

FOSTER DELIVERABLE 4.1

R&I policy support options for furthering food systems science at national, regional and local level in the EU

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Glossaries

Abbreviation	Full form
AKIS	Agricultural Knowledge and Innovation System
CAP	Common Agricultural Policy
CDIs	Change-Driven Initiatives
CF	Cohesion Fund
DG	Directorates-General
DG RTD	Directorate-General Research & Innovation
DG Connect	Directorate-General Connect
DG AGRI	Directorate-General for Agriculture and Rural Development
DG GROW	Directorate General for Internal Market, Industry, Entrepreneurship and SMEs
DG REGIO	Directorate-General for Regional and Urban Policy
DG ENV	Directorate-General for environment
DG CLIMA	Directorate-General for Climate Action
DG MARE	Directorate-General for Maritime Affairs and Fisheries
EACEA	European Education and Culture Executive Agency
EC	European Commission
EDP	Entrepreneurial discovery process
EGD	European Green Deal
ERDF	European Regional Development Fund
EMFAF	European Maritime Fisheries and Aquaculture Fund
ERA	European Research Area
ERDF	European Regional Development Fund
ERS	Ernährungsrat StadtRegion Stuttgart
ESF+	European Social Fund Plus
EU	European Union
F2F	Farm to Fork
FACCE-JPI	Joint Programming Initiative on Agriculture, Food Security, and Climate Change
FOKIS	Food Systems Knowledge and Innovation System
FS	Food System
HEU	Horizon Europe
K&I	Knowledge & Innovation
KIS	Knowledge and Innovation System
LIFE	Environment and Climate action
LMIC	Low and Middle Income Countries
NGO	Non Governmental Organisation
PGS	Participatory Guarantee System
PLP	Pannonian Local Product Nonprofit Ltd.
RDPs	Rural Development Programmes
REA	Research Executive Agency
RMA	Reflective Monitoring in Action

SCAR	European Union's Standing Committee on Agricultural Research
SDGs	Sustainable Development Goals
SME	Small and Medium Enterprises
TCV	Transitie Coalitie Voedsel
WP	Work Package

Executive Summary

The transition towards sustainable, equitable, and resilient food systems is critical in addressing global challenges such as food security, malnutrition, climate change, and biodiversity loss. Knowledge and Innovation (K&I) play a crucial role in this transformation as they drive the development, dissemination, and adoption of sustainable practices, technologies, and governance models. Effective policies that integrate diverse forms of knowledge and foster collaboration are essential to drive systemic change. Existing policies and governance frameworks however often struggle to align research with actionable solutions and fail to bridge the gap between scientific insights, local and practical knowledge, and policy implementation. To overcome these challenges, a well-governed, inclusive, and responsive Knowledge and Innovation system (KIS) is needed to promote food systems transformation.

This deliverable is part of the FOSTER project, which seeks to gain insight into how knowledge and innovation systems can be adapted, made more inclusive and better governed to transform Europe's food system outcomes for health, enterprise and the environment. FOSTER strives to build a foundation from which a new Knowledge and Innovation (K&I) governance structure for Europe's food system can emerge. For this purpose, the FOSTER consortium adopts a multi-actor approach combining insights from academia, citizen groups, policy makers, innovation advisors and advocacy groups. FOSTER works together with a number of Change-Driven Initiatives (CDIs), which are innovators of food systems at local, regional and/or national level. These CDIs act as intermediaries and knowledge brokers connecting academia to other forms of knowledge and linking researchers with underrepresented communities. By working with the CDIs, the FOSTER project seeks to create insights and highlight barriers that need to be addressed for a well-governed, inclusive, and responsive K&I governance structure.

From AKIS to FOKIS

The Agricultural Knowledge and Innovation System (AKIS) has historically been the primary framework for knowledge dissemination in European agriculture, evolving from a linear model to a more networked approach. However, despite its contributions to economic prosperity and productivity, AKIS has faced criticism for being slow to adapt to emerging challenges and remaining largely focused on optimizing existing structures rather than enabling transformative change in our food system. Reports from the European Commission and expert groups emphasise the need for a fundamental reorientation of research and innovation towards food system transformation beyond agriculture. AKIS therefore needs to shift towards a K&I system that strengthens more diverse perspectives and can function as an engine for driving systemic transformation. We call such a system FOKIS (Food system Oriented Knowledge and Innovation System), designed to function as an engine for systemic change across the whole food system.

Policy and governance play a crucial role in this shift. Currently, the fragmented governmental landscape, which is characterised by disconnected policies at different levels, limits systemic change as well as the agency of a variety of food systems stakeholders and change-driven initiatives (CDIs). Changing the way in which K&I is developed, disseminated and shared may provide us with levers that can help in instigating food system transformation. This document explores how inclusive governance, policy, and a multi-actor and systemic approach to knowledge creation can contribute to a shift from AKIS to FOKIS, also empowering societal organisation seeking to change the food system. By offering actionable insights and highlighting barriers to participation in the governance of K&I, for organisations close to society and underrepresented communities, it also seeks to give policymakers the knowledge and evidence to make better informed policies for transforming the KIS.

Advancing governance frameworks to support transformation

The empirical work in this report departs from a structured review of literature (Chapter 2) which synthesizes key lessons from other studies and highlights concrete recommendations for K&I policy and governance, with a focus on shaping a more effective FOKIS. The analysis highlights governance challenges, gaps in current K&I frameworks, and pathways for improvement. Identified key challenges in food governance include fragmented policy approaches, insufficient transdisciplinary collaboration, a lack of systemic approaches and the underrepresentation of diverse knowledge systems and knowledge holders.

The findings from the review highlight the need for a radical shift in knowledge and innovation systems for food systems. Systemic change requires adaptive governance that encourages continuous engagement with stakeholders, reflexive learning and adopting systemic thinking. In this context, there is a necessity for better integrating K&I policy and governance mechanisms across spatial scales, fostering inclusivity, promoting mission-oriented innovation and strengthening science-policy-practice interfaces. For this purpose, the literature review identifies a number of key ingredients – core considerations that can help redesign the K&I system to better serve society’s needs through FOKIS. These ingredients are themed around four pillars: broadening of the knowledge scope of KIS; better policy integration and alignment; justice and food democracy; and collaboration and network building.

Bringing underrepresented voices to the table

A second, integrative review of literature examines the exclusion of certain knowledge holders in food system governance (Chapter 3). It focuses on identifying underrepresented knowledge types, barriers to inclusion, best practices for involving these groups, and critically analysing debates on whose knowledge is neglected in food system decision-making. Through this, the chapter contributes to a more inclusive FOKIS framework for sustainable and just food system transitions, highlighting the need for reforms that integrate a broader spectrum of knowledge and perspectives into food system decision-making.

The review collects various arguments which show that the inclusion of diverse knowledge holders in food system governance is essential for normative justice, learning, equitable and sustainable change, legitimacy, and improved decision-making. It also addresses who and what knowledge are underrepresented, highlighting various marginalized groups as well as the dominance of scientific and expert-based knowledge. Structures that hinder inclusion include power dynamics, scientific approaches exclusionary mechanisms, exclusionary mindsets, and the co-opting of grassroots movements. Practical experiences around inclusion in the consortium led to debates on whether participation should always be inclusive¹, with some claiming it depends on the session’s goal.

A study of European K&I policy for food systems

Chapter 4 of this report dives into current EU policies, identifying a vast body of relevant policies and instruments for food systems K&I. It shows how the EU’s food system transformation is guided by the European Green Deal (EGD), with the Farm to Fork (F2F) Strategy promoting fair, healthy, and sustainable food systems. Funding sources include Horizon Europe, the Cohesion Fund, and LIFE. Networks such as EIT Food or the advice of SCAR support innovation. Many EU policies emphasize sustainability, digitalization, and collaboration across sectors to improve agriculture, food security, and climate resilience while ensuring economic and social benefits.

¹ Please see chapter 3 for our discussion on what we see as inclusion.

Discussing the EU's role in promoting societal transitions through policy, this chapter (re-)emphasizes the need for a food systems-based approach to K&I to address systemic challenges. It also advocates for a more inclusive K&I governance system. Right now, many CDIs lack awareness of EU programs, and engagement in CAP and/or other policies is limited. Engagement with CDIs highlights regional disparities, stressing the need for improved funding access and policy alignment. The chapter also offers a future outlook, highlighting how evolving political landscapes may influence EU food systems policies. It stresses the need for coordinated innovation, investment and policy to promote a fair and sustainable food system transition.

Mapping the stakeholder landscape

Chapter 5 presents a network analysis which was conducted to map the stakeholder landscape of FOSTER CDIs and assess knowledge flows. Network analysis is an important tool in understanding food systems as they are inherently complex and interconnected. Understanding these connections can drive more efficient, equitable, and sustainable changes. The network analysis aims to support CDIs in engaging more actively in KIS by strengthening connections, increasing influence, and fostering exchanges between science, policy, and practice. For each CDI, a diagram has been created which maps existing as well as desired relationships with various stakeholders around the CDIs.

Findings show that CDIs engage with government, research, education, and NGOs at varying levels, with differing priorities such as policy influence, advocacy, and multistakeholder alignment. Some seek to strengthen national and international ties, while others focus on local networks. Results were presented to EU policy makers and experts, facilitating discussions on enhancing networks to accelerate food system transformation. The study underscores the importance of strategic stakeholder engagement in fostering systemic change. Understanding stakeholders' needs, improving integration in decision-making, and addressing gaps in engagement with research and policy are essential for effective innovation.

Ingredients for FOKIS

Integrating the research findings presented in this Deliverable, Chapter 6 present a total of fifteen ingredients clustered under four main themes. These ingredients provide recommendations for aspects that should be taken into account regarding policy and governance of FOKIS. Table 1 below provides a quick overview of the four themes and associated ingredients, which are discussed and presented in more detail in Chapter 6.

Table 1: key governance and policy themes and associated ingredients for FOKIS

Ingredients
Broadening the knowledge scope of KIS
<ul style="list-style-type: none"> • Integrated food-systems perspective to K&I • Transdisciplinary approaches for breaking knowledge siloes • Support for alternative practices, economic models and knowledge types • Mutual understanding about perspectives of various actors
Policy integration and alignment
<ul style="list-style-type: none"> • Linking KIS to actionable, future-oriented governance • Vertical and horizontal alignment across policy domains and the KIS • Reflexive learning in the KIS • More accessible K&I structures
Justice and food democracy
<ul style="list-style-type: none"> • Addressing structures and power dynamics that support inequality • Even distribution of (means for) innovation amongst regions • Fair and equitable representation of underrepresented groups
Collaboration and network building
<ul style="list-style-type: none"> • Shared interests as a basis for collaboration and network building • Building capacities of stakeholders to make them better change agents • Increased deliberation on decision making • Strengthen the involvement of intermediaries in collaboration

The above ingredients are crucial for FOKIS as they ensure a more inclusive, just, and effective knowledge and innovation system. Broadening the knowledge scope of KIS fosters an integrated food-systems approach, integrating diverse perspectives and alternative models. Policy integration and alignment enhances governance coherence, strengthens individual efforts and promotes adaptability. Justice and food democracy help to address structural inequalities, empowering underrepresented voices. Strengthening collaboration and network building and increases stakeholder capacities and leverages the contributions of various stakeholders. Together, these elements create a more resilient, participatory and transformative KIS that supports sustainable food innovation and governance.

The discussion chapter closes with a critical reflection on the work in this report. This reflection emphasizes that true transformation requires systemic change - reshaping rules and power structures - rather than merely integrating alternative voices into existing frameworks. An actor-oriented approach, recognizing diverse perspectives and knowledge with systemic approaches, is essential for such a change. Agroecology and justice-driven food movements, such as La Via Campesina, and intermediary structures such as CDIs provide pathways forward. Rather than training initiatives to navigate bureaucracy, the EU should genuinely listen to those advocating for deep structural change. Moving beyond polarised views on sustainable intensification versus agroecological approaches, a future-proof and just food system can take root through providing space for collective action from movements and initiatives, prioritizing resilience, inclusivity, and sustainability.

Chapter 1

From AKIS to FOKIS



Chapter 1 – From AKIS to FOKIS

1. Background

The transition towards sustainable, equitable and resilient food systems is of key importance in addressing global challenges such as food security, climate change, biodiversity loss, poverty and malnutrition (Danse et al., 2020; El Bilali et al., 2019). However, research highlights the complexity of guiding and promoting such a transformation in the complex context of the food system, emphasizing the wide-ranging implications for governance and policy. A growing body of literature emphasises the key role of knowledge and innovation (K&I) as one of the (potential) driving forces in promoting the transformation of food systems (European Commission: DG RTD, 2022; Gardeazabal et al., 2023). Effective policies and governance frameworks that support research and innovation, combined strategically with collaborative action, are therefore seen as essential. Such frameworks and policies can foster sustainable change (den Boer et al., 2021; Grillitsch et al., 2019) and work in a mission-oriented way towards desired futures (Mazzucato, 2017). They can also promote approaches that are more people-centred, responding to calls for more openness, inclusivity, equity and justice in food systems (Huttunen et al., 2022; Kok et al., 2021; Leeuwis et al., 2021).

Changing the ways in which K&I is currently developed, disseminated and coordinated may prove to present a lever in instigating food system transformation. This can potentially drive the adoption of solutions and approaches that can reshape the system to be more sustainable, resilient and equitable. By linking knowledge creation to actionable governance, policymakers can better support transitions that address urgent global challenges (Gardeazabal et al., 2023; Knickel et al., 2018). At the same time, fostering innovation within an equitable framework ensures that solutions benefit all stakeholders, creating food systems that are not only sustainable but also just and resilient for future generations (Anderson & Leach, 2019; Hebinck, Klerkx, et al., 2021). This requires navigating diverse interests, addressing systemic barriers, and ensuring inclusive decision-making processes (Huttunen et al., 2022). Transformation should therefore not only focus on technological advancements but also on other sorts of innovations defined by integrating diverse perspectives, including academic and non-academic forms of knowledge (Hebinck, Klerkx, et al., 2021).

1.1 AKIS

To feed Europe's (increasingly urban) population and to boost exports from what eventually became an agricultural industry, national governments in the EU began to stimulate the systematic transfer of knowledge from research centres to producers (Vorlíčková, 2020). This process was reinforced by the gradually emerging European community of nations that made knowledge sharing a part of its CAP. What started out as an arrangement for linear dissemination of research findings from academic centres via extensive extension services to farmers (Cristóvão et al., 2012), over the years has developed into networked configurations for mutual learning among a wide variety of stakeholders (Cristóvão et al., 2009). These networks are now commonly referred to as Agricultural Knowledge and Innovation Systems (AKIS).

In the EU as well as in its member states, AKIS connects farmers, researchers, advisors, businesses, and policymakers to drive agricultural innovation and sustainability (Cristóvão et al., 2009). AKIS supports knowledge sharing, cooperation and the adoption of best practices, aligning with EU policies like the Common Agricultural Policy (CAP) to address climate, biodiversity, and other food system challenges with a specific focus on agricultural production.

The purpose of AKIS can be captured as the intention *“to facilitate the exchange, transfer, and translation of knowledge in the agri-food sector to meet current and future challenges”* (Spendrup & Fernqvist, 2019; Vorlíčková, 2020, p. 290). Implied in this articulation are the various functions the systems serve and the routes via which knowledge flows run. Among these is the aforementioned ‘top-down’ extension of transferring knowledge and technologies from publicly funded research to producers. In addition, it includes advisory services via which privately funded innovations and research-based solutions are disseminated among potential users, responding to farmers’ needs, as well as non-formal education efforts by academic institutions intended to train farmers’ and other food system actors’ new skills and competencies. Furthermore, AKIS also encompasses bottom-up efforts at knowledge co-creation and sharing in addition to farm-based innovation among primary producers, and the facilitation thereof by a range of ‘knowledge brokers’ (Cristóvão et al., 2012). In spite of the gradual broadening of functions of AKIS, and with that of the range of actors and knowledge flows implied, a definition of the early 1990s still captures the systems’ quintessence: the AKIS concept denotes a *“set of organizations or individuals in agriculture and the links and interactions between them that are involved in creating, transforming, transmitting, preserving, reusing, integrating, disseminating and exploiting knowledge and information for synergies to support decision-making, problem-solving and innovation in agriculture”* (Röling & Engel, 1991).

The increasing sophistication of AKIS has contributed to economic prosperity by ensuring higher and more stable yields (focus productivity). However, despite these advancements, persistent criticism of current AKIS remains. In 2012, the European Union’s Standing Committee on Agricultural Research (SCAR) highlighted concerns about the link between knowledge creation and innovation, emphasising the need to reassess it in light of the mounting challenges facing the agri-food and rural sectors. Mandated by the European Council to coordinate agricultural research across the European Research Area (ERA), it was observed that agricultural knowledge systems in Europe were, as Poppe observed in the Introduction to a 2012 SCAR reflection paper, *“unable to absorb and internalize the fundamental structural and systemic shifts that have occurred.”* They noted that publicly funded AKIS remained locked into outdated paradigms based on linear approaches and conventional assumptions (European Commission: DG RTD, 2012, p. 15). In other words, the AKIS works mostly towards an increasing optimisation of the existing food system. The K&I systems were observed to fail in shifting along with the pressing need to disrupt rather than optimise the current state of affairs, and to transform food system institutions and practices that are deeply ingrained in capitalist logics of economic efficiency optimisation and profit maximisation towards a system geared at just and sustainable food production, retail and consumption (Feola, 2025; Spaargaren et al., 2013).

Nearly a decade and a half ago, the SCAR’s critical report acted as a wake-up call, amplifying alternative perspectives and accelerating their prominence in policy discussions. In addition, it was at the heart of initiating and funding a whole array of new, transformation-oriented efforts. Among these are a range of EU-funded research programmes for boosting just and sustainable food system change. The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) was established with the aims to accelerate innovation in agriculture, forestry, and rural development, creating synergies between EU and Member State policy programs (European Commission: DG AGRI, 2018). Its ‘interactive innovation model’ promotes collaboration among various actors to co-create and implement practical solutions (EIP-AGRI SP, 2017). EIP-AGRI projects, funded by Horizon 2020 or Rural Development Programmes (RDP), address real problems faced by farmers and foresters using a ‘multi-actor approach’ (EIP-AGRI SP, 2017). This approach involves government, industry, academia, and civil participants working together to drive structural changes (Carayannis & Campbell, 2009). The Quadruple Helix approach is also part of the EU’s smart specialization strategies (RIS3). EIP AGRI is instrumental for emphasizing the role of innovation advisors and intermediaries.

Thus, the research-advisor-farmer axis remains dominant in AKIS (Fieldsend et al., 2021), including in recent projects such as I2Connect and ModernAKIS. Projects like IoF2020 and Smart AgriHubs highlight the social and technical challenges of introducing ICT in food chains (Wolfert et al., 2017).

Conceptual limitations in the EIP-AGRI model include the exclusive use of 'projects' with fixed schedules and budgets, excluding other co-innovation partnerships like networks and clusters (Knierim et al., 2015). Additionally, there is a focus on translating public sector research into practical applications, while private sector knowledge sharing is also crucial (Fieldsend et al., 2021). A practical concern that the EIP-AGRI faces is the challenge in engaging harder-to-reach user groups and ensuring suitability across all EU regions. During the 2014–2020 period, most Operational Groups (OGs) were planned for Western EU Member States.

Still, the “redefinition of AKIS” that the EU SCAR (2012) report pleaded for has been slow to materialise. Despite significant developments in AKIS over recent decades, many of the original criticisms persist—some even more strongly than before. Fresco et al. (2021) challenge the fitness of the AKIS overall, noting a strong focus on traditional agriculture and forestry knowledge, and the underexposed role of research and education as intermediaries. The multi-actor approach, while supporting co-innovation, can be time-consuming and risk losing focus. AKIS systems are crucial for developing food knowledge and innovation systems, but more work is needed to connect different types of knowledge and linkages among knowledge, innovation, and practical implementation. In 2020, expert groups advising the EU on food system innovation emphasised the urgent need for a fundamental reorientation of research and innovation towards transformative food system outcomes (EU SCAR, 2020). The policy framework Food 2030 Research and Innovation Pathways for action 2.0 also calls for an improved governance of knowledge and innovation to accelerate the transformation towards green and resilient food systems (European Commission: DG RTD, 2023). It is stated that, building further on successful innovations in organisation and networking under the SCAR Food Systems Strategic Working Group and projects such as Fit4Food2030 and SUSFANS, EU policy must now shift towards embedding research and innovation more effectively in both practice and policymaking. This requires engaging actors across the entire European food system with new research and innovation approaches that ensure meaningful, systemic change. It also demands looking at the whole food system and not only towards the role of agriculture (Cuhls et al., 2024a).

1.2 The role of policy and governance in moving towards an improved KIS

While AKIS has many strengths and merits, addressing its shortcomings represents more than a technical adjustment. Rather, this involves a fundamental transformation in how knowledge and innovation in food systems are currently being governed. The challenge of reorientating research and innovation towards transformative food system outcomes (European Commission: DG RTD, 2021) is not merely about expanding the scope of knowledge systems beyond agriculture. It requires confronting the structural and institutional barriers that have historically shaped the way research, innovation, and policymaking function and which influence actions that stakeholders can (collectively) employ in the food systems. Understanding the governance and policy dimensions of this transition is therefore crucial, as they determine both the feasibility and direction of change.

The concept of governance concerns the ways in which public issues are governed by both public and private actors through formal and informal ways of steering (Rhodes, 1996; Stoker, 1998). In this report, we have defined governance as “the many ways in which public and private actors from the state, market, academia and/or civil society govern public issues at multiple scales, autonomously or in mutual interaction” (definition

based on Visseren-Hamakers et al., 2021). We specifically focus on governance of K&I in food systems, aiming to understand in what way and towards what ends different stakeholders are involved in creation and implementation of food systems K&I (Giesbers et al., 2023). We define policymaking as both a technical and political process of articulating and matching actors' goals and means. As Howlett and Cashore (2014) describe, policies are political actions that contain goals and the means to achieve them, whether these are well or poorly identified, justified, articulated, or formulated. The technical aspect of policymaking involves the systematic analysis of problems, the evaluation of policy tools, while implementation is shaped by political, institutional, and administrative dynamics. Meanwhile, the political aspect reflects the influence of competing interests, power dynamics, and negotiation among stakeholders in shaping policy choices. Together, these dimensions determine how policies are designed, legitimised, and enacted within governance systems. In combining these two definitions we understand policy and governance as the way in which a diverse and wide representation of stakeholders work together or separately in or on multiple scales, to articulate and match their goals and the means to achieve these.

Currently, the policy environment around food systems remains fragmented, with different governance levels (EU, national, regional, local) and policy departments on these levels often pursuing disconnected or even conflicting objectives, making coordinated transformation efforts difficult (Klerkx & Begemann, 2020; Oliver et al., 2018). Policymaking in food and agriculture remains mostly reactive (Klerkx & Begemann, 2020), responding to crises rather than providing a mission-orientation towards transformative outcomes and long-term sustainability goals and desired futures (Cuhls et al., 2024a).

The challenges of reorienting K&I for food systems requires not only new policies but also new modes of governance. Existing governance models often struggle to navigate complexity, foster collaboration and enable adaptive learning (Ciaccia et al., 2021; den Boer et al., 2021; Leeuwis et al., 2021; Schot & Steinmueller, 2018), support mutual learning or direct necessary knowledge to those actors who need it. Moreover, the governance of K&I in food systems is deeply intertwined with power dynamics that shape whose knowledge is valued and whose interests are prioritised. Historically, this has privileged formal, scientific, and technical expertise over local, practical experiential, and indigenous knowledge (Hebinck, Klerkx, et al., 2021). This has reinforced hierarchies that marginalise certain actors – such as small-scale farmers, food sovereignty movements, agroecological initiatives and socio-economically disadvantaged groups – while favoring dominant agribusiness and research institutions (Anderson & Leach, 2019). Studying governance in this context thus involves unpacking how decision-making processes, funding structures, and institutional incentives influence which pathways of innovation are promoted and which are sidelined (Spaargaren et al., 2011; Vignola & Oosterveer, 2025).

The urgency of food system transformation has been widely acknowledged in EU policy frameworks such as Food 2030 and the Farm to Fork Strategy (European Commission, 2020). Yet, the persistent challenge remains: *how can governance structures evolve to facilitate not just incremental improvements but systemic change?* How can policies be designed to bridge the gap between knowledge production and practical implementation? *And crucially, how can governance arrangements be made more democratic, ensuring that a plurality of voices and knowledge systems contribute to shaping the future of food and agriculture?* These are not just technical questions but deeply political ones, underscoring the need for critical examination of the governance and policy dimensions of KIS (knowledge and information systems) for food systems.

1.3 Introduction of the FOSTER project

FOSTER is an ambitious Horizon Europe-funded project that will build food system capabilities, knowledge and new governance mechanisms for scientists, citizens and policymakers. The vision of FOSTER is to build a foundation from which a new K&I governance structure for Europe's food system can emerge. We call this

envisioned K&I system FOKIS, a Food Systems Knowledge and Innovation System. With the concept of FOKIS, FOSTER aims to explore what key guiding principles are important for developing a knowledge and innovation system for food system transformation.

The motivation for FOSTER's research is the hypothesis that knowledge co-creation and sharing linked with better collaboration of practitioners, researchers, policy makers, administrators, business and citizens in innovation, will drive the transition to a more sustainable food system at various scales. Many changes in the system need more speed so that the collaboration at the right time may drive the acceleration of necessary transformations. FOKIS can play an important role in this.

1.3.1 Working with change-driven initiatives

FOSTER adopts a multi-actor approach, bringing together academia, citizen initiatives, innovation advisors, and advocacy groups—collectively referred to as Change-Driven Initiatives (CDIs). These initiatives act as intermediaries and knowledge brokers, connecting researchers with different stakeholders and underrepresented communities². While not necessarily citizen-led, they drive food system innovation at local, regional, and national levels. Below is an overview of the CDIs involved in FOSTER:

- **Germany – Ernährungsrat StadtRegion Stuttgart (ERS)**

Established in 2021, ERS fosters interdisciplinary collaboration to transform food systems. It promotes regional and ecological food, sustainable local supply chains, food democracy, climate-friendly diets, and urban gardening. ERS also supports the local bioeconomy, regenerative agriculture, and community food initiatives.

- **Hungary – Pannonian Local Product Nonprofit Ltd. (PLP)**

PLP strengthens rural communities by connecting farmers, local governments, civic organisations, and consumers. Through direct relationships, it builds trust between food system actors, supports local economies, and enhances rural livelihoods.

- **Serbia – Delta Foundation & BioSense Institute**

The Delta Foundation educates farmers on modern agricultural techniques, fostering a resilient food system through innovation. Partnering with BioSense, a leader in digital solutions for agriculture, they develop smart technologies to optimise farming efficiency and sustainability in Serbia and beyond.

- **Spain – Living Lab for Health at Irsicaixa & FabLab Barcelona**

The Living Lab for Health at IrsiCaixa promotes healthy, sustainable diets in vulnerable communities through systemic, collaborative food system innovation. FabLab Barcelona provides digital fabrication tools and skills training, empowering local communities and fostering entrepreneurship, inclusion, and creativity.

- **The Netherlands – Food Transition Coalition (TcV)**

² Please see chapter 3 for an explanation of underrepresented communities.

TcV unites Dutch leaders in agriculture, food, nature, and health to accelerate systemic change. It champions sustainability, transparency, fair pricing, and a multidimensional value approach to replace outdated European food paradigms with a vision of "a healthy life on a healthy planet for all."

FOSTER WP4

FOSTER Work Package (WP) 4 focuses on promoting and understanding the changes needed in policy and governance of food systems, encouraging collaboration between researchers, citizens, NGOs and policymakers. This WP responds to the call for promoting and understanding transformation and for engagement of academia and other stakeholders in K&I by supplying methods that allow policy makers to promote transformations in practice. To truly strengthen the link between science and policy, we must go beyond simply sharing research findings. We need to review, explore, and test how knowledge and innovation can drive meaningful changes in food systems. By doing this, FOSTER WP4 will help building a stronger EU science-policy-practice interface, clarify the role of policymakers in research and innovation, and explore better governance options to foster food system innovation and transformation.

Policymakers play a key role in driving transitions because their decisions and procedures guide stakeholders' actions and can either enable or block changes in the system (Pitt and Jones, 2016). To support K&I for food systems, the European Research Area (ERA) should help researchers, citizens, NGOs, businesses, and policymakers in contributing to create sustainable food systems by improving the connection between science, policy, and practice. WP4 works with policymakers, citizens, and academia to discuss how K&I policies can strengthen these connections, using the connection as key leverage points to drive food system transformation.

1.4 Research objectives

The FOSTER project aims to develop a base for a FOKIS that goes beyond the current AKIS. Approaching the K&I system as a knowledge network, we emphasise that fostering societal transformations requires a combined effort of diverse actors within and outside of formal boundaries through networked forms of governance, linking scientific progress with social innovations and shifts in policy (see also den Boer et al. 2021; Hebinck et al. 2021a; Sonnino, 2023). To promote and strengthen interfaces between knowledge and innovation, policy and practitioners in the food system, FOSTER WP4 wishes to identify:

- Institutional and systemic barriers for CDIs and knowledge organisations in promoting food systems transformation.
- Constraints or opportunities for knowledge institutions and CDIs in exchanging knowledge.
- Policy options which support CDIs, grassroots organisations and other food system stakeholders to further their objectives in enacting food system change.

