOS ERDEKKEPVISELETENEK EGYESULETE Hungary, FACULTY OF AGRICULTURE - UNIVERSITY OF BELGRADE Serbia, INSTITUT ZA FIZIKU Serbia, FUNDACION AZTI - AZTI FUNDAZIOA Spain, FUNDACION CITOLIVA, CENTRO DE INNOVACION Y TECNOLOGIA DEL OLIVAR Y DEL ACEITE Spain, GABINETE DE GESTION INTEGRAL DE RECURSOS SL Spain, EIDGENOESSISCHES DEPARTEMENT FUER WIRTSCHAFT, BILDUNG UND FORSCHUNG Switzerland, ISEKI-FOOD - EUROPAISCHE GESELLSCHAFT FUR DIE INTEGRATION DER LEBENSMITTELWISSINSCHAFT UND -TECHNOLGIE IN DIE LEBENSMITTELVERSORGUNGSKETTE Austria, FOODDRINKEUROPE AISBL Belgium, FRUITVEGETABLES EUROPE Belgium, COMITE DES ORGANISATIONS PROFESSIONNELLES AGRICOLE DE L'UNION EUROPEENNE COPA ASSOCIATION DE FAIT Belgium, EUROPEAN FOOD INFORMATION COUNCIL Belgium, SOLIDARISCHE LANDWIRTSCHAFT EV Germany, LANDWIRTSCHAFTSKAMMER NIEDERSACHSEN Germany, ALCE NERO SPA Italy, ARVAIA SOCIETA COOPERATIVA AGRICOLA Italy, AMPED CONCEPTS BV, Netherlands, BRANDT & LEVIE BV Netherlands, CENTRE TECHNIQUE DE LA CONSERVATION DES PRODUITS AGRICOLES France, A LA FERME France, ASTIKOS PROMITHEUTIKOS SYNETAIRISMOS PERIORISMENIS EUTHYNIS ALLOTROPON Greece, SINETERISMOS PARAGOGON - KATANALOTON OIKOLOGIKON PROIONTON GAIA PE Greece, FOODHUB.HU TERMELOI AGRAR SZOLGALTATO NONPROFIT ZARKORUEN MUKODO RESZVENYTARSASAG Hungary, ZALA TERMALVOLGYE EGYESULET Hungary, PROMETNO PROMETNO DRUSTVO SA OGRANICENOM ODGOVORNOSCU POLO CACAK Serbia, UDRUZENJE

KOMPANIJA ZA PRERADU VOCAI POVRCA KRALJEVO Serbia, LA TRUFA DE ALAVA - ARABAKO BOILURRA KOOP E Spain, FUNDACION LANTEGI BATUAK Spain, BIOFRUITS SA Switzerland, JEAN-MICHEL BESSON Switzerland, NATUURLIJK VLEESPAKKET BV Netherlands, INNOGESTIONA AMBIENTAL SL Spain.
Countries represented by **43 partners** coming from: Germany, Italy, Netherlands, France; Greece; Hungary; Serbia; Spain; Switzerland; Austria; Belgium.

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Relevant links

https://www.smartchain-h2020.eu/

Relation to the SRIA development

SMARTCHAIN is related to **short food supply chains**. The main aim of is to implement collaborative short food supply chains in urban and rural areas to foster rural development. In relation to the SRIA development, the analysis of SMARTCHAIN description, objectives and results evidenced that the project mainly focuses on two Thematic areas and develops two Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 2 "**Change the way we process and supply food**", SMARTCHAIN aims at supporting a re-scaling of food supply chains, valorizing the role of short food supply chains (SFSCs) and supply chain collaborations towards the realisation of more sustainable FS, also capable to strenghten rural-urban linkages.
- Thematic Area 4 "**Change the way we govern food systems**", SMARTCHAIN intends to provide business and policy recommendations to unlock the potentials of SFSCs in Europe and align the regulatory framework.
- Activity Area C "**Establishing a FS Knowledge Hub**", SMARTCHAIN aims to establish 9 national communities of short food supply chains (Innovation and Collaboration Hubs) in different partner countries (France, Germany, Greece, Hungary, Italy, Netherlands, Serbia, Spain and Switzerland) and a virtual

innovation hub in order to facilitate stakeholder engagement, bringing farmers and consumers together in a trust-enhancing environment enabling them to generate demand driven-innovations.