In the above context, this project deliverable (Deliverable 4.1) serves three key purposes.

First, we document and synthesise the work on various research tasks conducted in WP4 of the FOSTER project, integrating this work into a foundation for working towards FOKIS through adapting policy and governance. By combining key lessons learnt from different project activities, this report produces an overview of ingredients that are relevant for FOKIS, for research purposes as well as for the exchange with various stakeholders in the field.

Second, this deliverable aims to support policymakers by clarifying which stakeholders warrant their attention and in what ways these stakeholders can or should be mobilised or engaged with. The report equips policy makers with a foundational set of governance ingredients to work towards FOKIS, integrating the results of various project activities. It also documents key insights from the FOSTER CDIs on barriers that should be addressed in future Knowledge & Innovation (K&I) policy.

Third it provides the CDIs with a consolidated reference that brings together the collective work they have contributed to in FOSTER. This will help them better understand their role in improving food system governance, strengthen their awareness of their network, and contextualise the policy landscape they navigate. By laying this groundwork, the document supports the development of targeted actions and strategies for bottom-up improvements to the food system.

1.5 Methods and approaches

In this deliverable, a variety of methods has been utilised for collecting and analysing data, each of which will be discussed in more detail in the respective chapter. Shortly summarizing, we have undertaken two literature reviews for chapter 2 (structured literature review) and chapter 3 (integrative review of literature). These literature reviews identified a selection of the most relevant and up to date literature regarding their specific topics. The literature review in chapter 3 is supplemented with insights from a workshop with CDI representatives, foster researchers, academic partners and external experts. In chapter 4 we conducted a policy analysis via an informal literature review gathering information on the background policies and frameworks relevant to the topic. Other information was gathered via the WP4 expert panel. The data for chapter 5 was collected through interaction with the five FOSTER CDIs, involving meetings and workshops. In a second step an excel based “stakeholder tool” was developed and applied for gathering information about CDIs’ network environments.

1.6 Reading guide

As a foundation for the empirical work presented in this report, Chapter 2 starts with a structured review of literature. This review aims to synthesize key insights on governance and policy around K&I for food systems transformation. It identifies strengths, gaps, and lessons learned in other European projects and studies, providing a point of departure for the further empirical work in this report and also for concrete recommendations on promoting FOKIS. In chapter 3, an integrative study of literature is conducted to examine the inclusion of structurally excluded knowledge holders in food system governance. This chapter identifies underrepresented knowledge types, analyses best practices for inclusion, and critically assesses debates on exclusion, contributing to a more inclusive FOKIS framework for sustainable and just food system transitions. Chapter 4 provides an analysis of European policy related to food systems K&I, exploring the need for a broader, more inclusive K&I governance structure (FOKIS) beyond traditional R&I policies. It summarises the main EU-policy programmes and examines challenges which CDIs face in navigating EU policies. Chapter 5 zooms in on the five FOSTER CDIs and their networks, analysing information flows, key actors, and knowledge dynamics. The findings from this chapter are used to inform strategies for strengthening CDIs’ connections, influence, and participation in food system governance. To conclude this deliverable, Chapter 6 summarises and integrates the main findings from the individual chapters, lists ingredients for a FOKIS, and provides a critical reflection on the work presented in this report.



Chapter 2

Bottom-up identification of improved K&I governance mechanisms to support food system change

Chapter 2 – Bottom-up identification of improved K&I governance mechanisms to support food system change

2. Synthesis on the role of K&I

The transformation of food systems towards more sustainable, equitable, and resilient models is a pressing challenge that requires coordinated efforts in governance, policy, and knowledge and innovation (den Boer et al., 2021; Hebinck, Klerkx, et al., 2021; Ruben et al., 2019). Across academic and policy discussions, it is widely recognised that K&I policies and associated governance mechanisms play an important role in steering this transformation (Ciaccia et al., 2021; Gaupp et al., 2021). Existing research has explored various aspects of governance and policy in food system transformations, occasionally also highlighting the role that K&I can play in these processes. While valuable insights exist, a structured review of the literature is necessary to synthesise key lessons and identify concrete recommendations for advancing governance frameworks that support transformation. Such an analysis is particularly relevant for FOSTER WP4 in providing recommendations for FOKIS.

2.1 Structured review of literature

A structured review of literature (Snyder, 2019) was conducted to learn from key findings and recommendations in other research projects and academic debates. By analysing key findings from existing research, this chapter aims to identify the strengths and shortcomings of current governance arrangements, extract lessons learned, and provide recommendations for designing a more effective FOKIS. This work serves as a foundational step in shaping governance strategies that can drive meaningful and lasting change in food systems.

The main questions guiding this exercise are as follows:

- How do K&I policies and governance arrangements shape agricultural and food research in the context of food system transformation?
- What shortcomings and recommendations are identified in relation to the current European KIS for food systems?
- What lessons and recommendations can be drawn from the literature for the purpose of defining and promoting FOKIS?

For this review, recent cross-cutting literature (2018-2024) was collected which combines a focus on food systems with a focus on governance and policy (for more details on the methodology, see Giesbers et al., 2023). Initially, 101 articles were collected through a query combining several relevant keywords, and this list was later narrowed down to 40 key articles. The key points from these articles were summarised in an Excel-file and clustered to summarise the main topics of discussion. In a second round of analysis for the writing of the current deliverable, the articles were reassessed with a specific focus on recommendations and changes considered necessary to move from an AKIS to a FOKIS. The literature cited in section 3.2 below was collected during the review process (see also Giesbers et al., 2023).

2.2 Overview of the literature

Most of the literature that was collected departs from the understanding that food systems face significant challenges. These include various inequities, environmental degradation, and unsustainable practices. Transforming current food systems into more sustainable, equitable, and resilient systems is an urgent task, but literature highlights how steering such a transformation is incredibly complex and has many implications for governance and policy (Ciaccia et al., 2021; Ruben et al., 2019). The important role of knowledge and innovation – and related policies and governance approaches – in promoting this transformation is stressed by many authors (e.g., Bronzwaer et al., 2022; den Boer et al., 2021).

Addressing the challenge of transforming to more equitable and sustainable food systems requires a rethinking of governance and policy for knowledge and innovation. This calls for inclusive, transdisciplinary collaboration, mission-oriented policies, and active stakeholder participation and collaboration to promote meaningful change (den Boer et al., 2021; Gaupp et al., 2021; Klerkx & Begemann, 2020). Various publications highlight how societal change is not only driven directly by public institutions. While policy and policy makers are important, many stakeholders potentially play a role and their involvement in policy as well as in practice is seen as important or even necessary for achieving systemic change across the food system (Dijkshoorn-Dekker et al., 2020; Hölscher et al., 2019; Kern & Rogge, 2018; Ruben et al., 2021).

2.2.1 Integration and alignment of policy and governance

Achieving sustainable and equitable food systems requires an integrated approach that addresses systemic challenges, fosters inclusivity, and drives transformative change. Food governance includes many modes of governing by various actors across domains, who are included in multiple formal and informal arrangements (Moragues-Faus, 2020). Mission-oriented strategies play a key role in guiding transitions (Gaupp et al., 2021) and transformation requires adaptability and ongoing stakeholder engagement to navigate the complexities of food systems (Dijkshoorn-Dekker et al., 2020). Reflexivity amongst these stakeholders is critical throughout, encouraging continuous evaluation of assumptions, power structures, and practices to ensure transitions are and remain just and effective (Huttunen et al., 2022).

This demands looking at the relations between (parts) of the food system as well as between the food system and other systems to tackle challenges in a holistic way (Moragues-Faus, 2020). Governance plays a central role, demanding structures that connect spatial scales like local, regional and national scales, and policy domains while ensuring horizontal collaboration among diverse stakeholders (Jani et al., 2022). Engaging citizens and diverse stakeholders are considered crucial for achieving effective 'good governance'. However, conflicting stakeholder interests and persistent inequities within food systems present significant challenges, often requiring solutions that operate across spatial scales (Hebinck, Klerkx, et al., 2021). Effective good governance must also navigate power imbalances and prioritise equity, acknowledging the growing role of non-governmental actors like food councils and grassroots networks in driving change (Moragues-Faus, 2020). Various scholars therefore advertise for a re-orientation of research and policy towards a more polycentric and plurivocal view of governance that addresses the role of a wide range of stakeholders on various spatial scales (Sonnino, 2023), recognises regional diversities (Dengerink et al., 2021) as well as the diversity of practices and associated governance arrangements (Vincent & Feola, 2020).

2.2.2 Broadening knowledge scope and transdisciplinarity

To support the above-mentioned integration, strengthening interfaces between science, policy, and practice is seen as crucial (e.g., Bronzwaer et al., 2022). Transdisciplinary approaches foster co-learning and collaboration across sectors, promoting a shared understanding of food systems and identifying leverage points for change (Anderson & Leach, 2019). Linking academic research with local, experiential, and traditional knowledge promotes solutions that are more likely to be used by various stakeholders (Hebinck, Klerkx, et al.,

2021) and which are also better tailored to the local context and understanding of stakeholders (Kern & Rogge, 2018). Transdisciplinarity requires crossing the boundary from academia to the lived experience of society, which offers an opportunity to broaden the knowledge scope through various forms of citizen science. Citizen science can also contribute important knowledge as well as promote civic engagement and the capabilities of citizens.

Transdisciplinary approaches play a crucial role in identifying leverage points for systemic change, allowing for adaptive strategies that respond to evolving contexts and stakeholder needs. Yet, current K&I systems largely fail to respond to the need for a food system transformation because they do not support transdisciplinarity. Institutional and structural challenges within K&I systems, such as rigid funding mechanisms or siloed disciplinary frameworks hinder the development and application of (longstanding) collaboration and transdisciplinary ways of working (den Boer et al., 2021).

The plea of various authors for broadening the scope of knowledge in food systems K&I does not only relate to transdisciplinarity and creating interfaces between science, policy and practice. The importance of interdisciplinary collaboration across sectors – such as agriculture, health, and environment – to address the interconnected challenges within food systems (Anderson & Leach, 2019) and to build holistic solutions that align with broader sustainability goals (Hebinck, Zurek, et al., 2021) is also stressed. This includes the overcoming of policy silo's (Bronzwaer et al., 2022).

2.2.3 Justice, equity and food democracy

Injustice, inequity, and dynamics of exclusion are embedded throughout agri-food systems, and the majority of change-processes in food systems overlook aspects of justice. As a result, injustices are exacerbated or reproduced or sustainability transitions that marginalise certain groups of people are pursued (Hebinck et al. 2021). A large part of the collected literature stresses the importance of people-centred approaches as part of the intended transformation for our future food systems. This includes promoting good governance (Anderson & Leach, 2019; Knickel et al., 2018), inclusivity (Anderson & Leach, 2019; Knickel et al., 2018), inclusivity (Dengerink et al., 2021; Gaupp et al., 2021; Ruben et al., 2021), justice (Huttunen et al., 2022; López-García & González de Molina, 2021; Moragues-Faus, 2020) and equity (Baker et al., 2021; Béné, 2022; Nicol & Taherzadeh, 2020). Without working towards such principles, efforts to address systemic challenges risk perpetuating existing inequalities (Huttunen et al., 2022; Nicol & Taherzadeh, 2020).

Inclusivity extends to the integration of various knowledge systems, blending academic insights with local and experiential knowledge to create solutions that resonate across contexts. Building on the need for policy alignment and broadening the knowledge scope for promoting food systems transformation, it thus becomes evident that systemic change requires addressing power imbalances, inclusivity, and fairness at every level (Hebinck, Klerkx, et al., 2021; Nicol & Taherzadeh, 2020). Effective and just governance must integrate diverse knowledge forms while amplifying the voices of marginalised groups, creating a more equitable foundation for action (Anderson & Leach, 2019; Gaupp et al., 2021). By promoting transdisciplinary approaches prioritising justice, equity and the active participation of all stakeholders, transformative change can be promoted that benefits both people and the planet (den Boer et al., 2021; Hebinck, Klerkx, et al., 2021). Three types of justice are important (Huttunen et al., 2022): 1) Distributive justice - justice in allocation of resources and harms & benefits; 2) Recognitive justice – respecting and valuing different people and their needs; 3) Procedural justice - in- and exclusion in procedures, and the capacity of people to influence decisions.

The concept of food democracy emphasises the active participation of all stakeholders, particularly marginalised groups, in shaping equitable and sustainable food systems (Sieveking, 2019). It underscores the need for transparent, inclusive decision-making processes where diverse voices are not only heard but hold genuine influence (Köhler et al., 2019). Strengthening food democracy involves fostering grassroots engagement, supporting local initiatives, and addressing systemic power imbalances that limit equitable access to resources and opportunities. By embedding food democracy into formal governance structures and

policies, food systems can better reflect shared values, ensure justice, and empower communities to drive meaningful transformation toward sustainability.

2.2.4 Collaboration and network building

Building resilient and equitable food systems hinges on collaboration and the creation of robust networks to address food systems from an integral perspective. This is needed to address their complexity (Hölscher et al., 2019). Effective transformation in this complex context requires diverse stakeholders – including amongst others policymakers, producers, researchers, civil society organisations, and citizens – to co-create solutions and collectively scale niche innovations into broader systemic changes (Anderson & Leach, 2019; Clark et al., 2021; Ruben et al., 2021).

Strong partnerships and cross-sectoral engagement encourage the integration of diverse perspectives and knowledge systems, leading to innovative and context-sensitive solutions (Anderson & Leach, 2019; Hebinck, Klerkx, et al., 2021; Sonnino, 2023). By fostering trust and collaboration across these networks, food systems can better address present and future challenges, paving the way for sustainable, just, and adaptive governance. Kivimaa, Hyysalo, et al. (2019) and Kivimaa, Boon, et al. (2019) highlight the important role of intermediaries in transitions, promoting capacity building, knowledge brokering and accelerating the speed of transformations through their mobilisation of various stakeholders. They argue that the supporting of such organisations is key in transformation.

Reflexivity plays a critical role by promoting continuous evaluation of practices, policies, and power structures, helping to maintain the equity, relevance, and adaptability of transition efforts (Hebinck, Zurek, et al., 2021). Adaptive learning processes, driven by transdisciplinary collaborations, allow stakeholders to refine strategies and frameworks iteratively, responding to emerging challenges and shifting dynamics in food systems (den Boer et al., 2021). By aligning governance, inclusivity, knowledge integration, and mission-driven action, food systems can evolve to meet the needs of people and the planet, creating resilient structures that address current challenges while safeguarding resources and equity for future generations.

2.3 Ingredients for a FOKIS

In the following section we look at the implication of the findings from our literature review for FOSTER WP4. We have clustered the main insights, recommendations, and options for improving the governance of the food system into what we call ingredients for a FOKIS. These ingredients belong to four themes reflecting the four sections of section 3.2: ‘2.2.1 Integration and alignment of policy and governance’, ‘2.2.2 Broadening knowledge scope and transdisciplinarity’, ‘2.2.3 Justice, equity and food democracy’, and ‘2.2.4 Collaboration and network building’. Table 1 below provides an overview, presenting the ingredients and relating them to current issues faced by the food system and expected outcomes of incorporating this ingredient into FOKIS. Following the table, we take a deeper look into the meaning behind the ingredients and how these can be operationalised.

Table 2: Overview of FOKIS ingredients following from the literature review

Theme	Current issue	Ingredient	Expected outcomes
Policy Integration and alignment	Policies and frameworks have aims that lead to different outcomes	Mission orientation/future orientation of the KIS	Better alignment of policies, frameworks, and tools to reach a common goal and promote transformation
	The goals of food system actors do not align with current policies. There is misalignment between policies on different levels of scale.	Vertical and horizontal alignment across policy domains and KIS	Align ideas and knowledge flows better so that stakeholders can work closer together to achieve their aims
	Decisions are made and carried out but there is limited ability and attention to evaluate whether the decisions are leading to desired outcomes	Reflexive learning in the KIS	Ability to change course to avoid unwanted transformations or side-effects and stay on track
Broadening of the knowledge scope of KIS	Ideas and innovations are slow to develop and disseminate due to limited interaction between various knowledge types and knowledge holders	Transdisciplinary approaches for breaking knowledge siloes	More integrated solutions to problems. Greater pool of knowledge to inform decision-makers
	Industry led thinking dominates discussions in the food system and smaller stakeholders do not have an opportunity to share their knowledge	Support and provide space for alternative practices and diversity of knowledge	New solutions and ways of thinking Greater input from minority groups and those not represented in the current system
	Current dominating stakeholders fail to address the core problems leading to undesired food system outcomes	Understanding of different stakeholder perspectives	Better insight into the cause of issues and how to address them

	The current system is not sufficiently engaging and utilising urban stakeholders, spaces and knowledge, therefore limiting solutions	Increased focus on the role of urban areas	Broader involvement of society in the food system. Access to resources and skills not in rural areas
Justice and food democracy	The current unequal power distribution keeps the system locked-in to its current functioning and prevents real transformative change	Addressing unequal power distributions	Greater representation of actors in the food system who can elevate and improve the welfare of disadvantaged groups and lead to a just and equitable transformation.
	Underrepresented and minority groups are not in a position to make decisions and to influence change	Fair and equitable representation of minority and underrepresented groups	Solutions and decisions are more effective as they are influenced by those at the focal point of issues
Collaboration and network building	Decisions made by a small number of powerful actors which prevents new ideas and solutions from emerging	Increased deliberation on decision making	New knowledge and solutions can emerge as previously siloed actors can now collaborate
	Actors with opposing views cannot communicate effectively and therefore common solutions do not emerge	Strengthen the involvement of intermediaries in collaboration	A shared understanding of an issue makes it easier to communicate and collaborate with all stakeholders even if they have different views to each other.
	Actors who wish to participate in the governance of the system do not have adequate resources to do so	Building capacities of stakeholders to make them better change agents	Underrepresented stakeholders will have more say in decision making and can contribute to creating better food system outcomes

2.3.1 Elaboration on the ingredients necessary to move from an AKIS to a FOKIS

The ingredients which we have identified in the table above arise from common identified barriers and solutions spread amongst all the literature we reviewed. These ingredients – as we name them – are supposed to help overcoming problems with our current K&I system and point towards what can be considered as desirable for the future food systems (see also Cuhls et al., 2024a; Cuhls et al., 2024b). Below we discuss these ingredients clustered into four different themes: 0 2.2.1 Integration and alignment of policy and governance, 0 2.2.2 Broadening knowledge scope and transdisciplinarity, 0 2.2.3 Justice, equity and food democracy, and 0 2.2.4 Collaboration and network building. Using articles collected in our structured review of literature, we will now explore more closely how these ingredients are relevant for FOKIS.

2.3.2 Policy integration and alignment

- **Mission orientation/Future orientation of the KIS:** policy is key for steering transitions. In order for this policy to be effective, models and instruments such as foresight tools, mission-orientation and sustainability indicators should be implemented. This helps to align policies and frameworks to work towards a joint goal for the future (Hebinck, Zurek, et al., 2021; Kern & Rogge, 2018; Klerkx & Begemann, 2020; Vincent & Feola, 2020). If this mission and future-oriented is not included, policy is likely to retain a fragmented, short-term focus limiting its transformative potential (Gaupp et al. 2021).
- **Vertical and horizontal alignment of K&I systems:** This ingredient points to the necessity of interventions and K&I policies to be connected. This includes vertical connections from grassroot actors to policy makers on different spatial scales. It also includes horizontally aligning policies, so they complement each other across sectors. In this manner, K&I systems become more effective at multilevel interventions and can inform integrated food policies (den Boer et al., 2021; Grillitsch et al., 2019; Puupponen et al., 2023). This is crucial for having a transdisciplinary approach and understanding the most pressing food systems challenges (Dengerink et al., 2021; Köhler et al., 2019).
- **Reflexive learning in the KIS:** policy makers should continuously reflect to ensure that the (policy) choices that are made are leading us down path towards a desired future. Transformation requires adaptability and ongoing stakeholder engagement to keep agendas aligned in the complex food systems context (Dijkshoorn-Dekker et al., 2020). Transitions are turbulent processes where power shifts and changing positions are to be expected and potentially need to be acted upon. In this context, participation and governance in a FOKIS are able to provide space for learning, reflection and adaptation (Huttunen et al., 2022; Ruben et al., 2019).

2.3.4 Broadening the knowledge scope of a KIS

- **Transdisciplinary approaches and breaking down siloes:** literature highlights that EU agencies and other governing bodies need to reassess how they work together with various stakeholders and incorporate different types of knowledge. The current K&I landscape is mostly working in siloes on niche problems. Funding structures are not harmonised and disproportionately focus on production processes and food security (den Boer et al. 2021). Future academic research should be better linked with local, experiential, and traditional knowledge. In this way, research findings are more likely to be used in practice (Hebinck, Klerkx, et al., 2021) and better tailored to the local context and understanding of stakeholders (Kern & Rogge, 2018).

- **Support and space for alternative practices and diversity:** industry and production-oriented thinking dominates a lot of current discussions on (the future of) our food systems, leaving out for instance agro-ecological approaches (Ciaccia et al., 2021). New approaches coming from niches often have difficulties to be seen, to be spread or used in a broad way (Köhler et al., 2019). Space for alternative practices and diversification can create room for more just and sustainable approaches and empower stakeholders to promote change. Clark et al. (2021) talk about governance spaces for underrepresented actors to work towards outcomes which further their own aims. This process works to further the food sovereignty paradigm by grounding transformative change in the actions of mobilised and empowered social actors working outside the existing system (Baker et al., 2021; Bui et al., 2019).
- **Understanding of different stakeholder perspectives:** big societal problems cannot be solved by a concentrated group of actors that reflect only part of those who have a stake. In order to understand the complexity of an issue, all relevant stakeholders need to contribute what they perceive as the most pressing food system challenge (Dengerink et al., 2021). A common understanding of pressing issues is need to create shared visions, equal distributions of power and concrete and actionable objectives (Grillitsch et al., 2019). Therefore, participation should be promoted through different governance structures for example, alternative food networks, food councils and food sovereignty movements (Hebinck, Klerkx, et al., 2021).
- **Increased focus on the role of urban areas:** Many of the current food system challenges arise from urban settings. Socio-economic conditions of people and environmental circumstances often exacerbate in highly-populated regions. Inclusion of stakeholders from these areas is key to finding solutions and accelerating the transition (Dijkshoorn-Dekker et al., 2020; Sonnino & Milbourne, 2022). The current AKIS and governance structures can be improved in how they respond to these challenges by developing a collective agency and policy entrepreneurship among stakeholders and communities in urban environments (Giambartolomei et al., 2021). This means creating place sensitive narratives which different actors can align around and facilitate grassroots stakeholders to develop solutions which respond to the local situation and interest of local communities.

2.3.5 Justice and food democracy

- **Addressing unequal power distributions:** this ingredient relates to the understanding that large companies and powerful governmental institutions exert an unbalanced amount of power which allows them to steer the current food systems and their outcomes to match their own interests (Béné, 2022). FOKIS needs to move beyond single-scale and sector perspectives towards more inclusive and integrated analyses of food system dynamics (Anderson & Leach, 2019; Hebinck, Klerkx, et al., 2021) and promote a more equal distribution of power amongst those who have a stake in our future food systems.
- **Fair and equitable representation of minority and underrepresented groups:** this requires that we need to do more than simply create multistakeholder deliberation processes. Often participation is not enough and more attention is needed to change decision-making structures. This includes creating more inclusive approaches to participation in decision-making processes which champions distributive justice, recognitive justice and procedural justice (Huttunen et al., 2022). In order to achieve this, an intersectional perspective across sectors of the food system is needed to promote food justice and an examination of the political dimensions of justice (Moragues-Faus, 2020).

2.3.6 Collaboration and network building

- **Increased deliberation on decision making:** several studies stress that more parts of society need to be involved in solving complex issues in order to have more effective and just decisions (Clark et al., 2021; den Boer et al., 2021; Grillitsch et al., 2019). The fostering of new social relations, promoting skills of stakeholders and creating new collaborations can improve decision making through strengthening deliberation (Hölscher et al., 2019). A FOKIS should therefore promote new stakeholder networks and joint learning in these networks to provide opportunities to stakeholders to carry out their transformative actions and increase the quality of decision making. This addresses the need of thinking creatively and finding unconventional solutions to achieving the food system transition (Knickel et al., 2018).
- **Strengthen the involvement of intermediaries in collaboration:** some societal groups and scientists have predominantly acted as only observers, but they have a bigger role to play as change agents, communicators and facilitators to involve more stakeholders (den Boer et al., 2021). In addition, new intermediaries (like FOSTERS CDIs) have a role in different phases of a transition. Without involvement of intermediaries, acceleration of transformations is seen as unlikely (Kivimaa, Boon, et al., 2019; Kivimaa, Hyysalo, et al., 2019).
- **Building capacities of stakeholders to make them better change agents:** underrepresented and marginalised stakeholders should not just be present to achieve one-time tasks. Rather, it is argued that they need to play a meaningful role in the ongoing governance of food systems transformation (Clark et al., 2021). This requires building their capacities through education, funding, and investments (Gaupp et al., 2021) and whatever else these stakeholders deem necessary to empower them to make choices and transform these choices into desired actions (Hölscher et al., 2019).

2.4 Operationalisation of the ingredients for a FOKIS

FOKIS requires a fundamental shift in how knowledge and innovation systems are currently structured and governed. The structured literature review which has been conducted in this chapter identifies shortcomings of the current KIS for food systems. It also names ingredients which can help to improve it. These ingredients emphasise the necessity of integrating policy frameworks, broadening the scope of knowledge, fostering justice and food democracy, and strengthening collaborative networks. Together, these ingredients support a more integrated, effective and inclusive approach to food system transformation.

A key takeaway from the review is that isolated, sectoral and short-term interventions will not be sufficient to achieve food systems transformation. Instead, systemic change requires a dynamic and adaptive governance structure that continuously engages with diverse stakeholders, encourages reflexive learning, and aligns policies at multiple levels. Breaking down siloes and ensuring that alternative knowledge systems are recognised and valued will enhance the ability of food systems to address sustainability challenges in an equitable manner.

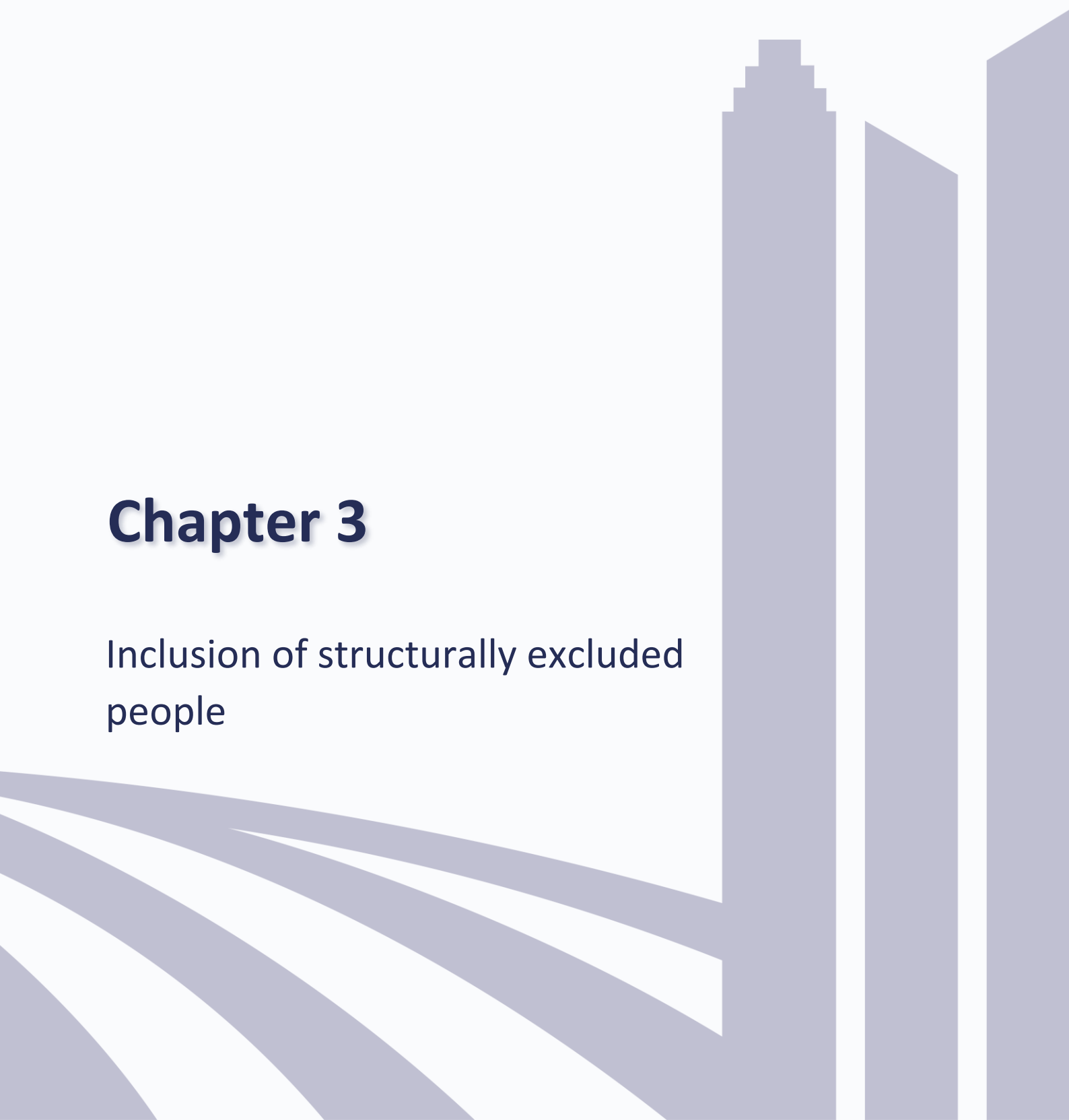
Furthermore, justice and democracy must be at the heart of this transformation. Shifting power dynamics, ensuring fair representation, and creating spaces for marginalised voices are essential for fostering resilient and just food systems. Without these elements, the risk of reinforcing existing inequalities and inefficiencies remains high and effective, supported change is unlikely. Collaboration and network building are also crucial enablers of transformation. The involvement of intermediaries strengthened stakeholder capacities, and

inclusive decision-making processes will enhance the ability to navigate complex challenges and co-create sustainable solutions. A FOKIS must, therefore, not only promote innovation but also build trust, agency, and long-term engagement among all actors involved.

These FOKIS ingredients allow stakeholders to mobilise themselves and promote their agency to work towards their desired food futures. The ingredients touch upon aligning policy and governance structures. But they also highlight the importance of food democratisation, creating just operating spaces and nurturing new spaces in decision making for incumbents and stakeholders with a lack of power. The other crucial step to achieving a FOKIS is the adoption of tools and instruments for the governance apparatus to be more reflexive and introspective in its decisions. By constantly analysing how the decisions that are made are navigating down a desired transformation path, we can gain the ability to notice when we stray from it and course correct to get back on track.

Chapter 3

Inclusion of structurally excluded people



Chapter 3 – Inclusion of structurally excluded people

3. Structurally excluded knowledge(holders) in a FOKIS

For a long time, decisions in the food system were made in relatively close agro-political circles in which mainly governmental institutions and large agricultural industrial companies were represented. There was not much public attention and space for public interference (Bornemann & Weiland, 2019). Even though some scholars like Bornemann and Weiland (2019) claim that there are attempts in the sector to create more open governance processes, governance of food systems is still considered to be far from democratic and often top-down. Various voices claim that decision-making processes require the involvement of multiple actors for these processes to be sustainable and just. This is especially relevant for decision-making processes in the food system as this system is infused with inequalities (Hebinck, Zurek, et al., 2021; see also section 2.2.3 of this chapter).

To create a better understanding of how a FOKIS system could be organised, this literature review focussed on the inclusion of structurally excluded people in food-system governance processes. The main aim of this study is explained in the next section.

3.1 Literature review

3.1.1 Research questions and focus

With this literature review, we aim to contribute to formulating important ingredients for a FOKIS by answering the following three questions:

- Which knowledge types and knowledge holders are currently underrepresented in the governance of food systems, and what structures hinder their inclusion?

This provides us an overview of whose knowledge and what types of knowledge are currently facing barriers to effectively engage in the governance of food systems and food system transitions, and therefore who are underrepresented in AKIS but could be given a place in FOKIS. This will also focus on what structures hinder the inclusion of these knowledge(holders)³.

- What are best practices of including underrepresented knowledge and knowledge holders?

Illustrating what best practices we encounter for including these knowledge holders in the food system. How are decisions made on who's knowledge should be included in actions towards transforming the food system?

- What are the ways to critically address the debate about underrepresented knowledge and knowledge holders?

Knowing what knowledge(holders) are mentioned as underrepresented in literature also shines light on who are overlooked by literature. A critical review is provided on who are seen as underrepresented. What does the literature say about the discussions about underrepresented people and knowledge in Europe?

³ Underrepresentation of specific actors is not per definition the result of hindering structures, but it can also be the result of individual factors, like mental space or individual preference. The focus of this chapter, however, is on structural underrepresentation and therefore does not elaborate on individual factors.

The literature that is included in this task specifically focusses on Europe and in- and exclusion in food system governance. We limited ourselves to literature that is published between 2018 and 2024. We gathered literature in two ways: with a structured literature search⁴ and by adding literature we were familiar with ourselves. Figure 1 illustrates in what way literature was found and what reasons were used for excluding papers.

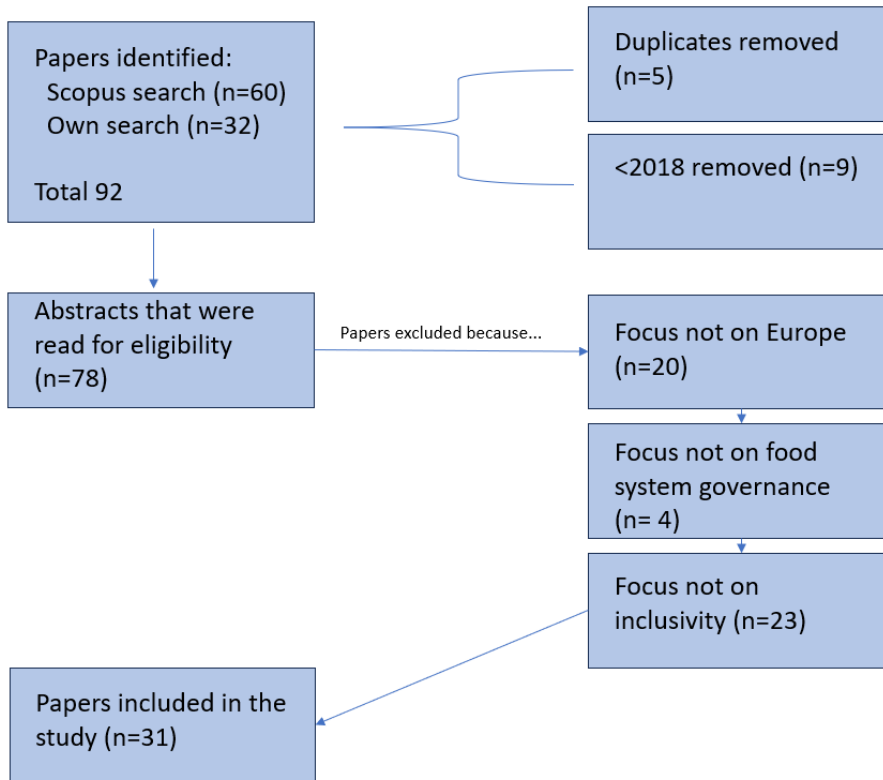


Figure 1 Visualisation of paper collection methods

3.1.2 Reasons for inclusion

Several reasons are mentioned in literature as to why knowledge and knowledge holders should be included in food system governance.

1. For normative reasons

Baena et al. (2023) and Leeuwis et al. (2021) both mention normative reasons when they describe why a broad group of citizens should be involved in decision making processes. Normative motives often highlight an ‘all affected principle’ which emphasises that all people who are affected by a matter at hand should be given an opportunity to be involved in the decision-making process. This would do justice to their viewpoints and respect their rights. Baena et al. (2023) argues that this is especially relevant when it comes to Indigenous

⁴ The search term used in Scopus on September 19th 2024 was (TITLE-ABS-KEY: “food system*” AND “governance” AND “inclusion” OR “exclusion” OR “epistemic justice” OR “food democracy” AND "transition" OR "transformation" OR "change" OR "revolution" OR "innovation" OR "development”).

people and their knowledge. Connected to this, inclusive governance could democratise the food system according to Bornemann and Weiland (2019) in the sense that different kinds of power can be promoted.

2. To learn from others

Actors can bring various types of knowledge to debates. Including underrepresented groups in decision-making processes allows for underrepresented knowledge to be included. When more types of knowledge are integrated, the food system can be understood from various perspectives (Van Den Akker et al., 2024). Transformative social learning can lead to a more critical understanding of food systems (Zollet & Maharjan, 2021). Food systems are constructs of reality (Leeuwis et al., 2021) and because of that there are “social and culture meanings that are context specific and epistemically determined” (Maughan & Ferrando, 2018, p. 2). There will be many context-specific interpretations of the food system that can be understood when a diversity of actors is included. For example, knowledge about alternative approaches can be integrated (Borsellino et al., 2024).

Not only can the integration of various types of knowledge lead to a better understanding of the issue, but it can also lead to more knowledge on potential fitting solutions. Policy makers will be better able to respond to the complexity of the issues related to the food system because they have a more holistic understanding (Van Den Akker et al., 2024). Bui et al. (2019) claim that the question should not just be who says something is sustainable or better, but also for whom it is sustainable or better. This can only be found out if the vision and interests that people have are actually included. This connects to the next reason for inclusion: to reach sustainable and equitable change.

3. To reach sustainable and equitable change

Various authors claim that if only a limited group of actors is included, a large potential for reaching lasting change remains unused. Citizens often have another take on and dependencies on the food system compared to for instance industry actors or councils (Holtkamp & van Mierlo, 2022). Enhancing diversity in systems is the first step of a transition process. When interactions emerge between actors with different values, new shared sets of values can be developed, “encompassing issues of social justice for both producers and consumers” (Bui et al., 2019, p. 284).

Inclusive governance is seen as a prerequisite for actually initiating a transition or transformation, instead of maintaining or strengthening the status quo. Because when people or organisations benefit from the status quo, they are less likely to initiate or support change that threatens their power. Instead, the focus will be on incremental change or technological fixes and a focus on profit and capitalist interpretations of food systems remains (Davies et al., 2019; Van Den Akker et al., 2024). To not favour the privileged in transitions and to rebalance power, inclusive governance is needed. As a result of the current focus on heteronormative and patriarchal ideas in our food system, social, political, and economic discrimination of specific groups leads to them facing difficulties accessing adequate and nutritious food (Gioia, 2019). When these marginalised and discriminated populations would be included in decision-making processes, more focus would be on a human- and nature based agricultural system, and on community-centred and sustainable solutions (Davies et al., 2019; Gioia, 2019). While the food system is regarded to be highly unjust and unequal, inclusive governance has the potential to make the food system more just and equitable (UN Food System Coordination UN Food System Coordination Hub). As Brons, van Der Gaast, et al. (2022) argue, without including those at the margin of the food system in governance of the food system, the “transformation towards healthier and more

sustainable food remains limited in reach, with healthy and sustainable food initiatives being labelled as left-elitist or as the ‘white-men’s diet’ (p. 2). Bui et al. (2019) describe that they argue for the uptake of systemic ethics by incumbent actors. This is the only way in which more diversity in agri-food systems can be integrated. And to ensure that ethical values that are currently missing in value chains are integrated, governance should pay specific attention to excluded and marginalised people and interests.

4. To increase the legitimacy and support of decision making

Civil society actors can use and bring in contextual and empirical knowledge about how food systems are understood and about what is most important for local people. Integrating these perspectives in debates can be more effective in the long-term compared to top-down decision-making processes as people will recognise themselves more in the decisions that are made. Furthermore, this can increase the legitimacy of decision-making processes (Kok et al., 2021; Zollet & Maharjan, 2021). This can ensure that decisions that are made are easier and wider accepted by citizens and societal organisations.

5. Other reasons that are mentioned

Besides these four reasons, multiple other arguments are given to inclusive governance of food systems. It would increase not only the relevance of the decisions that are made, but also the quality of decision-making processes, and lead to a “stronger sense of civic engagement and collaboration” (Zollet & Maharjan, 2021, p. 319). Zollet and Maharjan (2021) argue that if processes do not open up to citizens, “their potential risks remaining unused” (p. 326), thereby hinting at the transformative potential of citizens.

3.1.3 Who and what knowledge are currently underrepresented?

There are some actors and types of knowledge that are often included and have a strong influence on decision-making. Examples are commercial retailers, large scale conventional farmers (Bui et al., 2019; Davies et al., 2019) and powerful financial institutions (Bornemann & Weiland, 2019; Holtkamp & van Mierlo, 2022; Van Den Akker et al., 2024), all of whom are well entrenched in the primary value chain. There are some civil society groups who have more power in decision-making processes like privileged high-socioeconomic status citizens (Brons, van Der Gaast, et al., 2022) that usually reside in urban areas (Prové et al., 2019; Zollet & Maharjan, 2021). This overrepresentation also extends to the types of knowledge these actors bring. For example, Western scientific knowledge is often over-represented. This knowledge is deemed as expert knowledge (Brons, Oosterveer, et al., 2022; Leeuwis et al., 2021) and focusses on Western beliefs in conventional food and agricultural practices such as promoting agricultural intensification (Holtkamp & van Mierlo, 2022).

Just as well as there are knowledge and knowledge holders that are currently overrepresented in K&I structures for food system governance, various actors, and therefore various forms of knowledge, are mentioned as being underrepresented. Different governance levels are discussed, where some authors focus on actors that are underrepresented on the local and individual level, and others focus on the global and community level. Holtkamp and van Mierlo (2022) argue that citizens in general are not included in decision-making processes. Other authors refer to specific individuals or communities that are underrepresented, like migrant communities (Brons, van Der Gaast, et al., 2022), indigenous groups (Van Den Akker et al., 2024), people from lower socio-economic backgrounds (Brons, Oosterveer, et al., 2022; Candel, 2022; Maughan &

Ferrando, 2018), people from the LGBTIQ+ community, sexual minorities (Gioia, 2019; O'Keefe, 2019), and women (López Cifuentes & Gugerell, 2021; O'Keefe, 2019). Others, refer to grassroots movements, civil society groups or NGOs (Bui et al., 2019; Kok et al., 2021; Van Den Akker et al., 2024) that are not included in decision making processes.

Some refer to underrepresentation of food system actors specifically, like farmers (small holders) (Kok et al., 2021; Leeuwis et al., 2021), local food entrepreneurs (Brons, Oosterveer, et al., 2022) and other local communities (Maughan & Ferrando, 2018). Or to the underrepresentation of actors from certain geographical areas like the Global South (Leeuwis et al., 2021), LMIC (Van Den Akker et al., 2024) or rural areas. Where most authors focus on the in- or exclusion of certain people, communities or organisations, others focus more on what specific type of knowledge is included. Brons, Oosterveer, et al. (2022) found that in the processes they observed, citizens were often seen as powerless and not engaged with the food sector. This led to them not being included in formal networks, even though they were very active, showing a discrepancy between local knowledge and expert knowledge. Leeuwis et al. (2021) show that other forms of knowledge, besides scientific knowledge, is often excluded from agricultural education, and the existing regimes in general.

In general, as Van Den Akker et al. (2024) argues, often the affected community is not included in decision-making processes. Instead, other organisations who are economically and politically powerful have a large share in the decision-making processes (Bornemann & Weiland, 2019).

3.1.4 Hindering structures for inclusion

Various structures are in place that hinder the inclusion of specific knowledge(holders) and that uphold the inclusion of others. The literature points to 1) power dynamics, 2) the scientific method, 3) exclusionary mechanisms and institutions, 4) exclusionary mindsets, and 5) co-opting/greenwashing of movements as five separate governance dynamics that hinder the inclusion of certain groups. We will now unpack each of these with more detail and examples provided by literature.

Power dynamics considers how certain actors can control the narrative and levers of change based on their vested power within the current system. For example, traditionally those who wield economic power have the means and influence to exert political power (Bornemann & Weiland, 2019). Participation in decision making for the food system is often dominated by elites at the core of the current system who form powerful coalitions to amplify their voice (Brons, Oosterveer, et al., 2022; Leeuwis et al., 2021). This results in important decisions regarding different food system functions being made in meetings behind closed doors. Only the economic and political elite have access to these private meetings, thereby excluding the public from these events (Bui et al., 2019). In comparison to these elites, smaller grassroots movements and public interest groups are less organised. There are many different viewpoints which leads to them not being able to align their goals and formulate a joint group. This restrains them from putting up a united front to entrenched food system actors (Candel, 2022; López Cifuentes & Gugerell, 2021). One example of this is the difficulty of local urban agriculture practitioners to effectively organise a common goal and position in the Ghent Food Policy Council (Prové et al., 2019).

Scientific methods and language have also been identified as a structure that hinders inclusion. Complex language and theories required to engage with academia are seen as inherently exclusionary (Cretella, 2019). In addition, excluded people are often part of historically discriminated and marginalised groups, which researchers can find intimidating as they are lacking in the experience of dealing with such groups (O'Keefe, 2019). Within research itself there is an underutilisation of learning from past experiences and uptake of successful practices in future studies with regards to the inclusion of marginalised groups (Zollet & Maharjan, 2021).

Exclusionary mechanisms and institutions focus on the consideration of individual actors' resources be it financial, time or buy-in (Kok et al., 2021). These resources can be the ground on which specific actors are excluded for decision-making processes. For example, holding meetings during office hours hinders public participation as most people have to be at their jobs (Prové et al., 2019). Brons, Oosterveer, et al. (2022) mention that financially self-employed entrepreneurs and small business owners need to be paid for their involvement as they do not have the resources to invest in networking to increase their participation. Others claim that all actors should be financially compensated for the time they spend participating in the decision-making processes. Limited access to education and the aforementioned resource constraints limit the extent to how successful participation in food systems discussions can even be, if they are included (UN food system coordination hub). If we look at groups or communities, food safety regulations are designed often for large-scale commercial actors and grassroots initiatives struggle to meet these (Davies et al., 2019). This lack of statutory consideration excludes community gardens and other citizen mobilised in food sharing initiatives from being included in decision making and influence policy. High costs and complex logistical requirements are other important practical barriers for small producers (Bui et al., 2019).

Exclusionary mindsets embedded in governance of the food system also hinder inclusion. This encompasses mindsets such as the idea of citizens not caring about food systems past the ability of being able to purchase food (Brons, Oosterveer, et al., 2022). This can be extended further to different ethnicities, cultural groups, LGBTIQ or gender as not having their own distinct needs and desires for the food system (Gioia, 2019). In many cases even if a group has something to say about food system, if they are a local voice their knowledge might not be perceived as equally important to that of the "experts" (UN Food System Coordination UN Food System Coordination Hub). In a case study by Brons, Oosterveer, et al. (2022), municipality civil servants decided not to include citizens in the network of developing an urban food strategy. As they stated only the same small group of people turns up to the deliberations, who represents a highly knowledgeable minority of the town's citizens. Therefore, the city council acts as a better general representation of the towns people. This mindset had the effect of relegating citizens to passive participants of the urban food strategy as opposed to engaged members of the network.

Coopting or greenwashing of ideas can occur where underrepresented groups or grassroots movements desire to make a change but their agency is thwarted by larger power players. In trying to act in the greater good, these players take a unique idea and coopt it into the dominant food system structure preventing ownership of the underrepresented groups. One example of this is the UK supermarket chain Tesco running a fund-raising campaign for food-growing focused community projects. But rather than the initiative being about the improvement of local community and food alternatives it was turned into a marketing campaign for Tesco as a result of strict conditions requiring promotion of the brand (Maughan & Ferrando, 2018).

3.1.5 Examples of arranging inclusion

Besides identifying structures of exclusion, the literature also describes good practices of including a diverse group of actors in governance processes. These range from structural inclusion to incidental activities. In general, active participation is seen as key (Borsellino et al., 2024). Some papers mentioned specific participative methods or formats that worked out well. This could be formal arrangements like citizen juries and other forms of mini publics (Brons, Oosterveer, et al., 2022; Candel, 2022), food policy councils (Brons, Oosterveer, et al., 2022; Davies et al., 2019; Prové et al., 2019), participatory budgeting or citizens' budget (Candel, 2022; Holtkamp & van Mierlo, 2022), multi-sectoral platforms (Walls, 2018), or other forms in which governmental institutions asked for the involvement of citizens (Bui et al., 2019; Zollet & Maharjan, 2021). Specific examples of participatory food-based movements are also mentioned, like India's Right to Food Campaign, and Brazil's 'Zero Hunger' Policy (Walls, 2018), Alliance for Food Sovereignty in Africa (Leeuwis et

al., 2021) and the Land Dyke Feminist Family Farm in Taiwan that promotes biodiversity and addresses gender awareness (Gioia, 2019). Via Campesina is also mentioned which starts from ecological principles and therefore from a human- and nature-based agricultural system (Gioia, 2019; Leeuwis et al., 2021). Some of these movements, like Via Campesina but also the Landless Movement in Brazil, do not only address agricultural issues, but also work on strengthening LGBTIQ-rights. Gioia (2019) argues that the struggle of LGBTIQ rights, and human rights in general, need to be seen as a collective struggle for solidarity instead of private issues.

Others do not describe specific methods, formats or tools, but they describe starting points. Brons, van Der Gaast, et al. (2022) mentioned that for them it is key to single out the usual suspects and instead go to underrepresented communities to recruit participants in these communities. Others also claim that in this, knowledge sharing should be central. In order to do this, the intellectual property rights of communities need to be acknowledged and respected, as this will protect their knowledge (UN food coordination UN Food System Coordination Hub). Using models of dialogic democracy can be a way to include the perspectives of marginalised and excluded groups (Bui et al., 2019). According to Walls (2018), using the global human rights system can be used as a framework to address existing power imbalances.

In their description of a Philadelphian food policy council, Prové et al. (2019, p. 178) give some specific characteristics of why there is such a strong civic engagement dynamic. They identify that 1) the concerns amongst communities and urban agricultural actors are shared, 2) bridging actors assist in translating the concerns citizens have to governance levels, 3) urban agricultural actors have a big focus on the neighbourhood, and that 4) “food justice is a well-established vocabulary in Philadelphia”. Kok et al. (2021) add that there is a big role for facilitators in navigating power imbalances. And they endorse the importance of transformative learning processes.

Besides good practices, there are also examples of what works not so well regarding including underrepresented groups. Leeuwis et al. (2021) describe that in programs that are initiated to reduce poverty, there is often a great focus on technologies. As most interventions are executed in the existing regime, this regime is often reproduced. Instead of reducing poverty, poverty often increases. Cretella (2019) describes that when urban food strategies do not have an official statutory status, their efficacy is questioned as it is difficult to actually affect the governance of the food system.

3.2 Reflections of summer school session

During the FOSTER summer school in Barcelona in May 2024, a session focussed on discussing the inclusion of underrepresented communities. Participants of this session were representative of the CDIs, their academic partners, external experts linked to CDIs and other FOSTER colleagues. In this section, they are all referred to as FOSTER experts. To find out who FOSTER experts regard as underrepresented communities, and how they think about inclusion, all attendees were divided in sub-groups in which the following questions were discussed:

- What are potential roles of citizen participation in food system transition?
- What does inclusivity mean to you?
- Where are you (in your work related to food system transition) in- and excluded?
- Who are excluded in food system transitions and where? How do you notice this?
- Should participation always be inclusive?

3.2.1 Roles of citizen participation

Various roles are foreseen for citizen participation. FOSTER experts indicated that almost all citizens participate in the food system to a certain extent because they eat food. By being a consumer, most people can make decisions on what they eat, although often dependent on various circumstances. Some citizens are also part of the food system in other ways, via entrepreneurship for example. And by deliberately choosing a bank based on its investment policy, or by investing in specific parts of the food system, citizens can also have a financial role. This can all be seen as rather passive forms of participation in the food system.

There is also active participation in food system transitions. Active participation is when people are involved with decision-making processes in the food system on a voluntary basis. This can be via protests, participation in lobby groups or in organised participatory processes, volunteering via surveys etc. Specifically for the food system, this can also be by participating in community kitchens, or by joining initiatives like community supported agriculture. The FOSTER experts named various activities which citizens can do. Citizens express their thoughts or lobby for a specific issue, which creates an understanding of needs that various citizens have. This can be on the level of expressing demands for a specific type of food in canteens, or for more organic production methods. When citizens get together, a shared goal for an ideal future of food systems can be defined. Citizens can share knowledge and learn new things.

Expressing needs can have various goals and effects according to FOSTER experts. It can, next to top-down regulations, influence decision-making processes of food producers or processors, it can pressure politicians to make specific decisions, and in a broad sense it can change the food system or the society. The experts see citizens' involvement as an addition to top-down regulations. On a more individual level, the involvement of citizens can ensure that people living in marginalised positions are seen in decision-making processes. And by being involved in decision-making processes, people can feel more powerful over their own life.

Some FOSTER experts also claim that without citizens, decisions cannot be made. Their input is needed for a legitimate process and legitimate decisions. When citizens provide their experiences and knowledge, the effects of decisions can become clearer, and scientific knowledge used to legitimise decisions can be checked.

3.2.2 What is inclusivity?

In discussing what inclusivity means to experts of FOSTER, various understandings of inclusivity were mentioned. Some focussed on who needs to be present to call something inclusive, others mentioned various values that need to be met for processes to be inclusive, what the reason or the effect of a process is.

When thinking about the meaning of inclusion, some FOSTER experts referred to specific actors that need to be involved in inclusive processes. They mentioned that it is important to include structurally excluded people, and some mentioned that the perspectives of non-humans like nature and animals, and the interests of future generations need to be included. Some mentioned that everyone who is part of a process needs to be included so that no one is left out. This does not mean that a process should include everyone, but that a process recognises all values so that nobody is disadvantaged or forgotten.

This connects to the various values that were mentioned. Inclusion is not only about who is at the table, but also about how people are given the opportunity to express themselves. Therefore, one of the often-mentioned values is that people are heard and that their interests are recognised. An open and transparent atmosphere is important so that people open up to each other and various perspectives are respected. People can then try to understand each other's viewpoint.

Other experts claimed that for a process to be inclusive, it is important to think about the effects which processes have. They claimed that processes are inclusive when they truly have an effect on decision-making and can shape outcomes of a process. The food system itself is only inclusive when everybody has the same access to food.

3.2.3 Who are excluded in the food system?

FOSTER experts see that there are people who are not included in the food system in general, which means that they have limited access to food. People that are mentioned are social-demographic minority groups like homeless people, migrants living in vulnerable situations, and people with low incomes.

Most people are included in food systems, but not in decision making processes regarding the food system. These are for example people living in certain geographical areas. Examples that are given are that the EU exports certain types of food to other parts of the world, while people living there are not necessarily asked if they want that food. Often labour migrants are not given the opportunity to speak up. Children are also amongst those who cannot make their own food choices. Small agricultural producers are also mentioned, as decisions are often made by large and influential companies. Some people are excluded because they do not have access to knowledge or they do not have the opportunity to share their knowledge.

There are also people who do not care to be included, and also those who “might not have the ability to care because there are so many other [things] they might have [on their mind]”.

3.2.4 Should participation always be inclusive?

The last question that was discussed with FOSTER experts was if participation should always be inclusive. Some FOSTER experts mentioned that this depends on the goal of the session. They could foresee some cases in which it is more or less important to be inclusive. Some claim that participation as such is more important than being inclusive, while others argue that being inclusive is more important than participation. In other words, organising a participatory process without being inclusive is not valuable in their opinion.

Others mentioned that there are specific characteristics of potential participants that determine whether they should be included or not. This could depend on the knowledge people have, or on the values they have as some people will derail the process. Others claim that inclusion is difficult or even impossible. It takes time, and other claim that a process can never be truly inclusive. Inclusion can also be seen as a trade-off.

3.3 Critical note on inclusion

This exercise on underrepresented communities highlighted who are seen as underrepresented in knowledge and innovation systems of food systems in literature and by experts working on food system transitions. This leaves several questions and critical notes that we elaborate on in this part.

The literature on underrepresented communities shows several communities that are underrepresented. However, there might be biases that exist in the literature. Which underrepresented communities are perhaps overseen by literature and therefore also underrepresented in literature? In addition, as several FOSTER experts also indicated, it is difficult to be aware of all underrepresented groups. These people might not be the most vocal people, and when they are not recognised by others, they remain unseen. Furthermore, underrepresented groups need to be understood in their context. Often a list with ‘underrepresented groups’

is formulated and then it is being checked whether they are included or not. Some organisations might not fit to this list but can still be understood as underrepresented in their context. For example, the CDIs in FOSTER sometimes argue that they do not work with underrepresented groups, but when considering their decision-making power on national scale, they can all be seen as underrepresented as their knowledge and perspectives are not represented.