- Activity Area D "**Knowledge sharing and scaling**", SMARTCHAIN will generate concrete actions for knowledge transfer, through the organisation of multi-stakeholder workshops and training activities for farmers and short food supply chain entrepreneurs.

Overlaps and gaps in the content compared to the other projects

SMARTCHAIN focuses on a relevant theme, the implementation of collaborative short food supply chains in urban and rural areas**.** Regarding to the SRIA, Thematic Areas 1 and 3 and Activity Areas A and B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

10) Strengthening European Food Chain Sustainability by Quality and Procurement Policy – Strength2Food

Source(s)

CORDIS (https://cordis.europa.eu/project/id/678024)

Funding details

Source of funding: H2020-SFS-2015-2
Type of project (+ cluster if relevant): RIA - Research and Innovation action

Contract number : 678024
Project total budget: 6,911,876.25

Start and end date of the project

1/03/2016– 31/05/2021

Project summary

The project aims at improving the effectiveness of **EU food quality schemes** (FQS), public sector **food procurement** (PSFP) and to stimulate **Short Food Supply Chains** (SFSC) through research, innovation and demonstration activities.
Strength2Food is intented to dentify and implement strategies for upscaling: creating new and expanding existing **markets for quality food products** and fostering the development of an '**economy of quality'**. Specifically, Strength2Food contributes to: a) **Supporting policy makers** and other relevant stakeholders in **improving the effectiveness of current policies** on food quality designations and public sector food procurement to enhance their sustainability and **promotion of healthy and nutritious diets**. b) Developing and delivering effective policies for improving the overall sustainability of agriculture and capacity for balanced nutrition. c) Demonstrating and validating how to stimulate the development of new quality markets and local food chains through **pilot initiatives and innovative actions**. d) Maximising the impact of the project's activities and achievements through effective **knowledge exchange and communication** with a wide range of relevant stakeholders on up-to-date sustainable practices. Strength2Food is a 5-year project involving a 30-partner consortium, representing 11 EU and 4 non-EU countries combines leading academic, communication, SME and stakeholder organisations to ensure a multi-actor approach. The project undertakes case study-based quantitative research to measure economic, environmental and social impacts of FQS, PSFP and SFSC. The **impact of PSFP policies** on balanced nutrition in schools is also assessed. Primary research is complemented by advanced econometric analysis of existing datasets to determine impacts of FQS and SFSC participation on farm performance and survival, as well as understand price transmission and trade patterns. Consumer

knowledge, confidence in, valuation and use of FQS labels and products is assessed via cross-national survey, ethnographic and virtual supermarket-based research. Lessons from the research are applied and verified in **6 pilot initiatives**, focusing on less-developed and transition regions. These initiatives bring together academic and non-academic stakeholder partners in action research. The six pilot actions are: a school meals initiative to improve the nutritional outcomes and economic benefits for local agri-food producers; in-store trials (undertaken with a grocery retailer) to upscale sales of local produce; a scheme to stimulate a sustainable SFSC that adds value to the fishing community; and pilot actions to expand regional food labelling; increase sales of FQS products in non-traditional markers; and improve returns to local producers at food fairs and farmers' markets (via a smartphone app). Project impact is maximised through a **knowledge exchange platform**, hybrid forums, school educational resources, a Massive Open Online Course and practitioner options (Development, refinement and verification of policy and practical recommendations. Strategic Guides for Practitioners and identification of good practices. Creation of technical support systems and decision making tools for agri-food chain practitioners and policy makers. Development of Education Resources for Schools).