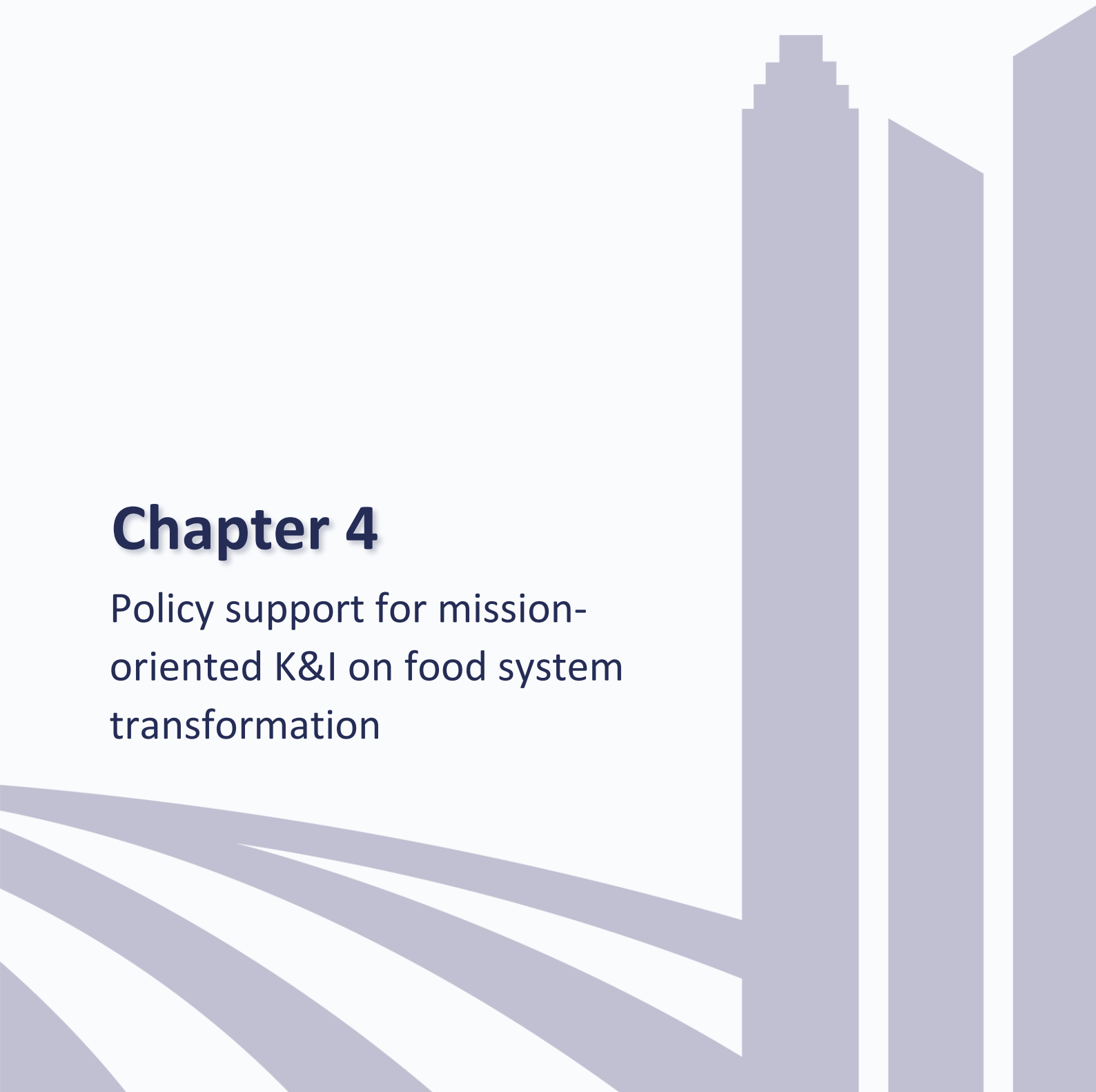
And when underrepresented communities are invited to partake in decision-making processes, they are often given the possibility to formulate recommendations for governmental institutions. But how much agency do they have? The decision-making structures often stay the same, and the ones making the final decisions are still the same people. One could wonder whether it is enough to invite people to processes happening within already established structures, or whether decision-making structures need to change as well. People who are familiar with these structures know how to navigate those, while people who are new to these structures do not yet have this knowledge and experience. This can be linked to chapter 2 and the need for “support and space for alternative practices and diversity of knowledge” as an ingredient form moving from AKIS to FOKIS. System change will not happen when only performing ‘business as usual’, more space needs to be given to people who think and work differently.

In the discussion with FOSTER experts, some mentioned that being inclusive is not always desired as some people will derail the process. This could be people who have a fundamental distrust in science or authorities, or who are not open to discuss issues with people with different beliefs and values. However, the threat of biases is big here as there is not one universal thought on what is acceptable and what not. More thought needs to be put into how to include contrarians.

This part on underrepresented communities is not complete without a critical reflection on us and on the FOSTER project. The FOSTER consortium consists mainly of academics and CDIs. The CDIs represent various parts of society that work on accomplishing transitions in the food system. Academics represent various knowledge institutes that study aspects related to food system transitions. While FOSTER promises to focus on underrepresented communities with its work, many of these groups are not part of the FOSTER consortium. Cultural and economically excluded groups are underrepresented, as are youth. Only groups that align with the perspectives of the consortium partners are included. And not all organisations are in the position to be part of such a consortium. Existing requirements already exclude many organisations as they are not formally organised or do not have the right requirements to comply with subsidy rules. Also, various types of knowledge are missing in the consortium as the project mainly drives on scientific knowledge. The main language spoken is scientific language, and there are cultural differences between various actors. And even when organisations are included, not all organisations share the same decision-making power. Some organisations might not be invited to meetings where decisions are made for example. FOSTER is not the only large research project that does not practice what it preaches on issues like these. True inclusion requires a critical rethinking strategy on how calls for grants are set up and what knowledge and input is valued. It needs to be critically assessed how time and money is divided between people, organisations, and various perspectives.

Chapter 4

Policy support for mission-oriented K&I on food system transformation



Chapter 4– Policy support for mission-oriented K&I on food system transformation

4. Why an overview on EU policies on knowledge and innovation for food systems?

FOSTER research is designed around the need to reorient the governance of knowledge and innovation (K&I) for Europe's food system. This chapter analyses how K&I policies can be better oriented towards the mission of transforming Europe's food system towards a sustainable future. There is a vast body of relevant EU policies and instruments, yet from the viewpoint of uptake and use there are limitations in their alignment on creating synergy. Policies could unintentionally even work contradictory. In shifting the orientation in food-related K&I from AKIS to FOKIS, FOSTER advocates for a more inclusive K&I governance structure, incorporating diverse actors like educators, policymakers, industry and entrepreneurs, citizens and societal actors, and for placing agriculture in a broader perspective. The chapter provides an overview of the EU's K&I strategies within the Green Deal and related to the Sustainable Development Goals. It discusses the EU's role in promoting societal transitions through policies such as subsidies, taxes, and facilitation, and calls for a food systems-based approach to R&I.

4.1 Why is this important to CDIs and food initiatives in general?

Food initiatives can easily get lost in all regulations and instruments on K&I in the EU. It takes substantial effort to understand how EU policies work, how instruments are interconnected and which opportunities they provide. This overview serves two goals. First, we want to make this landscape easier to navigate for the actors involved in the food initiatives. Second, we aim to learn from initiatives what directions for policy reform can be helpful to arrive at an inclusive FOKIS, shaped by a more comprehensive landscape. From working with the CDIs for the past two years in FOSTER, it has been noted that their connections to the policy landscape are vast yet not easily understood, especially at the EU level. Several CDIs find it difficult to define their role and position in the governance space – even to assess which policies help them and which cause barriers. Other CDIs are more policy savvy and collaborate on a frequent basis with local or national policy makers. An anthropological researcher made observations at a FOSTER workshop in which food initiatives met with policy advisors from the European Commission: the language spoken, words used and attitudes created a gap. In addition, barriers seem to appear on both sides; selected practitioners from food initiatives expressed the feeling that the policy makers have no understanding about the practical reality and implementation at local levels. As a result, the entry point of food initiatives into the policy arena and discussions is unclear.

4.2 Why is this important to policy makers?

The EU policy maze of all DGs, networks and EC services is difficult to follow for an outsider. There is a need for insight on how CDIs, as EU policy target groups, are connected to the EU policy system. If they are not connected, we need more understanding on the reasons why. Is this because they do not know which opportunities (for funding, networking, or other initiatives) are available? Is it because they have had bad experience with e.g. legislation, public agreements, regulations or reimbursements of funding or costs? Is it because the existing governance structures make it (nearly) impossible for them to be involved? Or is it that they explicitly choose to refrain from EU policy initiatives, funds, or networks out of activism or dissatisfaction?

4.3 EU policy framework for transition to sustainable food systems

Governments can promote societal transitions with various forms of policy (e.g. subsidies, taxes, facilitation, and stimulation). In general, you can say that the EU often sets frameworks, while national and local governments colour these with the diversity of specific food systems factors in their EU countries and regions.

EU policies on agriculture, fisheries, the environment, the economy and trade, food safety and consumption, directly influence the food system. In addition, knowledge and innovation for food systems is one of the policies, in which the EU is very active. The remit of knowledge and innovation has previously been defined as *“specific policies for creating knowledge, providing R&D financing, enabling extensive and effective cooperation and networks, improving intellectual property rights regimes, facilitating technology transfer, supporting skill formation and public procurement etc.”* (Edquist et al., 2004). From the perspective of a mission-driven policy framework, this is too narrow -- both food policy and knowledge and innovation policies form an integral part of the policy framework for transitioning to a sustainable food system in the EU. A policy brief developed under the working group food systems of the Standing Committee for Agricultural Research, calls for an innovation policy that adopts such systemic thinking:

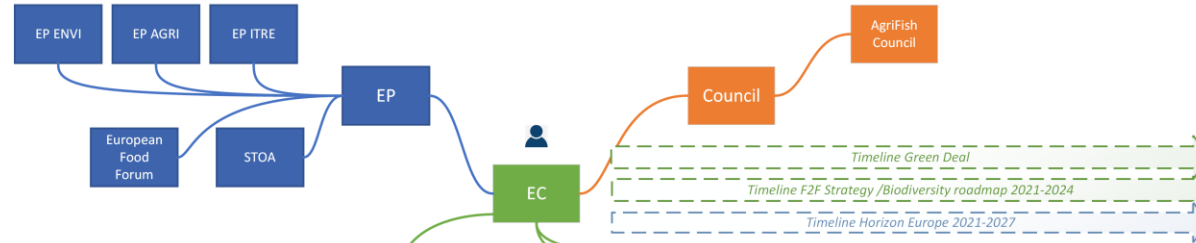
“There is growing evidence and consensus that a food systems-based approach to Research and Innovation in the combined fields of agriculture, fisheries, food, environment (including climate change mitigation and adaptation), human nutrition and health, is crucial for effectively addressing the large and systemic challenges the European food systems are facing. Use a food systems lens to create a shared understanding on what the systemic issues and R&I intervention points are, to prioritise and to focus on integrative as well as thematic research and innovation actions in the large research domain of food, nutrition and health, agriculture and farming, fisheries and natural resource use, and the environment and their interactions” (Halberg and Westhoek, 2019).

In this report we build on this statement for defining the boundaries of an EU policy framework for transition to sustainable food systems. In our approach this policy framework is defined as the body of policies and regulations at EU-level on research and innovation, food, nutrition and health, agriculture and farming, fisheries and natural resource use, the environment, and the interactions of activities in the food system with the natural environment and society.

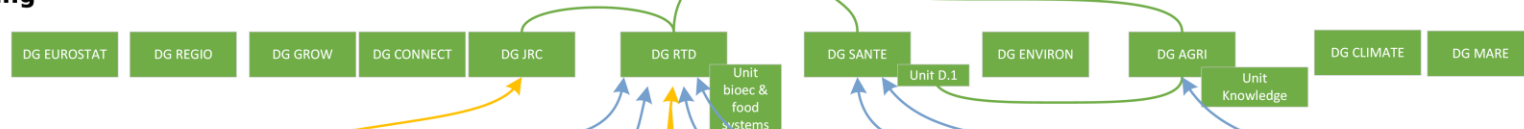
Figure 2 illustrates the EU policy network of key actors involved in shaping knowledge and policy for food systems transformations in the EU. It highlights four levels of decision-making, ranging from high-level political decision-making in the European Parliament and Council, to policy preparation within the European Commission's Directorates General, formal advisory input from expert groups, and informal stakeholder networks that contribute to shaping research and innovation agendas. Knowledge networks and professional interest groups around knowledge and innovation are an effective network for informal and unsolicited influence on formal decision-making and offer more opportunities than the EU expert groups and policy committees which provide formal policy input (Achterbosch & Bogaardt, 2022).

Levels of decision-making

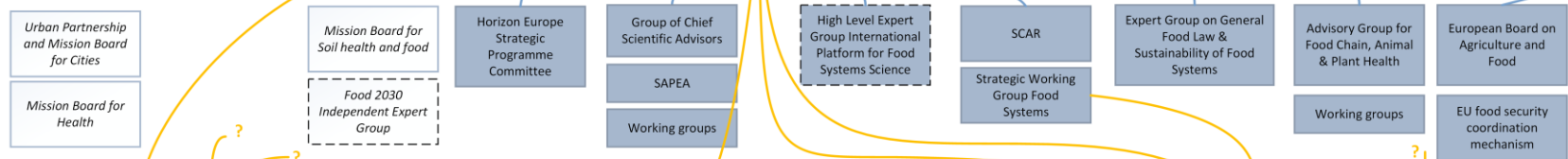
1. Policy-setting



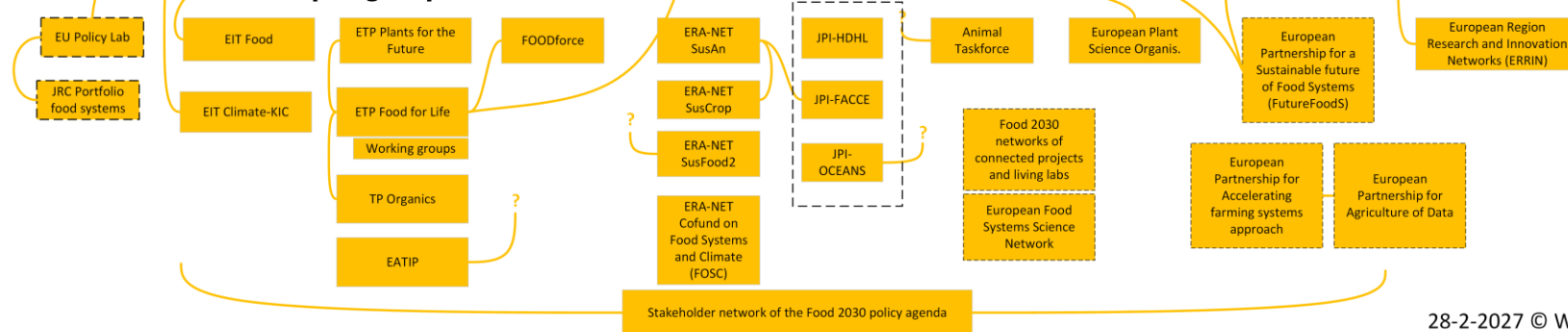
2. Policy-shaping



3. Formal contribution from expertgroups



4. Informal contribution from expertgroups



28-2-2027 © WUR

Figure 2 Network map of the EU policy actors on Food Systems K&I (source: updated from Achterbosch and Bogaardt, 2022)

Figure 3 shows an overview on EU K&I strategies and instruments to foster transitions in Food systems. At level one, the upper row, we see the overarching international framework of the sustainable development goals concerning food systems, required for insight on the connections between sustainability strategies between different scales: the United Nations (UN) and the EU. At level two, the EU overarching policy framework of the European Green Deal (EGD) is described, with all relevant policy strategies, legislation and initiatives relevant for food systems, connected to the EGD. Level 3, highlights the systems approaches and instruments, managed by the Directorates-General (DGs) of the European Commission (EC) addressing food systems. Finally, level 4 describes the initiatives and instruments for FOKIS actors in the EU to accelerate the transition.

Together these two visuals provide a complementary overarching view of the EU policy environment. It is important to note that not all policy frameworks are described in the current report, as this report is meant to be a summary of the policies. Only the most essential policy frameworks are described in detail and policy updates are provided. The detailed description of the policies provided in this figure can be found in the Appendix. In the remainder of this section, we present expert insights on the main EU policy frameworks for transition to sustainable food systems.

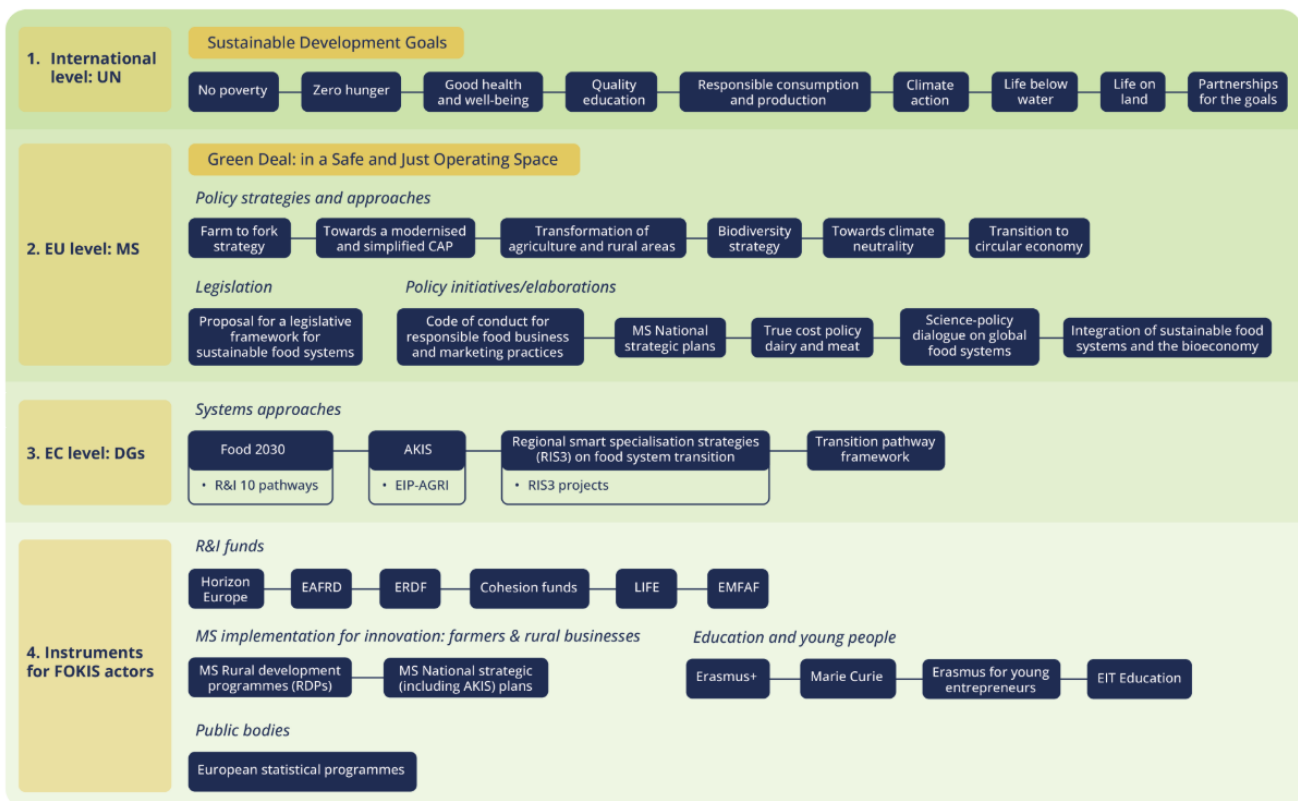


Figure 3 Overview on EU K&I strategies and instruments for food systems (source: authors)

4.4 Summary of the EU K&I policies and strategies for food system transformation

A recent publication of a monitoring framework for sustainable food systems by the Joint Research Centre of the European Commission presents an inventory of EU policies that set targets, strategies, regulations, guidelines and other policy instruments across the environmental, economic and social dimensions of a sustainable food system (see Box 1). It takes a comprehensive approach to the policy framework. Research

and innovation are incorporated under the economic policy dimension of sustainable food systems, through two components. The first element is technology and digitalisation. The policy target in the proposed monitoring framework is “increased uptake of technology and digitalisation”, which connects to the following policies: EU Digital Strategy, Common Agricultural Policy, Farm to Fork Strategy, Sustainable Bioeconomy Strategy. The Farm to Fork Strategy is no longer operational as a guiding policy framework, and is being replaced by new frameworks including a Vision for Agriculture and Food, which will indicate how the food system will be aligned to the ambitions of the Green Deal. The second element of sustainable food systems that relates to research & innovation is transport, accessibility and infrastructure. The policy target in the proposed monitoring framework is “optimise supply and food distribution chains”, which connects to the following policies: Farm to Fork Strategy, EU Sustainable Bioeconomy Strategy. Policy targets on “Transformation towards sustainable food systems” and “Ensure policy coherence for sustainable food systems” are proposed, both with reference to Horizon Europe as the additional policy framework.

This policy framework for sustainable food systems has two main shortcomings in how it reflects on the role of research and innovation. First, it fails to acknowledge the contribution of research & innovation in linking the environmental, economic and social dimensions into an integrated approach. Second, the exclusively economic and technological orientation on innovation and optimisation does not recognise that technological innovation is inherently connected to social innovation. Interestingly, no policy framework is presented under a policy goal to promote participatory processes in food system transformation. In future sections under this report, we will make the suggestion that R&I policies are partly in place to fill this gap.

EU Policy Framework for a Sustainable Food System

Cross-cutting across sustainability dimensions: Fisheries Policy, Common Market Organisation for fisheries and aquaculture.

Environmental dimension: European Climate Law, LULUCF Regulation, 8th Environment Action Programme, Zero Pollution Action Plan, Integrated Nutrient Management Action Plan, Chemicals Strategy for Sustainability, Nitrate Directive, Pesticides Directive, Directive on Industrial Emissions, Soil Monitoring Law, EU One Health Action plan against antimicrobial resistance, Zero pollution action plan, EU Veterinary Medicinal Products Regulation, Water Framework Directive, EU Soil Strategy for 2030, Soil Monitoring Law, Biodiversity Strategy, Energy Efficiency Directive, Energy transition in EU fisheries and aquaculture sector, Nature Restoration Law, Marine Ecosystem Framework Directive, Natura 2000, Birds and Habitats Directives, Plant Health Law, Waste Directive, Circular Economy Action Plan, Regulation on Deforestation-Free products,

Economic dimension: EU Sustainable Bioeconomy Strategy, Directive on Unfair trading practices, EU Digital Strategy,

Social dimension: European Pillar of Social Rights Action Plan, Youth Employment Support, Animal welfare legislations (protection of hens, pigs, calves and chickens - during farming, transport, and slaughter), EU Organic farming Regulation, Food Information for Consumers Regulation, EU Code of Conduct on Responsible Food Business and Marketing Practices, EU Code of Conduct on Responsible Food Business and Marketing Practices, General Food Law, Regulation, Europe’s Beating Cancer Plan, EU Contingency Plan.

Horizontal Thematic areas, incl. transformation, and governance: “Transformation towards sustainable food systems” and “Ensure policy coherence for sustainable food systems: Horizon Europe

Box 1 EU policy framework for a sustainable food system. Source: Tóth et al. (2024) and Acs et al. (2025)(supplementary data)

continent, which should be climate-neutral by 2050. This is in accordance with international agreements such as the [2015 Paris Climate agreement](#) and the overarching [UN SDGs](#), to which EU member states have agreed and in extension of the European commission.

The EGD has promised under the CAP to transition to an EU food system that is sustainable while ensuring food affordability and availability that also promotes environmental, health, social and economic benefits. The

actions taken under the Green Deal are wide, reaching from animal welfare, sustainable fertilizer and pesticide use, organic farming and extending as far as consumption for better nutrition and sustainability labelling.

4.4.1 The Farm to Fork Strategy

The Farm to Fork (F2F) Strategy was at the heart of the EGD, concerning food and agriculture. It is a comprehensive and ambitious plan that sets out the EU's vision for a sustainable food system. It aims to make the EU's food systems fairer, healthier, and more environmentally sustainable by 2030. The strategy encompasses a wide range of policies and actions across the entire food supply chain, from production to consumption ([f2f action-plan 2020 strategy-info en.pdf \(europa.eu\)](#)). The F2F strategy intended to serve as an umbrella for the EU's food policy, bringing together different policy areas that impact the food system, such as agriculture, fisheries, environment, health, and consumer protection. The F2F strategy was designed to ensure coherence and synergy in the overall policy approach on agriculture and food, and was intrinsically linked to the [Biodiversity Strategy](#) which bears the motto "bring nature back into our lives". The F2F strategy included a draft action plan with 27 specific proposals for action and a timeframe. When describing the EU food policies that indirectly impact K&I for food system transformation, the F2F strategy can be considered as an umbrella strategy. Selected elements of the F2F strategy were adopted, including a coordination on food security risk. Major regulatory actions i.e. a framework law as a cornerstone of EU's new policy approach to sustainable food systems, legislation to reduce the use of chemicals in agriculture and target-setting for organic farming, succumbed to political opposition. As of 2025, the unveiling of the new vision for Europe's agri-food system by 2040, may see a significant scaling back of the environmental regulations in favour of European competitiveness and improving farmer livelihoods⁵.

4.4.2 DGs responsible for K&I strategies, policies and implementation

The European Commission is organised in 33 policy departments, or Directorates-General (DGs). The majority, if not all DGs have relations to K&I on food systems. A comprehensive study and a strict conceptual framework is needed to assess the manifold relations of the DGs to K&I on food systems. In this limited overview we highlight a number of DGs with strong connections to K&I on food systems. Apart from DG RTD (Research and Innovation), these are DG CONNECT (Communications Networks, Content and Technology), DG AGRI (Agriculture and Rural Development), DG GROW (Internal Market, Industry, Entrepreneurship and SMEs), DG REGIO (Regional and Urban Policy) DG ENV (Environment), and DG MARE (Maritime Affairs and Fisheries). Whereas DG SANTE (Health and Food Safety) coordinates the F2F strategy, to date their K&I interests relate mainly to food safety and consumer trust as well as to food loss and waste.

4.4.3 Key K&I policy strategies and concepts on EU food systems

The Food 2030 Strategy is the roof under which the EU's research and innovation policy (EC DG RTD) to transform food systems takes place, and ensures that everyone has enough affordable, nutritious food to lead a healthy life. It was originally launched in October 2020 and has guided the implementation of research and innovation policy and development of a stakeholder community on EU food systems transition. The policy document on the Food 2030 agenda is revised in 2023. The primary objective of Food 2030 is to establish a

⁵ This is developing news as of the publication of this document and important to keep relevance with policy developments: [EU Commission sets Green Deal aside in new agri-food vision | Euronews](#)

resilient and future-ready food system that not only caters to people's health, but also considers the well-being of the climate, planet, and communities⁶.

Agricultural Knowledge and Innovation Systems (AKIS) is a key concept promoted by DG AGRI to enhance knowledge flows and innovation in agriculture. As elaborated upon in section 0, while AKIS connects diverse actors it is dominated by traditional agricultural research with limited cross-sectoral integration. The role of research and education as intermediaries is underdeveloped, and multi-actor collaboration is complex and time intensive. Despite these barriers, AKIS is a vital foundation for advancing food knowledge and innovation, requiring further refinement to strengthen linkages between knowledge, innovation, and practice⁷.

The Smart Specialisation strategy (S3) is a place-based innovation policy concept to support regional prioritisation in innovative sectors, fields or technologies through the 'entrepreneurial discovery process (EDP)', a bottom-up approach to reveal what a region does best in terms of its scientific and technological endowments. In 2012, the European Commission introduced the S3 concept in the EU Cohesion Policy 2014-2020 as an 'ex-ante conditionality' for European regions to obtain funding for research and innovation from the European Regional Development Fund (ERDF)⁸.

The **Transition pathways framework for the agri-food ecosystem** (DG Grow) was published on March 11, 2024 and outlines a strategic framework for transitioning the European agri-food industry toward sustainability, digitalisation, and resilience. It aligns with broader EU objectives, such as the EGD and the F2F Strategy, and consists of 8 main building blocks starting from sustainable transition up to International Trade and Cooperation⁹. One of the building blocks is related to K&I (Research, Innovation and Technology), which emphasises the critical role of research, innovation, and technology in transforming the European agri-food sector into a sustainable, efficient, and digitally advanced ecosystem. It emphasises the collaboration between stakeholders, including academia, industry, and government, to develop and implement cutting-edge solutions. It discusses specific initiatives, such as deploying precision agriculture, advancing food processing technologies, and improving supply chain transparency through digital tools. The focus is on creating a supportive environment for research and innovation, including funding opportunities, knowledge sharing, and policy frameworks encouraging sustainable practices¹⁰.

4.4.4 EU Financial funding instruments and beneficiaries

Horizon Europe (HEU): [Horizon Europe](#) is the EU's research and innovation programme for 2021-2027 with a budget of €95.5 billion. It tackles climate change, helps to achieve the UN's [Sustainable Development](#) Goals and boosts the EU's competitiveness and growth. The programme facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges. It supports creating and better dispersing of excellent knowledge and technologies. It creates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness and optimises investment impact within a strengthened European Research Area (ERA). Horizon Europe is mainly governed by DG RTD. It is the European Union's flagship research and innovation program for 2021-2027. It includes several funding opportunities related to sustainable food systems, including research on climate-smart agriculture, circular bioeconomy, sustainable and healthy diets, and food systems governance.

⁶ [Food 2030 \(europa.eu\)](#)

⁷ <https://scar-europe.org/akis-mission-and-aims>

⁸ https://www.interregeurope.eu/sites/default/files/inline/Smart_Specialisation_Strategy_S3_-_Policy_Brief.pdf

⁹ https://single-market-economy.ec.europa.eu/publications/transition-pathway-agri-food-industrial-ecosystem_en

¹⁰ https://single-market-economy.ec.europa.eu/sectors/agri-food-industrial-ecosystem/transition-pathway-agri-food-industrial-ecosystem_en

Cohesion Fund (CF): The [Cohesion Fund](#) is aimed at EU countries whose gross national income (GNI) per inhabitant is less than 90% of the EU average. It aims to reduce economic and social disparities and to promote sustainable development.

Environment and climate action (LIFE): the [LIFE programme](#) is the EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU. Since 1992, LIFE has co-financed more than 4.500 projects ([LIFE Programme \(europa.eu\)](#)). It provides funding opportunities for projects that promote sustainable practices, reduce greenhouse gas emissions, and protect biodiversity.

European Maritime Fisheries and Aquaculture Fund (EMFAF) [EMFAF \(europa.eu\)](#). This is a funding program that supports the sustainable development of the European Union's fisheries and aquaculture sectors. It provides support for developing innovative projects ensuring that aquatic and maritime resources are used sustainably.

European Regional Development Fund (ERDF). [The European Regional Development Fund](#) aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. The ERDF focuses its investments on several key priority areas, including innovation and research. The ERDF is one of the main financial instruments of the EU's cohesion policy. Its purpose is to contribute to reducing disparities between the levels of development of European regions and to improve living standards in the least-favoured regions ([European Regional Development Fund \(ERDF\) | Fact Sheets on the European Union | European Parliament \(europa.eu\)](#)).

EU countries implement national and regional **rural development programmes (RDPs)**, which are co-financed by the **EAFRD** and national budgets. The EAFRD budget for the 2014-20 programming period amounted to roughly €100 billion. Under the [CAP transitional regulation](#) (adopted on 23 December 2020), RDPs have been conditionally extended for 2021 and 2022. During these years, RDPs will be provided with €26.9 billion from the [EAFRD budget for 2021-27](#) and an extra €8.1 billion from the [next generation EU](#) recovery instrument. Due to this extension, many of the projects and schemes included in RDPs will continue to run until the end of 2025. The EAFRD forms the second pillar of the CAP and is mainly governed by DG AGRI ([CAP funds \(europa.eu\)](#)).

The EU offers various funding programmes to support young people in education, employment, entrepreneurship, and research:

- **Erasmus+:** Supports education, training, youth, and sport, enhancing skills, employability, and youth policy development. Managed by the **European Education and Culture Executive Agency (EACEA)** and national agencies.
- **Marie Skłodowska-Curie Actions:** Provides fellowships for researchers in all disciplines, administered by the **Research Executive Agency (REA)**.
- **Erasmus for Young Entrepreneurs:** An exchange programme allowing new entrepreneurs to gain experience by working with established business owners in another country for 1-6 months.
- **Youth Employment Initiative:** Supports unemployed youth (not in education or training) in regions with over 25% youth unemployment. Now integrated into the **European Social Fund Plus (ESF+)**.
- **Youth Guarantee:** Ensures that all young people under 30 receive an offer of employment, education, apprenticeship, or traineeship within four months of becoming unemployed or leaving education. Implemented by **EU national managing authorities**.

Statistical programmes also release calls for proposals. **Eurostat** publishes calls for proposals open to national statistical institutes and other national authorities responsible for collecting/producing and publishing official statistics. These bodies may benefit from grants under the European Statistical Programme.

4.4.5 EU networks for Food Systems K&I

The EU policy network for food systems K&I comprises at least 5 official expert groups and 22 stakeholder networks (see Figure 2). Six EC expert groups serve as advisory bodies for DG RTD and DG SANTE on knowledge and innovation policy for the transition to sustainable food systems in the EU. These are: the Horizon Europe Strategic Programme Committee, the Group of Chief Scientific Advisors, the SCAR Strategic Working Group Food Systems, the Expert Group on General Food Law and Sustainability of Food Systems, and the Advisory Group Food Chain and Animal and Plant Health. A 6th expert group, the High-Level Expert Group International Platform for Food Systems Science, completed its operations in 2022.

Notable networks

SCAR: The Standing Committee on Agricultural Research (SCAR) advises the EC, EU Member States, and Associated Countries on R&I priorities to tackle Europe's challenges in agriculture, fisheries, food systems, forestry, and the broader bioeconomy. Working closely with the European Commission, SCAR collaboratively develops impactful R&I strategies. SCAR fosters R&I by conducting foresight studies and providing recommendations, serving as an inspirational force.

EIT Food: is a community focused on addressing critical issues within the food system to improve outcomes for people and the planet. By adopting a mission-based approach, EIT Food prioritizes investments, funding, advocacy, and interventions to make a tangible difference. The community plays a pivotal role in shaping the goals and direction of EIT Food's missions, and individuals can contribute by joining the community. EIT Food collaborates with various partnerships, including FACCE-JPI and ERA-NET Cofund on Food Systems and Climate, to integrate and align national research resources in Europe.

FACCE-JPI (Joint Programming Initiative on Agriculture, Food Security, and Climate Change): and ERA-NET Cofund on Food Systems and Climate are collaborative initiatives focused on addressing the challenges at the intersection of food systems and climate change. FACCE-JPI aims to integrate and align national research efforts in Europe to develop a common research strategy for agriculture, food security, and climate change. It brings together 20 countries committed to building a cohesive European Research Area in these areas.

4.5 Initial findings on barriers for K&I policy from FOSTER CDIs

FOSTER has worked with CDIs to understand their perspectives on the K&I policy landscape. The project has brought policymakers into contact with the CDIs to enable an exchange of experiences and information. It has been noted in the FOSTER project that CDIs do not know most of the programmes from the EU and the DGs. When the CAP programmes reach the local and “on-the ground” actors, the CDIs experience that there is a lack of consultation. Interactions between EU policymakers and the CDIs have led to comprehension on resources that can be of help in CDIs gathering information of calls, such as the [EU Transition Pathways Platform](#).

Cross-border areas have been identified as outliers and potential areas for focus in improving funding and policy instruments for K&I. Regarding Hungary and Serbian stakeholder collaboration, instruments for promoting interregional development such as the [Interreg Danube Transnational programme](#) should be evaluated to see if the four thematic priorities and related calls are sufficiently tailored to facilitating small organisations working on food systems transformations and sustainable food initiatives.

In discussions with the Serbian CDI and interviews with Serbian farmers examples of cross border policies were described which increase the wealth inequality of the small holder farmers in comparison to big farms. From our discussions and interviews we assess that smallholder Serbian farmers work is affected because Serbia is not in the EU and therefore there is a lack of food system cooperation at the borders, which would be easier if Serbia would be part of the EU. The Serbian CDI is based in Mokrin, a village 15 minutes from the Romanian border which has many small-scale farmers. These farmers face so many barriers to exporting their goods to Romania, that they ultimately described it as impossible due to various EU policies. The farmers expressed increased inequalities in non-EU border countries, because large-scale farmers have the power and resources to make international deals for exportation. Small producers have the opportunity to export their products to the EU if they adhere to EU standards. However, their export opportunities are hindered because they lack the negotiating power that large companies have. Delta Agrar (one of the companies of Delta holdings a partner in FOSTER) can export to the EU, as they have traded with EU companies. On the EU side, farmers receive far higher subsidies than Serbian farmers, so also in low-income countries farmers can be insulated from price fluctuations giving them the ability to undercut Serbian farmers in markets. These examples highlight that EU border policies not only increase cross country inequalities but also in the non-EU countries themselves. The existing [Interreg-IPA CBC Hungary-Serbia](#) prioritises action in water management and nature protection but has also not had a new call since 2019. The [IPARD](#) is also active in Serbia which may not be sufficiently covering small organisations in the food system.

In FOSTERS discussion with the Spanish CDIs, we highlight that barriers are experienced in addressing urban food system interventions. The Spanish case illustrates that they are not consulted about food strategies at all levels of policy making, and public health authorities treat them as competition rather than partners in tackling issues. Policies around food, health and food supply chains need to have clearer definitions of stakeholders and their decision-making roles. To allow organisations at the focal point of the food system challenges, providing access to healthy, just and sustainably produced food for low-socio economic status neighbourhoods in Barcelona is needed, to shape food system strategies and have decision making roles in K&I development.

The Dutch CDI works with Participatory Guarantee System (PGS) and most of their challenges surround the goal of making this PGS dialogues an acknowledged way of interaction between farmers and citizens. At present PGS is sometimes seen as competition to organic certification or other established certifications. The goal is to make PGS a system that has new added value and that encourages wide participation between citizens and farmers on wider scale. It should produce value relevant for government policy and help it meet the needs of citizens over companies. In return policy should create more space for the PGS stakeholders to exchange information, and build the capacity for citizens to participate in the food system.

These are initial insights into the policy and governance related barriers which the CDIs faced while trying to bring about their desired food system changes while participating in the FOSTER project. The CDIs will continue to document and share their experience as they attempt to find solutions to these problems and adapt their strategies.

4.6 The Future outlook of the EU K&I policy development

Since the beginning of FOSTER in 2022 and the initial writing of the **Overview of K&I policies**, there has been a lot of change in the policy arena, both at home in the EU, and on the global policy stage. The discussion in 2024 has changed and priorities are shifting and adapting to a post COVID-19 world which has not seen the

desired “building back better” approach materialise¹¹. Post COVID-19 recovery has been faced with many challenges such as the rise of inequality in society, the war in Ukraine has continued, wars have begun in the Middle East, as relationships are deteriorating and there are rising tensions on the global stage. US policy in the 2025 presidency may tend towards more domestic focus, and the EU struggles to compete with the rest of the world, especially the US and China in Research and Innovation and other key economic areas. As a result, the EGD and all its associated policies are coming increasingly under scrutiny from certain political and societal actors who feel the transition to a sustainable Europe is coming at the cost of livelihoods and economic prosperity. The FOSTER project would like to reflect on how these changing perspectives may alter the food system transition, not by updating every single policy of our work up to now, but by reflecting on the possible futures, in which the EU K&I policy agenda may find itself in the coming years.

Hereby, we would like to reflect on two recent reports and explain some key insights they offer regarding the future of EU agriculture and European competitiveness: The Strategic Dialogue on the Future of EU Agriculture¹², and the Draghi Report¹³. Both reports address the need for transformation and innovation in their respective areas, aiming to ensure Europe's global competitiveness in the face of emerging challenges.

The Strategic Dialogue on the Future of EU Agriculture, launched in January 2024 by President Ursula von der Leyen, brought together 29 stakeholders from agriculture, civil society, and academia to develop a shared vision for the future of European farming. The dialogue's final report, published in September 2024, outlines recommendations for a sustainable, resilient, and competitive agri-food system over the next 10-15 years. The recommendations are structured around five key pillars: enhancing sustainability and competitiveness, advancing transformative resilience in response to environmental and geopolitical risks, fostering generational renewal, improving knowledge and innovation access, and promoting social responsibility across the sector.

In 2024 Mario Draghi prepared a report for the commission on his personal vision of the future of European competitiveness. The report highlights that the EU has been favoured by the global paradigm of US enforced security and a favourable global trade environment. This paradigm is now fading and as a result the EU can no longer rely on old truths to meet the needs of tomorrow. The report calls for Europe to address the issues of digitalisation and decarbonisation, while focusing on economic growth. This complex problem must be tackled by making the EU more productive. Otherwise, we might not be able to finance our social model and we risk having to scale back on major ambitions, such as envisioned food system transformation. A key solution is to enhance our R&I, as one of Europe's core strengths. “We [Europe] have many talented researchers and entrepreneurs filing patents. But innovation is blocked at the next stage: we are failing to translate innovation into commercialisation, and innovative companies that want to scale up in Europe are hindered at every stage by inconsistent and restrictive regulation” (Draghi, 2024, p. 6).

Both reports share concerns about Europe's global competitiveness, yet from different angles. The Agricultural Dialogue Group focuses on aligning EU farming practices with sustainability goals, integrating technology, and enhancing resilience to external shocks. It emphasises the need for a more robust agricultural strategy balancing environmental, social, and economic priorities. In the meanwhile, Draghi's report calls for a significant increase in EU investments and a more coordinated industrial policy to counter Europe's slowing economic growth, especially compared to the US and China. Draghi stresses the importance of fostering innovation and competitiveness through industrial strategies and investments to avoid economic stagnation.

¹¹ Read more about the report on accelerating the transition at: United Nations Development Programme. (2024). *Aligning NDCs with green recovery: A guidance framework*. United Nations Development Programme. Retrieved from <https://climatepromise.undp.org/research-and-reports/aligning-ndcs-green-recovery-guidance-framework>

¹² [The Strategic Dialogue on the Future of EU Agriculture](#)

¹³ Read the report by Draghi here: [EU competitiveness: Looking ahead - European Commission](#)

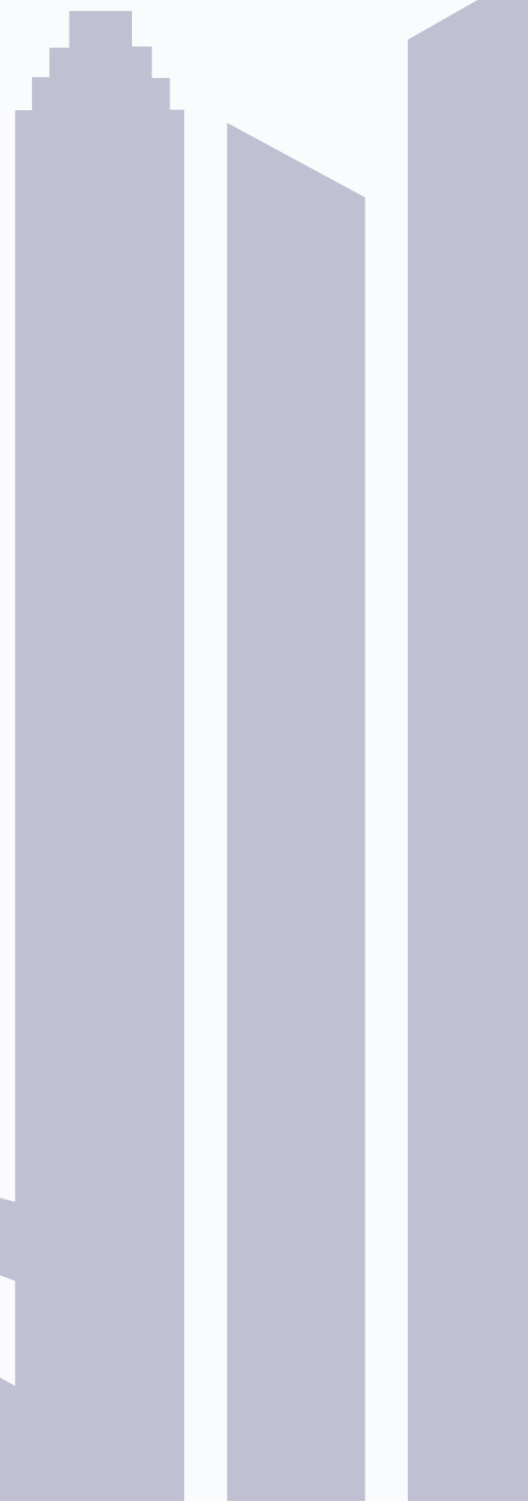
The Agricultural Dialogue Group highlights the necessity of sustainable practices, while Draghi's recommendations for fostering innovation and strengthening Europe's competitiveness, provide a broader framework that could support such agricultural transformation. Both reports suggest the urgency of overcoming economic and policy fragmentation, whether in agriculture or in industrial sectors, to maintain Europe's global standing and recognise the need for investments and innovation to maintain Europe's global standing. In addition, both reports emphasise the need to overcome economic and policy fragmentation in Europe. However, a critical remaining challenge is the R&I division between different regions in the EU. This division limits the potential of certain regions to fully contribute to, or benefit from the broader European growth agenda. For instance, the Strategic Dialogue on the Future of EU Agriculture highlights that innovation in agriculture is unevenly distributed across regions, with some areas lagging in technological adoption and sustainable practices. Similarly, the Draghi Report calls for a more coordinated industrial policy but also points out the disparities in investment and K&I capabilities across the EU, especially between more and less developed Member States. To address these disparities, the EU should focus on improving cohesion by investing in regions with weaker K&I capacities.

The EU needs to address the K&I division between different regions in the EU. However, there are notable regional disparities in K&I collaboration. Therefore, the European funding under notable policies and programmes such as the “Framework Programme for Research & Innovation” and the “European Structural and Investment Funds” are crucial to closing this gap and ensuring K&I development is promoted equally in the EU (European Commission: DG RTD, 2024). Furthermore, to sustain its competitive edge and progress toward the Sustainable Development Goals (SDGs), the EU must focus on translating scientific research into practical, commercial, and social applications. While innovation performance has improved, maximising the impact of research requires greater emphasis on knowledge sharing and application. This involves a systemic approach to knowledge diffusion, intellectual property management, and stronger collaboration between academia, industry, and government. To support innovation, adaptable regulations and a proactive standardisation strategy are crucial (European Commission: DG RTD, 2024). FOSTER's activities with the expert panel can add weight to this. As in workshops with the CDIs and Commission representatives, it has been acknowledged that there is interest in scaling up project results but there is misalignment with how the EU sees multistakeholder governance, potentially due lack of communication and the realities of representation at national level and therefore the desired changes are not being reflected fully between the local and European level.

The overview of K&I policies for food systems in the EU provides structure to the complex, and often confusing, landscape of various EU institutions, their policies, and their networks. The CDIs in FOSTER and policy makers in Brussels should assess them and see if they are fit for purpose, based on the reflections we provide here. For CDIs this means looking at their own funding mechanisms and seeing if they are taking full advantage of what the EU offers to aid them, in carrying out their goals. For policymakers this overview should help them reflect on whether the EU is creating a sufficient enabling environment to help SMEs and small-scale initiatives, which are at the heart of innovation in Europe. Only with this top-down and bottom-up approach, can we navigate to a future that foresees the food system transformation taking place in a fair, sustainable and productive way, where we thrive in a safe and just operating space. Otherwise, the food system transition may take place in a manner that leads to negative economic and likewise social outcomes in the short term. This will jeopardise the envisioned future environmental and health benefits of a sustainable EU food system.

Chapter 5

Network analysis



Chapter 5 – Network analysis

5. Analysis of CDIs networks

The network analysis was conducted to map the stakeholder landscape and assess how stakeholders influence food systems K&I policy in European institutions. This analysis incorporates insights from the FOSTER CDIs, which are used to inform policy developments on the ERA food systems and to provide recommendations for moving from AKIS to FOKIS and promoting aligned and coordinated K&I policies.

With this analysis, we aim to understand how information flows within the CDIs' networks and to uncover the knowledge underpinning each network. Additionally, we seek to identify all entities that have an interest in or can impact CDIs' activities, decisions, and performance. The process of creating these maps included developing a strategy and tools to collect information about the CDIs' environments, analysing the collected data, creating stakeholder diagrams and identifying relevant findings and implications for the CDIs. This was done in close interaction with all CDIs.

5.1 Research objectives

In FOSTER we aim to help to CDIs in becoming more involved in the KIS. This includes strengthening their networks, promoting their access to and influence on K&I, creating interfaces and exchanges between science, policy and practice, and learning by doing through action research and Reflective Monitoring in Action (RMA) (Prüse et al., 2023; Prüse et al., 2024). As part of this aim and joint learning trajectory, we have worked together with the CDIs to develop stakeholder network diagrams for FOKIS in their respective countries (Hungary, Germany, Netherlands, Serbia, and Spain). These diagrams are presented in the current chapter and will be centred on the CDIs. They include relevant FOKIS actor categories, such as public authorities, research and educators, third sector organisations/ associations, third sector NGOs, consumer associations, incubators, accelerators, investors, and financial agents, along with their linkages and knowledge flows. Based on the joint lessons learnt from this exercise, we aim to establish a set of actions for CDIs to implement, either to create new relationships not reflected in the current diagram or to strengthen the existing weak ones.

5.2 Methodology

To develop the stakeholder diagrams, we defined the following steps:

- Organising two webinars:
 - To present our vision for the network analysis and outline the necessary steps, we organised two dedicated webinars on July 9 and 16, 2024. These webinars were aimed at engaging the CDIs, providing a comprehensive overview of the planned work and jointly discussing how to move forward with the exercise.
- Gathering information about CDIs' environments:
 - To identify stakeholders that CDIs currently cooperate with or aim to collaborate with, we developed an Excel-based "stakeholder tool".

This tool was shared with the CDIs to complete, collecting data on existing and desired connections with stakeholders, as well as the scope and nature of these connections. The variables collected for each stakeholder and their corresponding options are presented below:

- Stakeholder categories: Government agencies; Industry/third sector associations; Technology providers; NGOs, including consumer and citizen representatives; Education; Research; Advisory or consultancy organisations; Financial/funding institutions; Media; FS actor (Producer); FS actor (Processing); FS actor (Storing); FS actor (Retailing); and FS actor (Disposing);
- Geographical scope: Local; Regional; National; European; and International;
- Level of influence of CDI on stakeholder (or stakeholder on CDI): High; Medium; and Low;
- Engagement objective: Information sharing; Collaboration; Capacity building; Advocacy; Funding acquisition; Policy influence; and Other;
- Current engagement status: Active; Potential; and Dormant;
- Desired engagement status: Maintain; Increase; Decrease; and Initiate;
- Impact of stakeholder on the CDI: Positive; Neutral; and Negative;
- Strategic importance of connection: Critical; Important; Moderate; and Low.
- Knowledge directional flow: From CDI to stakeholder; From stakeholder to CDI; and Both directions.
- Developing stakeholder diagrams:

After CDIs completed the Excel tool, we started the analysis of their stakeholders as follows.

First, each stakeholder was assigned to subcategories based on previously mentioned categories. These subcategories are presented below:

- Government agencies: International organisations/agencies/programmes; EC Directorates-General (DGs); EU parliament; National ministries; Agricultural/food chambers/offices; Regional governments; Local governments; Regional development agencies; and AKIS/CAP/ rural development network;
- Industry/third sector associations: Farmers associations; Food industry associations; Retail associations; Business/entrepreneurs associations; Rural development associations; and Agritourism associations;
- Technology providers: Agricultural start-ups;
- NGOs, including consumer and citizen representatives: Non-profit companies; Social organisations; Interest groups; Environmental organisations; Sustainable consumption and food awareness organisations; and Consumers associations.
- Education: Primary education; Secondary education; Higher education; and Other education centers;
- Research: Research institutions/centers;
- Advisory or consultancy organisations: Consultancy organisations/experts; and Law firms;
- Financial/ funding institutions: Accountant companies; Insurance companies; Banks; and Foundations;
- Media;
- FS actor (Producer): Producers.
- FS actor (Processing): Manufacturers.
- FS actor (Retailing): Retailers.

Second, for each subcategory and variable (namely level of influence, engagement objective, current and desired engagement status, impact of stakeholder on the CDI, strategic importance of connection and knowledge directional flow), we calculated percentages associated to the different options.

Third, to present the variables and the option associated with the highest percentage for each subcategory and CDI, we created different visualisations. To visualise categories and subcategories, we used balloons of different colours (see Table 3).

Table 3 Visualisation of stakeholder categories

Stakeholder categories - balloons	
Government agencies	Blue
Research	Red
Technology providers	Yellow
NGOs	White
Education	Orange
Advisory or consultancy organisations	Grey
Financial/ funding institutions	Brown
FS actor (Producer)	Violet
FS actor (Retailing)	Pink
Industry/ third sector associations	Black
Media	Light blue
FS actor (Processing)	Light violet

To visualise engagement objective, we used arrows of different colours (see Table 4) and for highlighting current engagement status, we used arrows of different thickness.

Table 4 Visualisation of engagement objective

Engagement objective - arrows	
Information sharing	Yellow
Collaboration	Green
Capacity building	Brown
Advocacy	Red
Funding acquisition	Orange
Policy influence	Blue
Other	Grey

To show the strategic importance of connection, we encircled stakeholders' categories (ballons) in circles of different colours: red – for critical, green – for important, purple – for moderate, grey – for low.

And to show the impact that the stakeholder has on the CDI, we used emojis: positive, negative or neutral.

Finally, we developed stakeholder diagrams of the current and desired situation for each of the CDIs (see Appendix A).

- Presenting the stakeholder diagrams:

On October 9 and 10, 2024, we organised a two-day event in Brussels, comprising a Project Meeting and a Joint Workshop with the FOSTER consortium and its science-policy expert panel. On October 9, during the Project Meeting, we presented and discussed the stakeholder diagrams with the CDIs and other consortium members. These discussions provided valuable insights and helped align the next steps for the network analysis task. On October 10, during the Joint Workshop with the FOSTER consortium and its science-policy expert panel, we facilitated a dialogue between the CDIs and the panel members. This was an opportunity for the CDIs to raise their voice, and to provide a sense of urgency and awareness that effectively support the transformation of food systems by addressing barriers and opportunities. The stakeholders' diagrams were also presented in the event and discussed.

5.3 Findings and implications for the CDIs

The FOSTER CDIs are embedded across different parts of the food system, addressing diverse goals. Some focus on the digitalisation of agriculture, while others form coalitions to amplify the voices of underrepresented stakeholders. Others aim to promote healthy and sustainable dietary habits through initiatives such as supporting local production and consumption, educational activities and fostering innovation towards integrated policies that accelerate the transition. These efforts involve a wide range of stakeholders with different geographical scopes and different perspectives on engagement and cooperation. By developing stakeholder diagrams, we tried to examine how these networks influence their activities and how different factors can help visualise these connections.

Based on the similarities and differences in the diagrams of the current and desired stakeholder environments, we present the key findings and their implications for the CDIs.

Governmental organisations engage at various levels in CDIs. The Delta Foundation in Serbia currently has connections with a limited number of governmental organisations at local, national and international levels. These connections are critical at national level, important at local level and moderately important internationally, primarily focusing on policy influence or collaboration. To foster collaboration and influence policy, the Delta Foundation aims to establish new connections with both local and international organisations. Additionally, it aims to strengthen its connections with national governments.

TCV from the Netherlands also has few stakeholders in this category at regional, national and European levels. These connections are important or critical and aim at advocacy opportunities. Maintaining connections with governmental organisations is critical for TCV, particularly in fostering relationships with national ministries to support advocacy efforts.

The Spanish CDIs¹⁴ and ERS in Germany have connections with some stakeholders from the governmental sector, predominantly at local or regional levels. For the Spanish CDIs, these connections are important for policy influence, and they would like to maintain them. ERS also has important governmental connections, but aiming at collaboration or information sharing. ERS seeks to preserve all of its connections within the governmental sector.

PLP from Hungary has significant connections at regional, national and international levels, including several critically important links with national ministries. These connections primarily focus on enhancing policy

¹⁴ We have developed one joint stakeholder diagram for the Spanish CDIs (FabLab and IrsiCaixa)

influence capabilities, although some also aim at fostering collaboration or facilitating information sharing. PLP aims to increase connections with some governmental organisations at regional, national and European levels.

Actors from the **research sector** are not widely represented within the CDIs. The Delta Foundation has some connections with research organisations/centres at national level, which are critical for the CDI to maintain. The Delta Foundation aims to establish a collaborative basis of connection with these organisations/centres.

TCV and the Spanish CDIs have also have connections with a limited number of stakeholders in research, operating mainly at national and regional levels. These connections are important for TCV and moderately important for the Spanish CDIs. Both CDIs would like to maintain these connections.

On the other hand, ERS and PLP have broader networks of stakeholders from the research sector. ERS cooperates with research institutions at both European and international levels. At these levels, it is important for this CDI to maintain connections while also increasing engagement at international level. PLP has important or moderately important connections at regional, national and European levels. The primary goal of these connections at regional and European levels is collaboration. However, at a national level, they also focus on information sharing and advocacy opportunities. PLP aims to increase collaborations with research institutions at national and European levels.

CDIs' relations with the **educational sector** are more extensive and operate at various geographical levels. The Delta Foundation's network in education is relatively narrow, with a few representatives at regional and national levels. With these connections, the Delta Foundations aims to share information or collaborate. These connections are important to be maintained for the CDI.

TCV's contacts with stakeholders from education are also relatively narrow and limited to the same geographical scope. TCV aims to collaborate with primary, secondary, higher educational establishments and with other educational centres, and to maintain these connections.

In contrast, other CDIs have much broader connections in this sector. PLP has more connections with education establishments at local, national and European levels. The aim of these connections is information sharing at local or national levels, and collaboration at European level. PLP wants to maintain engagement with education centres at local level, to increase engagement with higher education establishments at national and European levels, and with other education centres at European level. This CDI would also like to initiate connections with primary and secondary education establishments at local level.

The Spanish CDIs primarily connect with educational centres at local level and with higher education establishments and other education centres at regional level. They aim to share information with these centres/establishments, thus maintaining engagement. They also aim to increase participation of higher education establishments at regional level in their network.

ERS engages with stakeholders at local, regional and international levels and focuses on collaboration, information sharing and capacity building. ERS wants to maintain engagement with education centres at local level, with higher education establishments and other education centres at regional level, and with higher education establishments at international level.