Project results

The project produced several deliverables including six websites, 34 reports, 134 conference proceedings, 32 peer reviewed articles, 30 thesis dissertations, 2 monographic books, 30 book chapters and one dataset.

Strength2Food research established that *European Food Quality Schemes (FQS), including Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI), and organic, generate, overall, superior socio-economic outcomes* compared to comparative, non-protected equivalents. Benefits include *higher margins for producers, better paying jobs, and higher local economic multiplier effects*. Econometric evidence indicates that FQS aid exports and help producers capture premium international markets. FQS products are also subject to less price volatility and asymmetric price transmission. However, the carbon and water footprints of PDO/PGI products are often comparable to those of non-certified similar products. In some countries, the registration process for PDO/PGI has been too top down and lacked sufficient end user and retailer consultation, leading to disappointing outcomes, but this can be corrected.

Cross-national survey work established that European consumers' recognition and *understanding* of PDO and PGI labels *remains low*, limiting their use by consumers. However, Strength2Food research documents how trust in, and consequently use of, FQS labels can be improved through communication of third-party verification arrangements, and logo modification.

Regarding public sector food procurement (PSFP), *local sourcing systems* generate substantially higher local economic multipliers. High levels of plate waste (circa 30%) affects, however, PSFP, so that schoolchildren's food intake often falls short of recommended nutritional guidelines. Research in Croatian schools demonstrates that food waste can be cut through: improvements to layout, extending mealtimes, portion size control, and engagement of staff. The carbon footprint of PSFP depends most on use of ruminant meats in meals, rather than the procurement model. Research with Serbian schools demonstrates ways *to increase the nutritional composition of meals,*

cut carbon emissions, and switch to organic fruit and vegetables for only a very modest increase in cost.
Short food supply chains (SFSCs) generate a host of benefits to producers: capturing a larger proportion of the added value, better bargaining power and relationships with end consumers, higher trust, and greater job satisfaction. However, many SFSCs are small-scale and to grow they require collective efforts to improve convenience and service elements. Field research demonstrates that sales of local foods can be increased in supermarkets through aide memoire point of sale materials. SFSCs' carbon footprints can be higher than "long chains" but *co-operation in logistics* can cut emissions.
Overall, efforts to grow FQS, improve the quality of PSFP, and stimulate SFSCs can and do lead to meaningful economic, social, and environmental benefits.

Lead partner
University of Newcastle Upon Tyne, UK, Higher and Secondary Education Establishments

Other partners
UNIVERSITA DEGLI STUDI DI PARMA Italy, THE UNIVERSITY OF EDINBURGH United Kingdom, WAGENINGEN UNIVERSITY Netherlands, ARISTOTELIO PANEPISTIMIO THESSALONIKIS Greece, INSTITUT NATIONAL DE RECHERCHE POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT France, INSTITUT NATIONAL D'ENSEIGNEMENT SUPERIEUR POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT France, EKONOMSKI FAKULTET, UNIVERZITET U BEOGRADU Serbia, RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAT BONN Germany, OSLOMET - STORBYUNIVERSITETET Norway, SVEUCILISTE U ZAGREBU EKONOMSKI FAKULTET Croatia, CENTRE DE RECERCA EN ECONOMIA I DESENVOLUPAMENT AGROALIMENTARI-UPC-IRTA Spain, UNIVERSITA DEGLI STUDI DI MILANO Italy, SZKOLA GLOWNA GOSPODARSTWA WIEJSKIEGO Poland, KASETSART UNIVERSITY Thailand, TRUONG DAI HOC KINH TE THANH PHO HO CHI MINH Vietnam, EUROPEAN FOOD INFORMATION COUNCIL Belgium, EUROPEAN TRAINING ACADEMY Serbia, FILIPOVIC MALADA IVANA Serbia, CONFEDERAZIONE NAZIONALE COLDIRETTI Italy, ECO-SENSUS KUTATO, OKTATO ES KOMMUNIKACIOS NON PROFIT KORLATOLT FELELOSSEGU TARSASAG Hungary, GLOWNY INSPEKTORAT JAKOSCI HANDLOWEJ ARTYKULOW ROLNO-SPOZYWCZYCH Poland, FOOD NATION CIC United Kingdom, CONSIGLIO PER LA RICERCA IN AGRICOLTURA E L'ANALISI DELL'ECONOMIA AGRARIA Italy, BARILLA G. E R. FRATELLI SPA Italy, MINISTARSTVO PROSVETE, NAUKE I TEHNOLOSKOG RAZVOJA Serbia, KONZUM, TRGOVINA NA VELIKO I MALO DD Croatia, MUNICIPALITY OF ARILJE Serbia, CONSORZIO DEL FORMAGGIO PARMIGIANO-REGGIANO Italy, ECOZEPT GBR Germany, ECOZEPT FRANCE France, IMPACT MEASUREMENT LIMITED United Kingdom.
Countries represented by 30 members from: Italy, United Kingdom, Netherlands, Greece, France, Serbia, Germany, Norway, Croatia, Spain, Poland, Thailand, Vietnam, Belgium, Hungary.