Stakeholders from **non-governmental organisations (NGOs)** are not widely represented in the Delta Foundation network, which only includes limited connections at European level. These relationships aim at collaboration. The Delta Foundation aims to initiate connections with social organisations at European level.

TCV has a broader representation of stakeholders in this category, including environmental and sustainable organisations at both national and European levels, with the main objectives being collaboration and policy

influence. TCV aims to maintain existing connections with national-level environmental and sustainable organisations, while increasing connections with them at European level.

PLP also engages with various NGOs, such as non-profit companies, social organisations, food awareness groups and consumer associations, primarily at national level. These connections focus on collaboration or capacity building. PLP would like to increase most of their connections, while maintaining some relationships with local non-profit organisations.

The Spanish CDIs have limited representation from food awareness and social organisations at local level, and from environmental/sustainable organisations at regional level. Their interactions aim at sharing information or fostering collaboration. The CDIs aim to maintain connections with regional-level environmental/sustainable organisations, and to increase connections with food awareness and social organisations at local level.

ERS has the largest number of NGO connections among the CDIs. These partnerships span local, regional and national levels, with the primary goals of information sharing, collaboration and policy influence. ERS aims to maintain connections with social and sustainable/food awareness organisations at local, regional and national levels; to increase connections with sustainable/food awareness organisations at local and regional levels; and to increase connections with environmental organisations at regional and national levels.

Advisory or consultancy organisations are represented to a limited extent in the Delta Foundation, TCV and the Spanish CDIs, with connections mainly at local, regional and national levels. These connections serve distinct purposes for each CDI: policy influence for TCV, information sharing for the Spanish CDIs and collaboration for the Delta Foundation. Both TCV and the Spanish CDIs aim to maintain their existing connections. In contrast, the Delta Foundation aims to increase engagement with consultancy organisations at national level, and to initiate engagement with law firms at national level as well.

ERS and PLP have no representatives in this category, highlighting a very low engagement level of the CDIs with stakeholders in advisory and consultancy fields.

Financial organisations are not widely mentioned among the CDIs and typically cooperate at specific geographical levels: at local level with the Spanish CDIs, at regional level with ERS and at national level with the Delta Foundation and TCV. For most CDIs, these connections are important, primarily focusing on collaboration and funding acquisition opportunities.

Among them, TCV has the widest network of financial stakeholders, particularly with accounting organisations, foundations and banks. TCV aims to maintain these connections.

The Spanish CDIs aim to maintain their connections with local foundations, while ERS aims to increase its connections with regional foundations. The Delta Foundation would like to increase engagement with banks at national level.

PLP did not report any connections with financial institutions.

Industry associations play an important role for PLP, with engagements spanning local, regional, national and European levels. The aim of these engagements varies by geographical scope. At local level, PLP collaborates with rural development associations. At regional level, they engage with agrotourism and rural development associations for collaboration or information sharing. At national level, they work with agrotourism and farmers' associations, as well as business associations, to build advocacy opportunities. At European level, their engagement extends to agrotourism associations, farmers' associations, and farmers' federations with the goals of collaboration, policy influence and advocacy.

ERS and TCV have minor connections with farmers' associations, at regional level. ERS focuses on capacity building through these engagements and aims to maintain and increase them. TCV's goal is collaboration, and it plans to maintain its existing connections.

The Delta Foundation and the Spanish CDIs do not have any connections with industry associations.

Another type of industry connections involves **producers, retailers and processing companies** (manufacturers), which are represented across all CDI networks and play different roles in their value chains.

TCV and PLP have connections with **producers** at local level, focusing on capacity building. These connections are important or moderately important to them. TCV aims to maintain connections, while PLP to increase.

The Spanish CDIs, ERS and the Delta Foundation, in comparison, have connections with producers not only at local level, but also at regional level. For the Delta Foundation and ERS, local connections are critical, while regional connections are important or moderately important. The Delta Foundation focuses on capacity building and information sharing with producers, and aims to initiate or increase engagement. ERS prioritises collaboration, and aims to increase engagement. For the Spanish CDIs, connections with producers are important at local level but less significant at regional level. The purpose of these connections is to facilitate collaboration and information sharing. They aim to maintain or increase engagement with producers.

Retailers are widely presented in the ERS network at local, regional, national and international levels. These connections are important or moderately important, with the aim of collaboration and information sharing. ERS seeks to maintain or increase connections.

PLP has a minor but critical connection with a retailer at the local level, focusing on collaboration, and aims to strengthen this connection.

The Delta Foundation has some important connections with retailers at national level, aiming to share information. They are looking to increase these connections, but also to initiate new ones with other retailers. The Spanish CDIs collaborate with retailers at local level (critical importance) and regional level (low importance), with goals of collaboration or information sharing. They aim to maintain connections and initiate new ones.

TCV has important international-level connections with retailers, primarily targeting policy influence, and intends to increase their participation.

Manufacturers are not widely represented in the CDIs. TCV, the Spanish CDIs and ERS have limited connections with manufacturers.

TCV has connections at national and international levels. These connections are important, aim at policy influence and are important for the CDI to be maintained.

The Spanish CDIs aim to increase engagement with manufacturers at local level, emphasizing collaboration, with these connections being important.

ERS has moderately important connections at local and regional levels, with collaboration as the primary aim. ERS wants to increase engagement or initiate new connections with manufacturers.

PLP and the Delta Foundation did not mention connection with manufacturers.

Media connections within the CDIs' networks are limited. TCV has as a moderately important connection with media at national level, primarily aiming at collaboration. ERS reports an important connection at national level, also focused on collaboration. TCV seeks to increase media participation in its network, while ERS aims to initiate, maintain or expand these connections.

Other CDIs do not have any media connections, indicating a very low presence of media in their activities.

Connections with **technology providers** are also minimal among the CDIs. Delta Foundation engages with agricultural start-ups at national level. This connection is important, with a focus on information sharing and maintaining the relationship.

Other CDIs do not report any connections with technology providers, highlighting a low or non-existent engagement with this type of stakeholder.

5.4 Conclusions

Moving towards FOKIS requires more collaborative food systems and collaboration within food systems, with different stakeholders working together to co-create, implement, and scale up innovations that are driven by the needs and insights of different actors within the food system. Different stakeholders have a significant impact on food systems, each influencing various aspects such as production, distribution, consumption, production of waste and sustainability, and their inclusion is essential for developing food systems that are sustainable, equitable, and resilient. It requires multi-level, multi-actor collaboration, knowledge co-creation, and a commitment to gender and social equity.

An investigation into the stakeholder environments of CDIs reveals that a deeper understanding of their needs is necessary to assess the extent of their involvement in the current KIS. On one hand, CDIs express a desire to strengthen certain connections and become more integrated into the decision-making process. On the other hand, their current and desired situation maps indicate little to no engagement with some specific stakeholder groups.

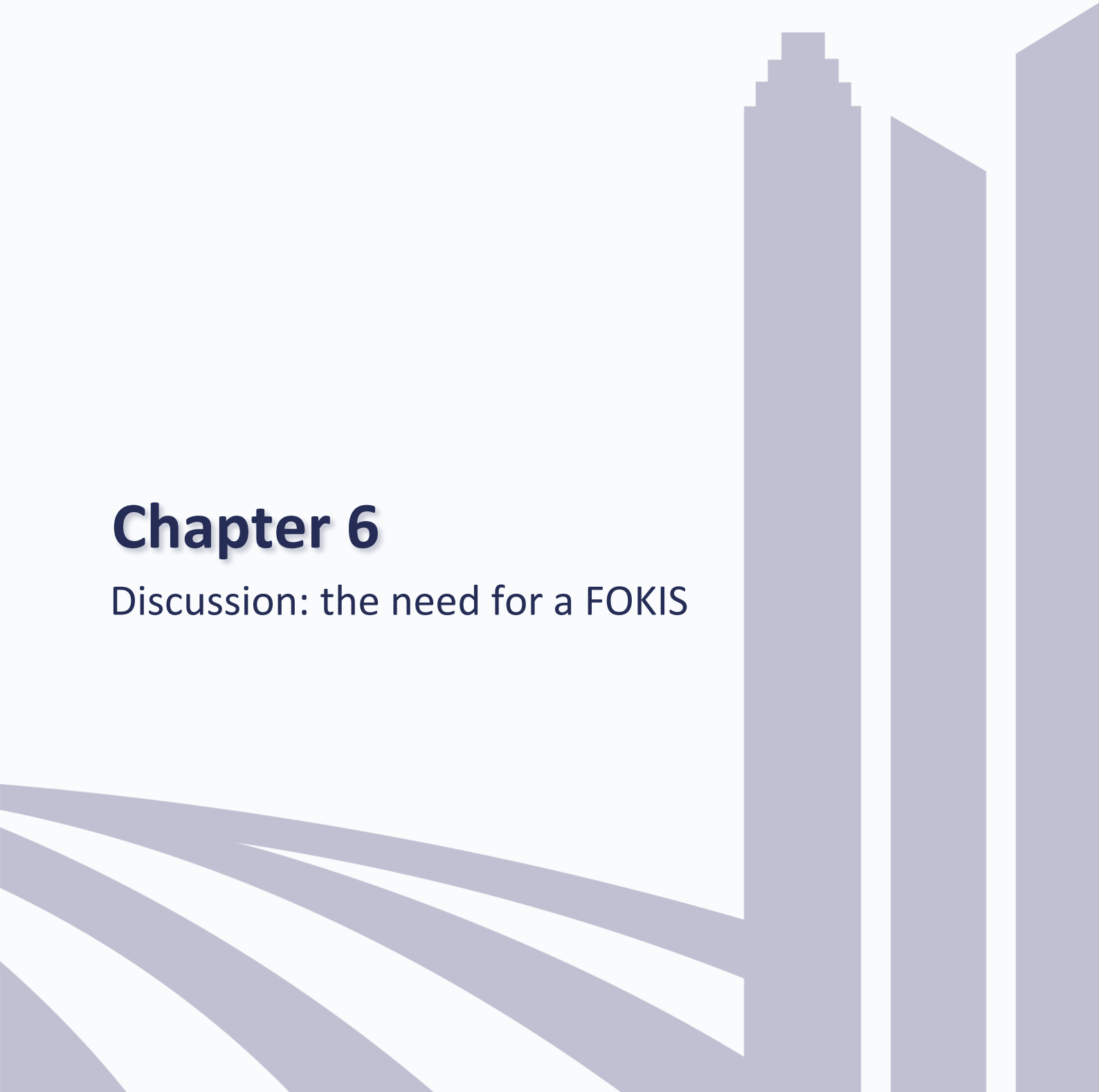
For example, the limited engagement of CDIs with the research sector could suggest that the research questions they are working on are not sufficiently addressed by the KIS, or that CDIs derive little benefit from such cooperation, or that it is difficult for them to find the specific knowledge they may need.

Other sectors, such as financial organisations and media, are also not widely mentioned among CDI stakeholders. Does this suggest that the lack of contact is due to insufficient requests for cooperation from the CDIs, or are their difficulties in establishing contacts and aligning goals?

Our goal is to identify this gap and explore how different CDIs formulate their research questions within the KIS. Additionally, to understand how to make food systems more inclusive for various stakeholders, ensuring that different perspectives, values, and experiences shape the development of innovative solutions.

Chapter 6

Discussion: the need for a FOKIS



Chapter 6 – Discussion: the need for a FOKIS

6. Governance and policy towards FOKIS

Throughout this document we have discussed the need for moving from the current AKIS to a FOKIS. Moving to a more sustainable, equitable and resilient food system requires a K&I system which can drive the adoption of solutions and approaches which benefit and represent a wide array of stakeholders and better integrate various knowledge types and flows. AKIS has connected farmers, researchers, advisors, business, and policymakers but a more systemic and inclusive approach to governing the full food system and its stakeholders is still missing. The complexity of the food system makes it challenging to steer and encourage adaptation of more sustainable, equitable and resilient practices on a systemic scale. Therefore, K&I is seen as a key area to improve, so it can be a driver of food system transformation. Overall, shifting from AKIS to FOKIS is not just a technical or managerial transition but a deeply political process that requires structural changes, power redistribution, and a fundamental rethinking of food systems.

6.1 Bridging science, policy and practice

Bridging science, policy, and practice in the transition from AKIS to FOKIS requires rethinking how knowledge is produced, shared, and applied in food systems. This shift challenges existing hierarchies in agricultural innovation and governance, demanding a more participatory, transdisciplinary, and justice-oriented approach. However, several governance and policy challenges hinder the development of FOKIS. A key issue across all empirical chapters of this report is the exclusion of certain knowledge holders and stakeholders, often due to power dynamics, institutional barriers, and exclusionary mindsets. Current policies often remain fragmented across different levels and cross cutting issues are often dealt with in siloes. Transdisciplinary collaboration is often lacking, and the bureaucratic world of food policy is difficult to access for many stakeholders.

Thus, FOKIS should more effectively link knowledge creation to actionable governance and produce more transdisciplinary knowledge to be more transformative in its scope. It should also help policymakers and other stakeholders to find and make use of more inclusive and comprehensive solutions to tackling urgent challenges faced by the food system and society. A more adaptive, mission-oriented governance approach is therefore required, integrating K&I policy across spatial scales and sectors to enable long-term food system transformation. Policy transformation is important in this context, shifting from centralized, technocratic governance to participatory decision-making that aligns policies across sectors and scales while supporting grassroots innovation. Science must move beyond corporate-driven research towards transdisciplinary, co-produced knowledge that values not only intensification and precision agriculture, but also health, agroecology and food sovereignty. Ultimately, moving from AKIS to FOKIS demands systemic change rather than incremental reform.

6.2 Enabling agency and promoting inclusivity

European policies, including the European Green Deal and Farm to Fork Strategy, emphasize the need for engaging with a wide range of societal actors. Yet, CDIs often struggle to access funding and participate in policy discussions. Many lack awareness of EU programs and regional disparities further complicate CDIs' ability to influence governance. A stakeholder network analysis reveals varying levels of CDI engagement with government, private sector, research institutions, education, and NGOs. Strengthening these connections is key to integrating CDIs into decision-making, fostering knowledge exchange, and accelerating systemic

change. To support the transition from AKIS to FOKIS, discussions should focus on how K&I systems can better integrate diverse knowledge holders, what governance reforms are needed to enable effective transformation, and how CDIs can enhance their engagement with policy, research, and funding opportunities.

The current KIS leaves many stakeholders unable to effectively influence decision making and take actions to further their goals for the food system. The KIS is geared to respond to linear thinking approaches. As we have identified, many excluded stakeholders are mainly from civil society, especially people with low socio economic backup, low income or/and immigrant backgrounds. Niche approaches and alternative practices are often excluded in a KIS that is production-oriented, and industry dominated. To promote the agency of various stakeholders in food systems transformation, the EU policy framework needs to be more open for different kinds of actors. It also needs to be reoriented to promote a better embedding of research and innovation in practice for stakeholders across the entire food system.

6.2.1 Working with Change-Driven Initiatives

All the CDIs involved in the FOSTER project are working together with stakeholders or citizens that are in some way disadvantaged by or at least not fully included in the current KIS. As highlighted in chapter 2, intermediaries, like our CDIs, promote capacity building, knowledge brokering and accelerate the speed of transformations. Our experiences in working with the CDIs, as documented in chapter 3, 4 and 5, provide concrete examples of how they aim to do so and promote a more inclusive KIS.

Both CDIs in Spain work directly with representatives from low socioeconomic neighbourhoods in Barcelona. The Dutch CDI is investigating how to increase citizen involvement in the governance of food systems via Participatory Guarantee Systems (PGS) and promotes various alternative visions and practices within the food system. Through interacting with the FOSTER teams over a period of two years, the CDIs developed an understanding of the barriers and challenges they are encountering in navigating the current system. For example, issues with cross border competition and collaboration in border regions such as Hungary – Serbia have come to light. The ERS in Stuttgart is struggling with power imbalances when dealing with well-established stakeholders. And in Barcelona some government agencies do not understand the need for a systemic approach promoted by the CDI encroaching on their work which obstructs collaboration.

Through the policy review (Chapter 4) and network analysis (Chapter 5) detailed in this document we have co-created an approach to identifying gaps in the CDIs networks and mapping areas where they seek to develop or improve their connections. In this, all CDIs have identified a desire to either create new connections to governmental organisations or to strengthen existing ties. In order to influence policy, advocacy efforts and/or knowledge sharing these connections are seen as crucial. Chapter 5 also shows that the research sector is not widely represented within CDIs contacts, but it is seen as important to maintain these contacts for information sharing purposes. Educational contacts are seen as important for all CDIs to share information and collaborate. NGOs are important also for collaborating on policy influence, especially for the German CDI. Meanwhile, we see that all CDIs share few contacts with technology providers, media, financial institutions, manufacturers. This highlights the disconnection between large and powerful stakeholders and grassroots movements, while CDIs indicated that these connections are important and would like to develop them.

6.3 Key ingredients for FOKIS

In Chapter 2 of this report, we have presented four key themes for governance and policy of FOKIS as a conclusion of our review of literature: (1) broadening the knowledge scope of KIS; (2) policy integration and alignment; (3) justice and food democracy; and (4) collaboration and network building. For each of these

themes, several ingredients had already been identified from the literature (see Table 1 in Section 2.3). Below, we revisit these ingredients based on the analysis in Chapters 3 to 5, expanding the four key themes into an updated and improved list of key ingredients for FOKIS. First, we shortly discuss the four themes – briefly summarizing their relevance before going into more depth. We then provide a new list of ingredients in Table 4, before discussing all these specific ingredients individually and providing references to the findings in this report underpinning the ingredients.

1. **Broadening the knowledge scope of KIS.** Innovations and ideas should be rooted in an integrated food systems perspective across actors in knowledge, industry & farming, civil society and government. There is a need for integrating and aligning various knowledge types and recognizing a diversity of practices that can lead towards transformation. Right now, this is underdeveloped due to siloed actors, disciplines and sectors.
2. **Policy integration and alignment.** Presently, there is a disconnect between policies and governance approaches that lead to different environmental, economic and social outcomes of the EU food system. Policies are often not aligned with stakeholders' aims and often lack a transformative scope, missing opportunities for integration at systemic level.
3. **Justice and food democracy.** Various economic and political structures exclude stakeholders from food systems decision making. It is important to address the unequal power distributions and to empower currently disempowered/underpowered actors with the agency to transform the food system, also recognizing regional inequalities.
4. **Collaboration and network building.** There is a need to bring together those with opposing views, finding common ground and pooling resources for stakeholders that are unable to make a change to the food system alone.

6.3.1 Renewed list of ingredients

Error! Reference source not found. in Chapter 2 describes the ingredients for a FOKIS linked to these four themes as derived from the literature review on governance. However, the literature review on underrepresented communities (chapter 3), the policy analysis (chapter 4) and the network analysis (chapter 5) provided additional ingredients for a FOKIS. Integrating and adapting the findings from the literature review has led to a revised and improved list of extended ingredients. These ingredients are described in Table 5 below.

Table 5 5 Extended list with governance and policy ingredients for FOKIS

Ingredient	Explanation
Broadening the knowledge scope of KIS	
Integrated food-systems perspective to K&I	Attention should be given to various parts of the food system and their interaction with each other as well as other systems in both rural and urban areas.
Transdisciplinary approaches for breaking knowledge siloes	Combining and valuing various knowledge types helps to overcome siloing and promotes more integrated food system approaches.
Support for alternative practices, economic models and knowledge types	Embracing diversity, alternative perspectives and alternative practices can promote new solutions, nurture their uptake, and empower stakeholders in transformation.
Mutual understanding about perspectives of various actors	A deeper and more systemic understanding of the needs and perspectives amongst stakeholders is needed to address the

	complexity of issues in the food system and promote actionable solutions for stakeholders.
Policy integration and alignment	
Linking KIS to actionable, future-oriented governance	Policy needs to have an orientation towards a desired future for aligning policies and frameworks, increasing its transformative potential and preventing short-term disconnected actions with a limited scope and focus.
Vertical and horizontal alignment across policy domains and the KIS	Vertical and horizontal alignment of policies can promote complementary efforts across sectors and scales, better aligning K&I systems and making them more effective.
Reflexive learning in the KIS	Continuously evaluating whether policies and governance lead to desired outcomes with participatory and systemic approaches leaves room for adaptation and responding to (societal) developments.
More accessible K&I structures	Aligning K&I structures with the ways of working of various stakeholders makes them more accessible, leveraging impact of policy by enabling more stakeholders to act with systemic approaches.
Justice and food democracy	
Addressing structures and power dynamics that support inequality	Unbalanced power of large stakeholders and complex political and economic structures that exclude certain stakeholders need to be addressed to promote a more equal power distribution.
Even distribution of (means for) innovation amongst regions.	Currently, innovation and means for innovation are not evenly distributed in Europe, leading to more inequality. Improving cohesion by investing in regions with weaker K&I capacities or giving better access will support equality.
Fair and equitable representation of underrepresented groups	Decisions are more effective and just when influenced by those at the focal point of issues, which is why underrepresented groups need to be included in processes of making these decisions.
Collaboration and network building	
Shared interests as a basis for collaboration and network building	There is an underutilised potential for collaboration that can be strengthened by developing a common understanding and language, focusing on underlying values and goals of various stakeholders.
Building capacities of stakeholders to make them better change agents	Not only do stakeholders need to be invited or allowed to contribute, but they need to have capacities for transformation. An equitable approach is needed by providing attention to specific wishes and needs.
Increased deliberation on decision making	Strengthening deliberation promotes mutual understanding, joint learning and the quality of decision making and potentially leads to finding unconventional solutions.
Strengthen the involvement of intermediaries in collaboration	Intermediaries often support the creation of a common understanding amongst stakeholders and leverage the agency of

citizens and other (marginalised) stakeholders, promoting transformation.

The ingredients which we have identified in Table 5.5 summarise the main findings and recommendations across the four empirical chapters of this report (chapter 2 to 5). These ingredients for FOKIS – as we name them – are supposed to help overcoming problems with our current KIS and point towards what can be considered as desirable for future food systems K&I (see also Cuhls et al., 2024a; Cuhls et al., 2024b). Below we discuss these ingredients clustered into the four main themes of Table 4: Broadening the Knowledge Scope of KIS (Section 6.2.2); Policy Integration and Alignment (Section 6.2.3); Justice and Food Democracy (Section 6.2.4); and Collaboration and Network Building (Section 6.2.5). Referring back to the analysis and findings from Chapters 2 to 5, we will now explore more closely how these ingredients are relevant for FOKIS.

6.3.2 Broadening the knowledge scope of KIS

A K&I system that informs governance structures to foster just and sustainable changes in the food system should include:

- **An integrated food-systems perspective to K&I:** Chapter 2 highlights how many of the current food system challenges arise from urban settings and how inclusion of stakeholders from these areas is considered key to finding solutions and accelerating the transition (Dijkshoorn-Dekker et al., 2020; Sonnino & Milbourne, 2022). This chapter therefore concludes that an increased focus on the role of urban areas in food systems K&I is required. The current AKIS and associated governance structures often focus on either rural production or occasionally on urban consumption, missing interconnections within and among them. Therefore, there is an urgent need to better link the different parts of the food system to be able to accelerate its transformation (Cuhls et al., 2024a; Ruben et al., 2019; Chapter 4). In this context, K&I structures can be improved by better connecting various parts of the food system (Moragues-Faus & Carroll, 2018), linking different parts of the food system and its value chains (Sonnino & Milbourne, 2022). While the urban dimension is important, we have broadened this ingredient in comparison to Chapter 2 to stress the importance of a broader food systems perspective.
- **Transdisciplinary approaches for breaking knowledge siloes:** The notion of transdisciplinarity refers to the co-production of knowledge between non-academic actors and academic actors of different disciplines, in order to “produce the best available knowledge and values, as well as the creation of shared ownership to deal with complex problems” (Cronin et al., 2024, p. 1). Transdisciplinary approaches are essential for breaking knowledge siloes in FOKIS because food system challenges are complex and span multiple domains of policy and sections of society (den Boer et al., 2021). Traditional knowledge structures, like those in AKIS, often prioritize sector-specific expertise, academic knowledge and technological solutions. As discussed in chapter 3, experiential and community-based insights are frequently overlooked. Chapter 5 also shows how knowledge flows in the network around CDIs are not always connected to those of policy makers and powerful industry actors. By integrating scientific knowledge with other knowledge flows, transdisciplinary approaches can foster integrated problem-solving. This helps to align diverse stakeholders around shared goals, enabling more practical and context-specific innovations reflecting real-world dynamics (den Boer et al., 2021). Future academic research in the food system should be better linked with local, experiential, and traditional knowledge. In this way, research findings are more likely to be used in practice (Hebinck, Klerkx, et al., 2021) and better tailored to the local context and understanding of stakeholders (Kern & Rogge, 2018).

Ultimately, breaking knowledge siloes through transdisciplinary working allows for more inclusive, efficient and better implemented food policies – increasing their transformative potential.

- Support for alternative practices, economic models and knowledge types:** All FOSTER CDIs to some extent promote alternative approaches to problems associated with our current food systems (Prüse et al., 2024; Chapters 4 and 5). While some CDIs are more closely connected with the policy regime and others less, they all struggle to be visible and to penetrate the current governance regime. And therefore, spreading their ideas in a field which is dominated by industry and production-oriented thinking, technical innovation and academic knowledge production – which leaves out for instance agroecological approaches (Ciaccia et al., 2021). Space for alternative practices and diversification can create room for more just and sustainable approaches and empower stakeholders to promote change – with diversification of practices offering a potential pathway towards larger transformation (Buijs et al., 2023; Cretella, 2019). Clark et al. (2021) emphasize the importance of creating governance spaces for underrepresented actors. This can further food sovereignty with integrated approaches by grounding transformative change in the actions of mobilised and empowered social actors working outside the dominant KIS oriented notably on agricultural production (Baker et al., 2021; Bui et al., 2019). Support for alternative practices, economic models and knowledge types should broaden the focus on innovation beyond the technical and economic (Chapter 4). It should also explicitly reach out to underrepresented communities and their ways of working (Chapter 3) – which can increase the diversity of practices within the KIS.
- Mutual understanding about perspectives of various actors:** In order to understand and address the complexity of food systems, all relevant stakeholders need to contribute (Dengerink et al., 2021). As discussed in chapters 2 – 5, right now, many stakeholders are underrepresented in decision making and their perspectives are often accounted for only to a limited extent. A common understanding of pressing issues is needed to create shared visions, equal distributions of power, and work towards actionable objectives (Grillitsch et al., 2019). If not, then conflicting interests and misaligned policies can hinder progress. Through exchange, stakeholders can refine their mutual understanding of complex issues and of each other’s position, fostering convergence and a greater awareness of their interdependent roles (Leeuwis & Pyburn, 2002). This can create a stronger foundation for collective action and policy alignment, reducing fragmentation and polarisation and increasing the legitimacy of governance structures (Giesbers et al., in press). To promote mutual understanding, participation should be promoted through different governance structures, for example alternative food networks, food councils and food sovereignty movements (Hebinck, Klerkx, et al., 2021). CDIs and similar actors can potentially play an important role in this as intermediaries and change agents, as is shown in chapter 5 of this report. By not just integrating diverse perspectives, but also promoting mutual understanding, FOKIS can develop more inclusive, adaptive, and impactful food system innovations.

6.3.3 Policy Integration and alignment

- Linking KIS to actionable, future-oriented governance:** A key finding from Chapter 2, as well as from other work in FOSTER (Cuhls et al., 2024a; Cuhls et al., 2024b), especially the Horizon Scanning displayed in fosterfutures.eu, is the importance of more long-term future-orientation in policy and governance. If policy lacks a direction or a mission-oriented approach, it risks short-termism oriented towards the next elections, limiting its long-term impact (Gaupp et al., 2021). Aligning policies and frameworks with shared future goals enhances their transformative potential (Kern & Rogge, 2018;

Klerkx & Begemann, 2020; Vincent & Feola, 2020). The policy analysis (Chapter 4) shows how EU policies and associated instruments aim to promote long-term objectives of food systems transformation. CDIs can play a crucial role in this by operationalizing future visions through experimentation, pilot programs, and cross-sector collaborations, but now they often struggle to connect with policy makers (see Chapters 4 and 5). In this light, future-oriented governance must also be actionable, meaning policies should translate long-term visions into concrete, implementable steps that can be acted upon by all relevant stakeholders. This should ideally ensure that policies are not just aspirational but drive real change in actual activities on the ground, better enabling policy to support transitions that address urgent global challenges (Gardeazabal et al., 2023; Knickel et al., 2018).

- **Vertical and horizontal alignment across policy domains and the KIS:** Chapter 4 highlights a vast body of relevant EU policies and instruments. In general, the EU sets frameworks which are then translated into national legislations by its member states. However, from the viewpoint of uptake and implementation, there are challenges in ensuring synergy between policies across different domains and governance levels. Policies can sometimes unintentionally contradict one another or create inefficiencies due to sectoral fragmentation or misaligned priorities between local, regional, national, and EU levels. As highlighted in Chapter 2, a wide range of scientific literature emphasizes the necessity of interconnected interventions and K&I policies. This requires vertical connections between policymakers across spatial scales. It also demands horizontal alignment across sectors to avoid siloed policymaking and ensure that policies reinforce rather than counteract one another. Strengthening these connections makes K&I systems more effective in enabling multilevel interventions and shaping integrated food policies (den Boer et al., 2021; Grillitsch et al., 2019; Puupponen et al., 2023). This is crucial for having an integrated approach addressing pressing food systems challenges (Dengerink et al., 2021; Köhler et al., 2019).
- **Reflexive learning in the KIS:** Our review of literature in chapter 2 highlights that striving for food systems transformation requires adaptability and ongoing stakeholder engagement to keep agendas aligned in the complex food systems context (Dijkshoorn-Dekker et al., 2020). Transformations are turbulent processes where power-shifts and changing positions are to be expected and potentially need to be acted upon. In this context FOKIS should provide space for learning, reflection and adaptation (Huttunen et al., 2022; Ruben et al., 2019). Yet, existing governance models in our food systems often struggle to navigate complexity, foster collaboration and enable adaptive learning (Ciaccia et al., 2021; den Boer et al., 2021; Ruben et al., 2019). A similar criticism can be made towards some of the EU's policy programmes (chapter 4) and efforts by some national policy makers (chapter 5). Policy makers should therefore continuously reflect to ensure that the policy choices that are made are leading us towards a desired future. Promoting continuous reflective monitoring and evaluation of practices, policies, and power structures will help maintain the equity, relevance, and adaptability of transition efforts (Hebinck, Zurek, et al., 2021; Verwoerd et al., 2021). Adaptive learning processes, driven by transdisciplinary collaborations, allow stakeholders to refine strategies and frameworks iteratively, responding to emerging challenges and shifting dynamics in food systems (den Boer et al., 2021). Transformations always occur under uncertainty and therefore need foresight thinking and learning from potential futures, as discussed in Cuhls et al. (2024b).

- **More accessible K&I structures:** As AKIS is mainly focused on established agricultural players and large industry actors, the main K&I structures are also designed to fit these actors (Feola, 2025; Spaargaren et al., 2013). This determines to a large extent where money and time are allocated in food systems innovation. As a result, other actors might not find their way around existing K&I structures and often do not comply to rules or characteristics needed to make use of these K&I structures. For instance, they might not be eligible for certain subsidies or have the capacity to participate in Horizon Europe projects (see chapter 4). Chapters 2 and 4 showed that some organisations, like some of the CDIs, experience difficulties with finding funding mechanisms which they can access. More accessible K&I structures in a FOKIS require that preconditions for K&I structures are more diverse and transparent. Rules and regulations need to be explained in a way that is understandable for everyone. Also, it is important to create less administrative obstacles and set the preconditions in such a way that more stakeholders are eligible to apply.

6.3.3 Justice and Food Democracy

- **Addressing structures and power dynamics that support inequality:** Large companies and powerful government institutions hold a disproportionate amount of influence over the food system, shaping policies, market structures, and decision-making processes in ways that often favour their own interests (Béné, 2022). This concentration of power limits the participation and agency of smaller actors, such as CDIs, small-scale farmers, grassroots movements, and marginalized communities, who struggle to gain recognition and resources within existing governance frameworks. As highlighted in Chapter 4, policies frequently reinforce these inequalities by favouring industrial agriculture, large-scale food producers, and well-established stakeholders, making it difficult for alternative models to emerge and thrive. Addressing these power imbalances is not only a matter of fairness but also a necessary step toward a more inclusive, resilient, and sustainable food system. As seen in Chapter 3, scholars argue that inclusive governance is a prerequisite for transformative change in the food system (Davies et al., 2019; Van Den Akker et al., 2024). For FOKIS, this means actively engaging with power dynamics by challenging structures that entrench inequality while creating pathways for more democratic participation in an equal playing field.
- **Even distribution of (means for) innovation amongst regions:** Innovation in agriculture and food systems is unevenly distributed across the EU, leaving some regions behind in technological adoption, economic competitiveness and sustainability transitions. As highlighted in Chapter 4, border regions – such as those in Serbia – might also face structural disadvantages that exacerbate economic and governance disparities. Addressing regional disparities is crucial for creating a more resilient and inclusive European food system that utilizes the potential of all its member states and their regions for achieving a sustainable food system. To address these disparities, the EU must strengthen investment in regions with weaker K&I capacities through targeted funding, knowledge diffusion, and capacity-building. Policies should foster regional innovation ecosystems by enhancing collaboration between local, national, and EU actors and ensuring alignment between governance levels. For FOKIS, this means advocating for more adaptive policies that recognize and support regional diversity in innovation ecosystems. By doing so, FOKIS can contribute to a European food system that leverages the strengths of all regions, rather than reinforcing existing disparities.

- Fair and equitable representation of underrepresented groups:** For food system governance to be inclusive and transformative, it must go beyond tokenistic participation and address structural barriers that prevent underrepresented groups from having a real say in decision-making and contributing to societal change. Chapter 3 outlines five key reasons for ensuring their fair and equitable representation: (1) normative reasons which highlight the “all affected principle” (Baena et al., 2023); (2) joint learning promotes a holistic understanding of food systems issues (Van Den Akker et al., 2024); (3) including underrepresented groups promotes sustainable and equitable transformative change (Davies et al., 2019); (4) inclusivity increases the legitimacy and support of decision making (Kok et al., 2021); and (5) improved quality in decisions made (Zollet & Maharjan, 2021). However, deliberation alone is not enough. More attention is needed to reshape decision-making structures in ways that promote distributive, recognitive, and procedural justice (Huttunen et al., 2022). This requires an intersectional approach across food system sectors, acknowledging the political dimensions of justice to advance food equity (Moragues-Faus, 2020). As seen in Chapter 5’s network analysis, CDIs remain disconnected from key actors they need to engage with, highlighting the current exclusionary nature of the K&I system. FOKIS should work toward bridging these gaps by fostering stronger networks and advocating for inclusive governance reforms.

6.3.4 Collaboration and network building

- Shared interests as a basis for collaboration and network building:** There is a underutilised potential for collaboration in food systems change that can be strengthened by developing a common understanding and language, focusing on underlying values and goals of various stakeholders (Bui et al., 2019). One of the key insights from FOSTER is that CDIs are highly diverse in their goals, operational methods, and approaches to food system transformation. This diversity can be a challenge, but it also presents an opportunity: building collaboration around shared interests rather than expecting full alignment on every issue. The diversity shows that there are not standardized approaches and that there is a need to further explore the CDI's roles, approaches and methodologies to be able to design the networks of CDIs that are needed in each local, regional and national context. In Chapter 5, we demonstrated the first step in this process by mapping CDI networks, helping them identify opportunities for mutual learning and strengthening connections. Establishing new social relations, improving stakeholder capacities, and fostering collaboration can enhance decision-making by reinforcing deliberation and participatory governance (Hölscher et al., 2019) – something which we also learnt from the interactions with the FOSTER CDIs. A FOKIS should therefore promote cross-sector networks and joint learning, offering stakeholders the chance to exchange insights and scale up transformative actions. This approach supports creative problem-solving and the development of unconventional solutions necessary for transitioning toward a sustainable food system (Knickel et al., 2018).
- Building capacities of stakeholders, to make them better change agents:** For food systems transformation to be inclusive and effective, non-powerful stakeholders must play an active and sustained role in governance rather than merely being involved in one-time consultations (Clark et al., 2021). Capacity building is essential to enable them to contribute meaningfully to decision-making, ensuring that policies reflect diverse perspectives and needs. But it is just so important that stakeholders also build skills that allow them to contribute to food systems change in their daily lives. In chapter 3 we highlighted formal arrangements that can aid in this such as citizen juries, mini publics, food policy councils (Brons, Oosterveer, et al., 2022; Candel, 2022; Davies et al., 2019; Prové et al.,

2019), participatory budgeting or citizens' budgets (Candel, 2022; Holtkamp & van Mierlo, 2022). However, meaningful participation requires more than just invitations; stakeholders must have the skills, knowledge, and resources to engage effectively. Tailored support, such as training, financial assistance, and institutional backing, is crucial to level the playing field. FOSTER is helping in capacity building of both CDIs and academic partners, and in developing evidence to contribute to advance towards defining clear guidelines or ingredients to transform KIS. For FOKIS, this means fostering long-term capacity-building efforts so that all stakeholders—especially those traditionally excluded—can act as agents of change. Strengthening their role in governance will lead to more equitable, responsive, and resilient food systems policies.

- **Increased deliberation on decision making:** Chapters 2 and 3 both highlight that more parts of society need to be involved in solving complex issues in order to have more effective and just decisions (den Boer et al., 2021; Kok et al., 2021; Zollet & Maharjan, 2021). Strengthening deliberation fosters mutual understanding, joint learning, and higher-quality decision-making, while also creating space for unconventional solutions that may not emerge through conventional policymaking. FOKIS should actively promote new stakeholder networks where diverse actors can engage in dialogue, share knowledge, and co-develop transformative actions. Deliberative processes are especially valuable for amplifying the voices of marginalized groups (Bui et al., 2019), ensuring their perspectives co-shape the transition to a more equitable food system. Creative problem-solving and out-of-the-box thinking are essential to overcoming entrenched challenges (Knickel et al., 2018). The way of working in FOSTER exemplifies how this can be done by facilitating deliberation through connecting CDIs, experts, and policymakers through its expert panel. As highlighted in chapter 4 and visualized in chapter 5, expanding and strengthening these networks will enhance communication flows and improve the effectiveness of food system governance.
- **Strengthen the involvement of intermediaries in collaboration:** Intermediaries that connect various stakeholders play a key role in network-building for societal change. Without their involvement, the acceleration of transformations is seen as unlikely (Kivimaa, Boon, et al., 2019; Kivimaa, Hyyalo, et al., 2019). In this light, scientists, like other societal groups, can also act as intermediaries in K&I: as change agents, communicators, and facilitators to engage a broader range of stakeholders (den Boer et al., 2021). Additionally, new intermediaries – such as FOSTER's CDIs – can play distinct roles at different phases of a transition, from agenda-setting and promoting new approaches in the KIS, to implementation and scaling. In chapter 3 we have also discussed if participation should always be inclusive. In the FOSTER consortiums' opinion, organising a participatory process without being inclusive is often not valuable. This critical reflection highlights that intermediaries are especially crucial when stakeholders hold conflicting views, as they can mediate, build trust, and create common ground for effective collaboration. By facilitating dialogue across diverse perspectives, intermediaries can enhance the legitimacy and coherence of governance processes, ultimately strengthening the transition towards more sustainable food systems.

6.4 Critical reflection

This deliverable identified a need to change global food systems and an accompanying need to broaden stakeholder participation in AKIS. And the need to broaden stakeholder participation with transdisciplinary and systemic approaches. It also presented suggestions on how to do this, reasonable suggestions in the face of a European agricultural and food regime that is seen by some as being violent to nature, people and their

knowledge. Historically this regime has roots of more than five centuries (as recently documented by, e.g., ecologist Argeloo (2022), economist Piketty (2022) and philosopher Jhagroe (2024) but also much earlier by anthropologist Wolf (1982) and agricultural historians Segers et al. (2009).

Whilst acknowledging the salient importance of telling this longer history, it seems acceptable to immediately jump to the 1990s as the start of the current phase in discussing and addressing the prevailing global industrial-capitalist agricultural and food system. This was the decade of the historical compromise between economics and ecology in the pursuit of sustainable development (e.g., UNCED Earth Summit in 1992¹⁵), ecological modernisation (e.g., Huber (2004)) and sustainable intensification of agriculture (e.g., WRR (1992)). This compromise persists in the European Green Deal and the recent conceptual framing of a “safe and just operating space.” Both approaches fail to address the major issues at stake, continuing to assume that one can have their cake and eat it too, thereby overlooking the inherent scarcity and limits of natural and human resources. The 1990s were also the decade of the alleged triumph of liberalism over socialism/social democracy (some scholars, i.e. Fukuyama (1992), even pronounced the “end of history”).

How different do things look in the post-Covid roaring twenties with everyday news from the eastern front (cf. Remarque (1928) and people firmly confined in their respective bubbles with more than a little help from social media algorithms. Cautious observers could have seen the historical compromise of sustainable intensification of agriculture already falling apart in the 2000s and 2010s but it is definitely “out” in the public debates nowadays. The sociocultural undercurrent of ecologists and organic agriculture practitioners have retreated in their lifestyle bubble, whereas the socioeconomic elite of agrifood multinationals no longer feel a need to look beyond the dogma of “*the business of business is business*” (Friedman, 1970). This left European bureaucracies (EU and Member States) with technocrats “*falling for the promise of the emptiness machine*” (Linkin Park, 2024) and people in marginalised positions suffering from the European agricultural and food regime without a way to express their voice. Some politicians have added blaming the victim to their repertoire by trapping poor white industrial workers into the fallacy of believing that at least equally poor migrant communities of colour are the source of their misery.

The need to change global food systems, the CAP and the accompanying AKIS is obvious, but it is not that clear that broader stakeholder participation in the latter system makes much sense or can be organised as a transformation pathway. Such assimilation proposals are the standard system response to lifeworld challenges¹⁶ (Habermas, 1984) and should not be accepted at face value. Systems do not change without changing the rules and the rulers, without deconstruction before reconstruction (Hoes et al., 2012). It is therefore better to adopt an actor-oriented approach that sees people as fundamentally capable and willing persons (e.g., Long & Van der Ploeg, 1989) who can make a change. However, it is pivotal to adopt an appreciative yet critical stance towards food initiatives to ensure that they do not violate nature, people and their knowledge as in the prevailing industrial-capitalist agricultural and food system. Key criteria for such a stance are:

¹⁵ See <https://www.un.org/en/conferences/environment/rio1992>

¹⁶ The lifeworld represents the shared understandings, cultural traditions, and social norms that guide communication and interactions in society. Challenges to the lifeworld arise when external systems—such as the economy, bureaucracy, or technology—start dominating and disrupting these social and cultural structures. Habermas contrasts the lifeworld with the system, which includes formal institutions like the market and state, governed by power and money rather than mutual understanding.

- *Inclusion of agroecology spokespersons for the interests of nature and earth.* Agroecology has been widely recognized as a critical pathway for sustainable food systems, balancing productivity with environmental integrity (Altieri & Nicholls, 2017). However, dominant agricultural policies often favor industrial models, marginalising agroecological voices (IPES-food, 2016). Ensuring the inclusion of agroecology spokespersons in food systems K&I would help address the ecological crises driven by intensive agriculture and promote biodiversity (Gliessman, 2016), as well as integrate local and cultural ecological knowledge (cf. Arts et al., 2022).
- *Inclusion of an “act globally, act local” philosophy to ensure that European needs are not catered at the expense of poor people of colour in the global south.* The current structure of global agricultural trade often exacerbates inequalities, with European agricultural policies and subsidies leading to market distortions that undermine farmers and citizens in the Global South (Clapp, 2015) and even those farmers just across the EU’s borders (as we learnt from the Serbian CDI). Land grabs, exploitative labor conditions, and unsustainable sourcing of commodities illustrate the need for food system transitions that do not externalize environmental and social costs across borders (Borras et al., 2011), but rather points towards the need for policy frameworks to consider issues globally across knowledge disciplines and sectors.
- *Inclusion of voices of economically disadvantaged migrant people of colour in Europe and their needs for available and affordable sufficient and healthy food.* Migrant and racialized communities in Europe disproportionately experience food insecurity due to economic exclusion and structural discrimination (Klein, 2024). Studies have shown that access to culturally appropriate, affordable, and nutritious food is a key determinant of health, yet European food systems often fail to accommodate these needs for various minorities (Abdalla & Goulao, 2024; Intersos Hellas, 2023). Addressing food system transformation without integrating these voices risks perpetuating existing inequalities.
- *Inclusion of voices of indigenous minority communities in Europe (e.g. Roma, Sami, Sinti) and their needs for available and affordable sufficient and healthy food.* Indigenous and minority communities across Europe face systemic marginalization in access to land, food, and natural resources. The Sami, for instance, continue to struggle with industrial encroachments on reindeer herding lands (Johnson, 2016), while Roma communities frequently encounter food insecurity due to socio-economic exclusion (Soares et al., 2024). Recognizing these communities’ rights and knowledge systems is crucial for a genuinely inclusive and just food transition.
- *Inclusion of voices of economically disadvantaged white people in Europe and their needs for available and affordable sufficient and healthy food.* Food insecurity is also a growing issue among economically disadvantaged white Europeans, especially in rural and deindustrialized regions (Loopstra, 2020; United Nations, 2022). The rise of food banks and emergency food aid across the EU highlights how poverty cuts across racial and ethnic lines, necessitating an inclusive approach to food justice that does not exclude any disadvantaged group (Hermans et al., 2023; Thompson et al., 2018).

It is possible to wonder about whether this is perhaps asking for too much identitarian politics. EIP-AGRI as a previous attempt to broaden inclusion of voices on European agricultural knowledge and innovation shows what happens without such criteria. This platform has not addressed the lack of stakeholder diversity any more than the more formalised AKIS. And therefore has still not undertaken a transformation that resembles transformative change to the current regime. This is not only because certain people are excluded but also because qualitatively different knowledge among these missing persons (cf. Douglas, 1998) is equally excluded: their more informal, local, experimental, practical and actionable experiences. Even if the CDIs in FOSTER do not all live up to all of these criteria, there are coalitions of food initiatives that do, among them La Via Campesina. A range of food movements in the Global South experiment with and promote strategies for community-university partnerships in collaborative enactment of social transformation (Guzmán Luna et al.,

2022; Kesselman, 2022). There is currently an absence of partnerships with these movements and their organisations in EU-funded R&I projects. Rather than trying to broaden participation of CDIs or other food initiatives in AKIS or FOKIS by training initiatives on how to work with the bureaucracy, funding schemes and jargon of the system, the EU may better start just listening to the needs for upscaling regime changes as voiced by those initiatives. Beyond sustainable intensification might bloom agroecology in a just society.

Moving forward, it is imperative to continue refining and operationalising these ingredients in practice. The transformation towards a more future-oriented, open, and just knowledge and innovation system for food requires both commitment and adaptability. By fostering synergies between different sectors, disciplines, and governance levels, we can create a food system that is not only more sustainable but also more resilient, democratic, and inclusive for future generations.

Bibliography



Bibliography

- Abdalla, L., & Goulao, L. F. (2024). Food security and nutrition in refugee camps in the European Union: Development of a framework of analysis linking causes and effects. *Food Security*, 16: 735-755. doi: <https://doi.org/10.1007/s12571-024-01440-5>
- Achterbosch, T., & Bogaardt, M. (2022). Europese kennisnetwerken voor verduurzaming van voedselsystemen: Nederlandse posities in een veranderend speelveld: Achtergrondnotitie voor workshop. Retrieved from
- Acs, S., Costa Leite, J., Sanyé-Mengual, E., Caivano, A., Catarino, R., Druon, J.-N., . . . Gurría, P. (2025). Towards sustainable food systems: developing a monitoring framework for the EU. *Frontiers in Sustainable Food Systems*, 8. doi:doi:10.3389/fsufs.2024.1502081
- Altieri, M. A., & Nicholls, C. (2017). Agroecology: a brief account of its origins and currents of thought in Latin America. *Agroecology and Sustainable Food Systems*, 41 (3-4): 231-237. doi:<https://doi.org/10.1080/21683565.2017.1287147>
- Anderson, M., & Leach, M. (2019). Transforming food systems: The potential of engaged political economy*†. *IDS Bulletin*, 50 (2): 131-146. doi:<https://doi.org/10.19088/1968-2019.123>
- Argeloo, M. (2022). *Natuuramnesie: hoe we vergeten zijn hoe de natuur er uitzag*. Amsterdam: Atlas Contact.
- Arts, K., Mattijssen, T. J. M., & Wiersum, K. F. (2022). Dynamics in community forestry in the Netherlands. Impacts of changing cultural ecological knowledge. In J. Bulkan, J. Palmer, A. M. Larson, & M. Hobley (Eds.), *Routledge Handbook of Community Forestry*. London: Routledge.
- Baena, P. A., Brunel, A., Fernández-de-Larrinoa, Y., Martínez-Cruz, T. E., Milbank, C., Way, M., . . . Rights, I. I. P. (2023). In Brief: The White/Wiphala Paper on Indigenous Peoples' Food Systems. *Science and Innovations for Food Systems Transformation*: 229.
- Baker, P., Lacy-Nichols, J., Williams, O., & Labonté, R. (2021). The political economy of healthy and sustainable food systems: an introduction to a special issue. *International Journal of Health Policy and Management*, 10 (12): 734.
- Béné, C. (2022). Why the Great Food Transformation may not happen—A deep-dive into our food systems' political economy, controversies and politics of evidence. *World Development*, 154: 105881.
- Bornemann, B., & Weiland, S. (2019). Empowering people-democratising the food system? Exploring the democratic potential of food-related empowerment forms. *Politics and Governance*, 7 (4): 105-118.
- Borras, S. M., Hall, R., Sconnes, I., White, B., & Wolford, W. (2011). Towards a Better Understanding of Global Land Grabbing: An Editorial Introduction. *Journal of Peasant Studies*, 38 (2): 209-2016. doi:10.1080/03066150.2011.559005
- Borsellino, V., Ascani, M., Martino, G., & Schimmenti, E. (2024). Practices of food democracy: A systematic review. *Local Development & Society*: 1-30.
- Brons, A., Oosterveer, P., & Wertheim-Heck, S. (2022). In-and exclusion in urban food governance: exploring networks and power in the city of Almere. *Journal of Environmental Policy & Planning*, 24 (6): 777-793.
- Brons, A., van Der Gaast, K., Awuh, H., Jansma, J. E., Segreto, C., & Wertheim-Heck, S. (2022). A tale of two labs: Rethinking urban living labs for advancing citizen engagement in food system transformations. *Cities*, 123: 103552.
- Bronzwaer, S., Catchpole, M., de Coen, W., Dingwall, Z., Fabbri, K., Foltz, C., . . . Jokelainen, P. (2022). One health collaboration with and among EU agencies—Bridging research and policy. *One Health*, 15: 100464.
- Bui, S., Costa, I., De Schutter, O., Dedeurwaerdere, T., Hudon, M., & Feyereisen, M. (2019). Systemic ethics and inclusive governance: two key prerequisites for sustainability transitions of agri-food systems. *Agriculture and Human Values*, 36: 277-288.
- Buijs, A. E., de Koning, S., Mattijssen, T. J., Smeding, I. W., Smits, M.-J., & Steins, N. A. (2023). Civil society for sustainable change: strategies of NGOs and active citizens to contribute to sustainability transitions. *Journal of Environmental Planning and Management*: 1-22. doi:10.1080/09640568.2023.2205571

- Candel, J. J. (2022). Power to the people? Food democracy initiatives' contributions to democratic goods. *Agriculture and Human Values*, 39 (4): 1477-1489.
- Carayannis, E. G., & Campbell, D. F. (2009). 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International journal of technology management*, 46 (3-4): 201-234. doi:<https://doi.org/10.1504/IJTM.2009.023374>
- Ciaccia, C., Testani, E., Fiore, A., Iocola, I., Di Pierro, M., Mele, G., . . . Farina, R. (2021). Organic agroforestry long-term field experiment designing through actors' knowledge towards food system sustainability. *Sustainability*, 13 (10): 5532.
- Clapp, J. (2015). Food security and international trade. Unpacking disputed narratives. Retrieved from
- Clark, J. K., Lowitt, K., Levkoe, C. Z., & André, P. (2021). The power to convene: making sense of the power of food movement organizations in governance processes in the Global North. *Agriculture and Human Values*, 38 (1): 175-191.
- Commission, E. (2020). A Farm to Fork strategy for a fair, healthy and environmentally-friendly food system. COM/2020/381. Retrieved from Brussels: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381>
- Cretella, A. (2019). Alternative food and the urban institutional agenda: Challenges and insights from Pisa. *Journal of Rural Studies*, 69: 117-129.
- Cristóvão, A., Ferrão, P., Madeira, R., Tibério, M. L., Rainho, M. J., & Teixeira, M. S. (2009). Circles and communities, sharing practices and learning: looking at new extension education approaches. *Journal of agricultural education and extension*, 15 (2): 191-203.
- Cristóvão, A., Koutsouris, A., & Kügler, M. (2012). Extension systems and change facilitation for agricultural and rural development. In I. Darnhofer, D. Gibbon, & B. Dedieu (Eds.), *Farming systems research into the 21st century: The new dynamic* (pp. 201-227). Dordrecht: Springer.
- Cronin, E., Block, T., Fosselle, S., & Rogge, E. (2024). Whose knowledge counts? Power dynamics in the co-production of knowledge and innovation in agri-food systems. *Science and Public Policy*, 51 (6): 1117-1132.
- Cuhls, K., Voglhuber-Slavinsky, A., & Banchs-Piqué, M. (2024a). D1.2 Interim Report: New Topics in Food Systems - Horizon Scanning Long List. Retrieved from <https://data.europa.eu/doi/10.2777/717705>
- Cuhls, K., Voglhuber-Slavinsky, A., & Banchs-Piqué, M. (2024b). D1.5 Report Context Scenarios for Food Systems. Retrieved from <https://doi.org/10.24406/publica-2992>
- Danse, M., Klerkx, L., Reintjes, J., Rabbinge, R., & Leeuwis, C. (2020). Unravelling inclusive business models for achieving food and nutrition security in BOP markets. *Global Food Security*, 24: 100354.
- Davies, A. R., Cretella, A., & Franck, V. (2019). Food sharing initiatives and food democracy: Practice and policy in three European cities. *Politics and Governance*, 7 (4): 8-20.
- den Boer, A. C., Kok, K. P., Gill, M., Breda, J., Cahill, J., Callenius, C., . . . Lähtenmäki, L. (2021). Research and innovation as a catalyst for food system transformation. *Trends in food science & technology*, 107: 150-156.
- Dengerink, J., Dirks, F., Likoko, E., & Guijt, J. (2021). One size doesn't fit all: Regional differences in priorities for food system transformation. *Food Security*, 13 (6): 1455-1466.
- Dijkshoorn-Dekker, M., Linderhof, V., Mattijssen, T. J., & Polman, N. (2020). Food Secure Metropolitan Areas: The Transition Support System Approach. *Sustainability*, 12 (13): 5376.
- Draghi, M. (2024). The future of European competitiveness. Part A | A competitiveness strategy for Europe. Retrieved from https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en
- Edquist, C., Marlerba, F., Metcalfe, J. S., Montobbio, F., & Steinmueller, W. E. (2004). Sectoral systems: implications for European innovation policy. In F. Marlerba (Ed.), *Sectoral Systems of Innovation. Concepts, Issues and Analysis of Six Major Sectors in Europe* (pp. 427-461). Cambridge: Cambridge University Press.
- EIP-AGRI SP. (2017). Horizon 2020 Multi-actor Projects. Retrieved from https://ec.europa.eu/eip/agriculture/sites/default/files/eip-agri_brochure_multi-actor_projects_2017_en_web.pdf

- El Bilali, H., Callenius, C., Strassner, C., & Probst, L. (2019). Food and nutrition security and sustainability transitions in food systems. *Food and energy security*, 8 (2): e00154.
- EU SCAR. (2012). Agricultural knowledge and innovation system in transition - a reflection paper. Retrieved from Brussels: https://scar-europe.org/images/AKIS/Documents/AKIS_reflection_paper.pdf
- EU SCAR. (2020). Natural resources and food systems: transitions towards a 'safe and just' operating space. Retrieved from <https://scareurope.org/images/FORESIGHT/FINAL-REPORT-5th-SCAR-Foresight-Exercise.pdf>
- European Commission: DG AGRI. (2018). European Innovation Partnership for Agricultural Productivity and Sustainability. Retrieved from <https://ec.europa.eu/eip/agriculture/content/EIPAGRIabout.html>
- European Commission: DG RTD. (2012). Agricultural knowledge and innovation systems in transition - A reflection paper. Retrieved from <https://data.europa.eu/doi/10.2777/34991>
- European Commission: DG RTD. (2021). Research & Innovation for accelerating food system transformation - Operationalising FOOD 2030 through living labs. Retrieved from <https://data.europa.eu/doi/10.2777/122836>
- European Commission: DG RTD. (2022). Everyone at the table - Transforming food systems by connecting science, policy and society. Retrieved from <https://data.europa.eu/doi/10.2777/440690>
- European Commission: DG RTD. (2023). Food 2030 - Pathways for action 2.0 - R&I policy as a driver for sustainable, healthy, climate resilient and inclusive food systems. Retrieved from <https://data.europa.eu/doi/10.2777/365011>
- European Commission: DG RTD. (2024). Science, research and innovation performance of the EU – A competitive Europe for a sustainable future – Executive summary. Retrieved from <https://data.europa.eu/doi/10.2777/346850>
- Feola, G. (2025). Postgrowth food systems: critique, visions, pathways. *Degrowth Journal*, 3. doi:10.36399/Degrowth.003.01.02
- Fieldsend, A., Cronin, E., Varga, E., Biró, S., & Rogge, E. (2021). 'Sharing the space' in the agricultural knowledge and innovation system: multi-actor innovation partnerships with farmers and foresters in Europe. *The Journal of Agricultural Education and Extension*, 27 (4): 423-442. doi:10.1080/1389224X.2021.1873156
- Fresco, L. O., Geerling-Eiff, F., Hoes, A.-C., van Wassenaeer, L., Poppe, K. J., & van der Vorst, J. G. (2021). Sustainable food systems: do agricultural economists have a role? *European Review of Agricultural Economics*, 48 (4): 694-718. doi:10.1093/erae/jbab026
- Friedman, M. (1970, September 13). The Social Responsibility of Business is to Increase its Profits. *New York Times*.
- Fukuyama, F. (1992). *The end of history and the last man*. New York: Free Press.
- Gardeazabal, A., Lunt, T., Jahn, M. M., Verhulst, N., Hellin, J., & Govaerts, B. (2023). Knowledge management for innovation in agri-food systems: a conceptual framework. *Knowledge management research & practice*, 21 (2): 303-315.
- Gaupp, F., Ruggeri Laderchi, C., Lotze-Campen, H., DeClerck, F., Bodirsky, B. L., Lowder, S., . . . Fan, S. (2021). Food system development pathways for healthy, nature-positive and inclusive food systems. *Nature Food*, 2 (12): 928-934. doi:10.1038/s43016-021-00421-7
- Giambartolomei, G., Forno, F., & Sage, C. (2021). How food policies emerge: The pivotal role of policy entrepreneurs as brokers and bridges of people and ideas. *Food Policy*, 103: 102038.
- Giesbers, E., Mattijssen, T., & Leeuwis, C. (in press). Citizen participation in food systems transitions: how inclusive should it be? *Environmental Innovation and Societal Transitions*.
- Giesbers, E., Tsvetkov, B., Achterbosch, T., Aramyan, L., Duarte, R., Geerling-Eiff, F., & Mattijssen, T. (2023). Milestone 13: Creation of typology of K&I governance options for fostering mission-oriented innovation.
- Gioia. (2019). Coming out! Gender diversity in the food system. *Women's Power in Food Struggles*, 11.
- Gliessman, S. (2016). Transforming food systems with agroecology. *Agroecology and Sustainable Food Systems*, 40 (3): 187-189. doi:<https://doi.org/10.1080/21683565.2015.1130765>