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Relevant links

https://www.strength2food.eu/
https://www.facebook.com/Strength2Food/

Relation to the SRIA development

Strength2Food is related to food quality schemes, public sector food procurement, and Short Food Supply Chains. The main aim is to dentify and implement strategies for creating new and expanding existing markets for quality food products and fostering the development of an 'economy of quality'. In relation to the SRIA development, the analysis of Strength2Food description, objectives and results evidenced that the project focuses on four Thematic areas and develops two Activity Areas, all considered from a food systems lens. Specifically, with regard to:

- Thematic Area 1 "**Change the way we eat food**", Strength2Food aimed to improve food quality designations and public sector food procurement to enhance their sustainability and promotion of healthy and nutritious diets.
- Thematic Area 2 "**Change the way we process and supply food**", Strength2Food aimed to foster and accelerate the shift towards collaborative short food supply chains.
- Thematic Area 3 "**Change the way we connect with food systems**", Strength2Food aimed to improve relationships with end consumers, higher trust, and greater job satisfaction.
- Thematic Area 4 "**Change the way we govern food systems**", Strength2Food intends to provide business and policy recommendations to unlock the potentials of SFSCs in Europe and align the regulatory framework.
- Activity Area C "**Establishing a FS Knowledge Hub**", Strength2Food demonstrated and validated how to stimulate the development of new quality markets and local food chains through pilot initiatives and innovative actions.
- Activity Area D "**Knowledge sharing ands scaling**", Strength2Food maximised the impact of the project's activities and achievements through effective knowledge exchange and communication with a wide range of relevant stakeholders on up-to-date sustainable practices.

Overlaps and gaps in the content compared to the other projects

Strength2Food focuses on a relevant theme, the improvement of the effectiveness of EU **food quality schemes**, public sector **food procurement** and the stimulation of **Short Food Supply Chains** through research, innovation and demonstration activities**.** Regarding to the SRIA, Activity Areas A and B are less developed in this project. In the final report, an in-depth analysis and discussion of overlaps and gaps is provided on the complete sample of 30 projects.

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The portal **data.europa.eu** provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

This review of 30 EU-funded projects identifies the research and innovation gaps and the needs affecting the transition to future-proof food systems.
It contributes to the development of a new strategic research and innovation agenda and Sustainable Food Systems Partnership.
As a main outcome, the report presents a list of R&I topics that should require more research and policy efforts and it highlights the need to develop specific supporting actions.
The strategic research and innovation agenda and the Sustainable Food Systems Partnership will help to re-orient programmes to concrete needs of research and action, to reduce overlaps and to build synergies between past and future efforts, in line with relevant policy goals and strategic frameworks.

Studies and reports

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