- Grillitsch, M., Hansen, T., Coenen, L., Miörner, J., & Moodysson, J. (2019). Innovation policy for system-wide transformation: The case of strategic innovation programmes (SIPs) in Sweden. *Research Policy*, 48 (4): 1048-1061.
- Guzmán Luna, A., Bacon, C. M., Méndez, V. E., Flores Gómez, M. E., Anderzén, J., Mier y Terán Giménez Cacho, M., . . . Benavides González, A. N. (2022). Toward Food Sovereignty: Transformative Agroecology and Participatory Action Research With Coffee Smallholder Cooperatives in Mexico and Nicaragua. *Frontiers in Sustainable Food Systems*, 6. doi:10.3389/fsufs.2022.810840
- Habermas, J. (1984). *The theory of communicative action*. Boston: Beacon Press.
- Hebinck, A., Klerkx, L., Elzen, B., Kok, K. P. W., König, B., Schiller, K., . . . von Wirth, T. (2021). Beyond food for thought – Directing sustainability transitions research to address fundamental change in agri-food systems. *Environmental Innovation and Societal Transitions*, 41: 81-85. doi:<https://doi.org/10.1016/j.eist.2021.10.003>
- Hebinck, A., Zurek, M., Achterbosch, T., Forkman, B., Kuijsten, A., Kuiper, M., . . . Leip, A. (2021). A Sustainability Compass for policy navigation to sustainable food systems. *Global Food Security*, 29. doi:10.1016/j.gfs.2021.100546
- Hermans, K., Cantillon, B., Bernát, A., Carrillo-Alvarez, E., Cussó-Parcerisas, I., Mäkinen, L., . . . Szivos, P. (2023). Food aid in four European countries: Assessing the price and content of charitable food aid packages by using food basket, household budget survey and contextual data. Retrieved from <https://medialibrary.uantwerpen.be/files/57001/d47f14a6-9d41-4a03-869e-c7fbc8e2790e.pdf>
- Hoes, A.-C., Beekman, V., Regeer, B. J., & Bunders, J. F. (2012). Unravelling the dynamics of adopting novel technologies: an account of how the closed greenhouse opened-up. *International Journal of Foresight and Innovation Policy*, 8 (1): 37-59.
- Hölscher, K., Wittmayer, J. M., Avelino, F., & Giezen, M. (2019). Opening up the transition arena: An analysis of (dis)empowerment of civil society actors in transition management in cities. *Technological Forecasting and Social Change*, 145: 176-185. doi:<https://doi.org/10.1016/j.techfore.2017.05.004>
- Holtkamp, C., & van Mierlo, T. (2022). Paving a way towards food democratisation: mechanisms in contentious niche development. *Sustainability*, 14 (3): 1553.
- Howlett, M., & Cashore, B. (2014). Conceptualizing public policy. In *Comparative policy studies: Conceptual and methodological challenges* (pp. 17-33): Springer.
- Huber, J. (2004). *New technologies and environmental innovation*. Cheltenham: Edward Elgar Publishing.
- Huttunen, S., Turunen, A., & Kaljonen, M. (2022). Participation for just governance of food-system transition. *Sustainability: Science, Practice and Policy*, 18 (1): 500-514. doi:<https://doi.org/10.1080/15487733.2022.2088187>
- Intersos Hellas. (2023). Being hungry in Europe: an analysis of the food insecurity experienced by refugees, asylum seekers, migrants and undocumented people in Greece. Retrieved from https://www.intersos.gr/wp-content/uploads/2023/05/Report-Being-Hungry-in-Europe_3.pdf
- IPES-food. (2016). From uniformity to diversity: a paradigm shift from industrial agriculture to diversified agroecological systems. Retrieved from https://www.ipes-food.org/_img/upload/files/UniformityToDiversity_FULLL.pdf
- Jani, A., Exner, A., Braun, R., Braun, B., Torri, L., Verhoeven, S., . . . Ochoa, A. (2022). Transitions to food democracy through multilevel governance. *Frontiers in Sustainable Food Systems*, 6: 541. doi:<https://doi.org/10.3389/fsufs.2022.1039127>
- Jhagroe, S. (2024). *Voorbij duurzaamheid: op weg naar een ecorechtvaardige samenleving*. Zutphen: Marizel Pres.
- Johnson, K. I. (2016). Land-use conflicts between reindeer husbandry and mineral extraction in Finnmark, Norway: contested rationalities and the politics of belonging. *Polar Geography*, 39 (1): 58-79. doi:<https://doi.org/10.1080/1088937X.2016.1156181>
- Kern, F., & Rogge, K. S. (2018). Harnessing theories of the policy process for analysing the politics of sustainability transitions: A critical survey. *Environmental Innovation and Societal Transitions*, 27: 102-117.

- Kesselman, B. (2022). Participatory action research for food justice in Johannesburg: Seeking a more immediate impact for engaged research. In A. Bezuidenhout, S. Mnwana, & K. von Holdt (Eds.), *Critical engagement with public sociology: A perspective from the global south* (pp. 171-191). Bristol: Bristol University Press.
- Kivimaa, P., Boon, W., Hyysalo, S., & Klerkx, L. (2019). Towards a typology of intermediaries in sustainability transitions: A systematic review and a research agenda. *Research Policy*, 48 (4): 1062-1075.
- Kivimaa, P., Hyysalo, S., Boon, W., Klerkx, L., Martiskainen, M., & Schot, J. (2019). Passing the baton: How intermediaries advance sustainability transitions in different phases. *Environmental Innovation and Societal Transitions*, 31: 110-125. doi:10.1016/j.eist.2019.01.001
- Klein, L. (2024). “Now I Do Not Eat, it is Just For My Children”: Mapping Food Access Disruption Among Refugees and Migrants in Athens, Greece. *Glocality*, 7 (1). doi:10.5334/glo.91
- Klerkx, L., & Begemann, S. (2020). Supporting food systems transformation: The what, why, who, where and how of mission-oriented agricultural innovation systems. *Agricultural Systems*, 184. doi:10.1016/j.agsy.2020.102901
- Knickel, K., Redman, M., Darnhofer, I., Ashkenazy, A., Chebach, T. C., Šūmane, S., . . . Rivera, M. (2018). Between aspirations and reality: Making farming, food systems and rural areas more resilient, sustainable and equitable. *Journal of Rural Studies*, 59: 197-210.
- Knierim, A., Koutsouris, A., Mathé, S., Ndah, T. H., Temple, L., Triomphe, B., & Wielinga, E. (2015). Support to Innovation Processes: a Theoretical Point of Departure. Retrieved from https://agritrop.cirad.fr/581607/1/652642_An%20overview%20of%20theories%20and%20concepts%20and%20a%20comprehensive%20analytical%20framework%20.pdf
- Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., . . . Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31: 1-32. doi:<https://doi.org/10.1016/j.eist.2019.01.004>
- Kok, K. P. W., Gjefsen, M. D., Regeer, B. J., & Broerse, J. E. W. (2021). Unraveling the politics of ‘doing inclusion’ in transdisciplinarity for sustainable transformation. *Sustainability Science*, 16 (6): 1811-1826. doi:<https://doi.org/10.1007/s11625-021-01033-7>
- Leeuwis, C., Boogaard, B. K., & Atta-Krah, K. (2021). How food systems change (or not): governance implications for system transformation processes. *Food Security*. doi:<https://doi.org/10.1007/s12571-021-01178-4>
- Leeuwis, C., & Pyburn, R. (2002). *Wheelbarrows full of frogs*. Assen, Neth.: Koninklijke Van Gorcum by Eidgenössische Technische Hochschule Zurich-Chemistry Biology Pharmacy Information Center on, 3 (24): 09.
- Linkin Park. (2024). *The Emptiness Machine*. On *From Zero*.
- Long, N., & Van der Ploeg, J. D. (1989). Demythologizing planned intervention: an actor perspective. *Sociologia ruralis*, 14 (4): 249-272.
- Loopstra, R. (2020). An overview of food insecurity in Europe and what works and what doesn’t work to tackle food insecurity. *European Journal of Public Health*, 30 (5). doi:<https://doi.org/10.1093/eurpub/ckaa165.521>
- López-García, D., & González de Molina, M. (2021). An operational approach to agroecology-based local agri-food systems. *Sustainability*, 13 (15): 8443.
- López Cifuentes, M., & Gugerell, C. (2021). Food democracy: possibilities under the frame of the current food system. *Agriculture and Human Values*, 38 (4): 1061-1078. doi:<https://doi.org/10.1007/s10460-021-10218-w>
- Maughan, C., & Ferrando, T. (2018). Land as a commons: Examples from the UK and Italy. In *Routledge Handbook of Food as a Commons* (pp. 329-341): Routledge.
- Mazzucato, M. (2017). *Mission-oriented Innovation Policy: Challenges and Opportunities*. UCL Institute for Innovation and Public Purpose Working Paper.
- Moragues-Faus, A. (2020). Towards a critical governance framework: Unveiling the political and justice dimensions of urban food partnerships. *Geographical Journal*, 186 (1): 73-86. doi:<https://doi.org/10.1111/geoj.12325>

- Moragues-Faus, A., & Carroll, B. (2018). Reshaping urban political ecologies: an analysis of policy trajectories to deliver food security. *Food Security*, 10: 1337-1351. doi:10.1007/s12571-018-0855-7
- Nicol, P., & Taherzadeh, A. (2020). Working co-operatively for sustainable and just food system transformation. *Sustainability (Switzerland)*, 12 (7): 1-18. doi:10.3390/su12072816
- O'Keefe, G. (2019). The hidden mirror: Sexual and gender minorities in agricultural research.
- Oliver, T. H., Boyd, E., Balcombe, K., Benton, T. G., Bullock, J. M., Donovan, D., . . . Zaum, D. (2018). Overcoming undesirable resilience in the global food system. *Global Sustainability*, 1: e9. doi:10.1017/sus.2018.9
- Piketty, T. (2022). *A brief history of equality*. Cambridge MA: Harvard University Press.
- Prové, C., de Krom, M. P., & Dessein, J. (2019). Politics of scale in urban agriculture governance: A transatlantic comparison of food policy councils. *Journal of Rural Studies*, 68: 171-181.
- Prüse, B., Struth, A., Thompson, J., & Seufert, V. (2023). D3.1 Consolidated status assessment report for 6 CDIs. Retrieved from <https://fosterfoodsystem.eu/wp-content/uploads/2023/11/Consolidated-status-assessment-report-for-CDI-case-studies.pdf>
- Prüse, B., Thompson, J., Seufert, V., & Loeber, A. M. C. (2024). D3.2 Needs assessment report on 5 citizen (change) driven initiatives - case studies Retrieved from
- Puupponen, A., Huttunen, S., Kortetmäki, T., Lähteenmäki-Uutela, A., & Kaljonen, M. (2023). Justice in Finnish food policies. *Food Ethics*, 8 (1): 6.
- Remarque, E. M. (1928). *All quiet on the western front*. Boston: Little, Brown and Company.
- Rhodes, R. A. W. (1996). The New Governance: Governing without Government. *Political Studies*, 44 (4): 652-667. Retrieved from <https://www.scopus.com/inward/record.uri?eid=2-s2.0-0005478397&partnerID=40&md5=59cb6e56a30d3fc4f088e6b8327e65c8>
- Röling, N., & Engel, P. (1991). The development of the concept of agricultural knowledge information systems (AKIS): implications for extension. In W. Rivera & D. J. Gustafson (Eds.), *Agricultural extension: Worldwide institutional evolution and forces for change* (pp. 125-139). Amsterdam: Elsevier Science Publishers.
- Ruben, R., Cavatassi, R., Lipper, L., Smaling, E., & Winters, P. (2021). Towards food systems transformation—five paradigm shifts for healthy, inclusive and sustainable food systems. *Food Security*, 13 (6): 1423-1430. doi:10.1007/s12571-021-01221-4
- Ruben, R., Verhagen, J., & Plaisier, C. (2019). The challenge of food systems research: What difference does it make. *Towards Sustainable Global Food Systems*, 11 (1): 171.
- Schot, J., & Steinmueller, W. E. (2018). Three frames for innovatin policy: R&D, systems of innovation and transformative change. *Research Policy*, 47 (9): 1554-1567. doi:<https://doi.org/10.1016/j.respol.2018.08.011>
- Segers, Y., Bieleman, J., & Buyst, E. (2009). *Exploring the food chain: Food production and food processing in Western Europe 1850-1990*. Turnhout: Brepols.
- Sieveking, A. (2019). Food policy councils as loci for practising food democracy? Insights from the case of Oldenburg, Germany. *Politics and Governance*, 7 (4): 48-58.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104: 333-339. doi:<https://doi.org/10.1016/j.jbusres.2019.07.039>
- Soares, P., Molins, B. H., Martínez Milán, M. A., Rodríguez Camacho, M. F., Clemente-Gómez, V., Comino, I., & Davó-Blanes, M. C. (2024). Experiences of food insecurity in the Roma population before and during the COVID-19 lockdown in Spain. *Plos one*, 19 (7). doi:<https://doi.org/10.1371/journal.pone.0306471>
- Sonnino, R. (2023). Food system transformation: Urban perspectives. *Cities*, 134: 104164.
- Sonnino, R., & Milbourne, P. (2022). Food system transformation: a progressive-place-based approach. *Local Environment*, 27 (7): 915-926. doi:10.1080/13549839.2022.2084723
- Spaargaren, G., Loeber, A., & Oosterveer, P. (2013). Food futures in the making. In G. Spaargaren, P. Oosterveer, & A. Loeber (Eds.), *Food Practices in Transition. Changing Food Consumption, Retail and Production in the Age of Reflexive Modernity* (pp. 312-338). New York: Routledge.
- Spaargaren, G., Oosterveer, P., & Loeber, A. (2011). *Food Practices in Transition. Changing Food Consumption, Retail and Production in the Age of Reflexive Modernity*. New York: Routledge.

- Spendrup, S., & Fernqvist, F. (2019). Innovation in agri-food systems—a systematic mapping of the literature. *International Journal on Food System Dynamics*, 10 (5): 402-427.
- Stoker, J. (1998). Governance as theory: five propositions. *International Social Science Journal*, 50 (155): 17-28.
- Thompson, C., Smith, D., & Cummins, S. (2018). Understanding the health and wellbeing challenges of the food banking system: A qualitative study of food bank users, providers and referrers in London. *Social Science & Medicine*, 211: 95-101. doi:10.1016/j.socscimed.2018.05.030
- Tóth, K., Ács, S., Aschberger, K., Barbero, V. G., Bopp, S., Caivano, A., . . . De Laurentiis, V. (2024). EU food system monitoring framework. From concepts to indicators (9268189100). Retrieved from doi:10.2760/94456
- UN Food System Coordination Hub. Key Inputs from Summit Workstreams - Levers of Change: Policy Brief: Equity in Food Systems. Retrieved from <https://www.unfoodsystemshub.org/fs-summit-legacy/food-systems-summit-compendium/chapter-2-levers-of-change/equity-in-food-systems/en>
- United Nations. (2022). Global impact of the war in Ukraine: Billions of people face the greatest cost-of-living crisis in a generation. Retrieved from https://news.un.org/pages/wp-content/uploads/2022/06/GCRG_2nd-Brief_Jun8_2022_FINAL.pdf
- Van Den Akker, A., Fabbri, A., Slater, S., Gilmore, A. B., Knai, C., & Rutter, H. (2024). Mapping actor networks in global multi-stakeholder initiatives for food system transformation. *Food Security*: 1-12.
- Verwoerd, L., Klaassen, P., & Regeer, B. J. (2021). How to normalize reflexive evaluation? Navigating between legitimacy and integrity. *Evaluation* 27 (2): 229-250.
- Vignola, R., & Oosterveer, P. (2025). Conceptualizing the governance challenges for food system transformation. *Frontiers of Sustainable Food systems*, 20 (9). doi:<https://doi.org/10.3389/fsufs.2025.1397574>
- Vincent, O., & Feola, G. (2020). A framework for recognizing diversity beyond capitalism in agri-food systems. *Journal of Rural Studies*, 80: 302-313.
- Visseren-Hamakers, I., Razzaque, J., McElwee, P., Turnhout, E., Kelemen, E., Rusch, G., . . . Islar, M. (2021). Transformative governance of biodiversity: insights for sustainable development. *Current Opinion in Environmental Sustainability*. doi:10.1016/j.cosust.2021.06.002
- Vorlíčková, L. P. (2020). System Approach to Agri-rural Knowledge and Innovation Systems. *AGRARIAN PERSPECTIVES XXIX.*: 287.
- Walls, H. L. (2018). Wicked problems and a 'wicked' solution. *Globalization and health*, 14: 1-3.
- Wolf, E. R. (1982). *Europe and the People without History*. Berkeley: Univ of California Press.
- Wolfert, S., Ge, L., Verdouw, C., & Boogaardt, M. (2017). Big data in smart farming - a review. *Agricultural Systems*, 153: 69-80. doi:<https://doi.org/10.1016/j.agsy.2017.01.023>
- WRR. (1992). *Grond voor keuzen: Vier perspectieven voor de landelijke gebieden in de Europese Gemeenschap*: Wetenschappelijke Raad voor het Regeringsbeleid.
- Zollet, S., & Maharjan, K. L. (2021). Resisting the vineyard invasion: Anti-pesticide movements as a vehicle for territorial food democracy and just sustainability transitions. *Journal of Rural Studies*, 86: 318-329.

Appendixes



Appendixes

Appendix A. CDIs stakeholder diagrams

Delta Foundation

Legend

Categories - balloons	
Government agencies	Blue
Research	Red
Technology providers	Yellow
NGOs	White
Education	Orange
Advisory, consultancy, law	Grey
Financial institutions	Brown
Producers	Violet
Retailers	Pink

Engagement objective - arrows	
Information sharing	Yellow
Collaboration	Green
Capacity building	Brown
Advocacy	Red
Funding acquisition	Orange
Policy influence	Blue
Other	Grey

Current engagement status

Active

Potential

Dormant

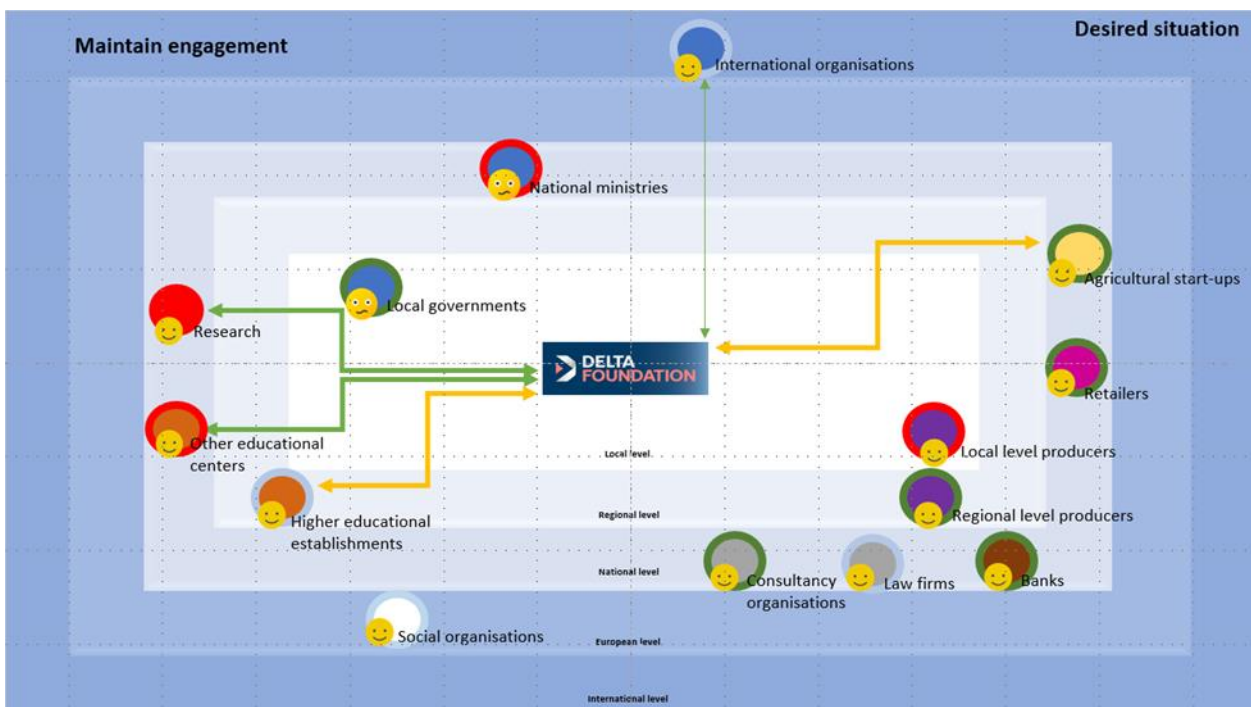
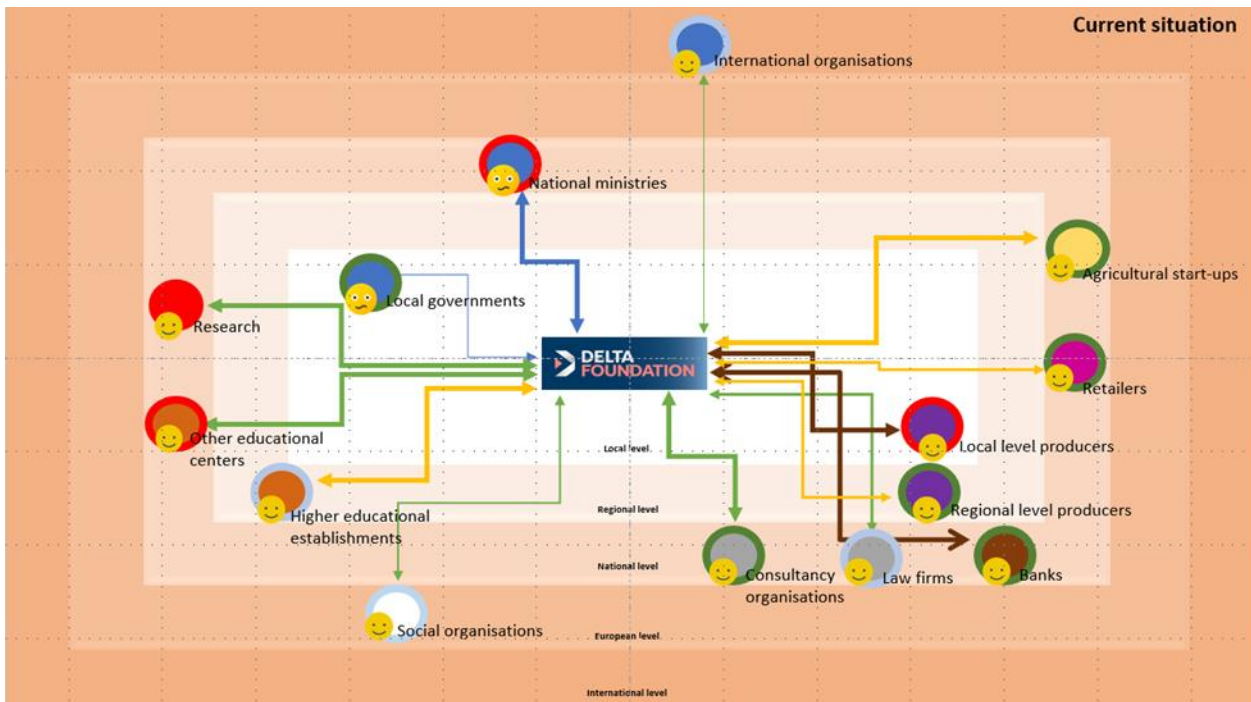
Legend

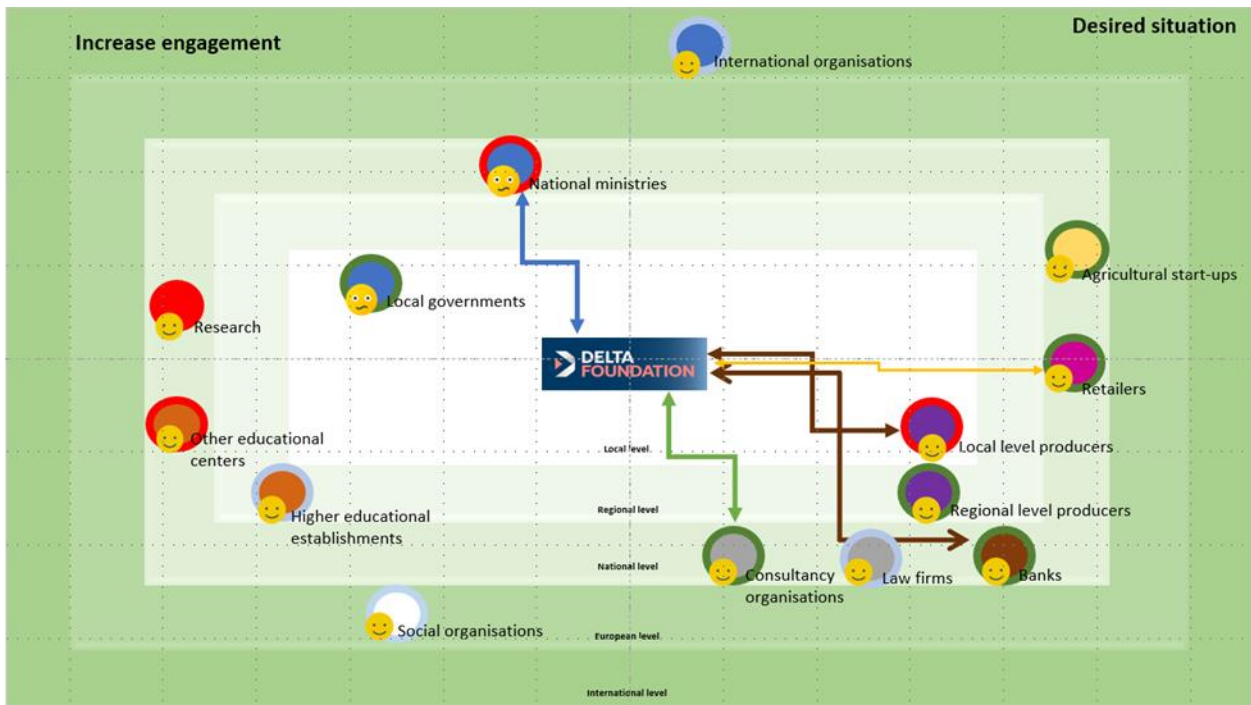
Strategic importance of connection:

- Critical
- Important
- Moderate
- Low

Impact of stakeholder on the CDI:

- Positive 😊
- Neutral 😐
- Negative 😞





ERS

Legend

Categories - balloons	
Government agencies	Blue
Research	Red
Technology providers	Yellow
NGOs	White
Education	Orange
Advisory, consultancy, law	Grey
Financial institutions	Brown
Producers	Violet
Retailers	Pink
Industry associations	Black
Media	Light blue
Processing	Light violet

Engagement objective - arrows	
Information sharing	Yellow
Collaboration	Green
Capacity building	Brown
Advocacy	Red
Funding acquisition	Orange
Policy influence	Blue
Other	Grey

Current engagement status

Active

Potential

Dormant

50% Active/50% Potential

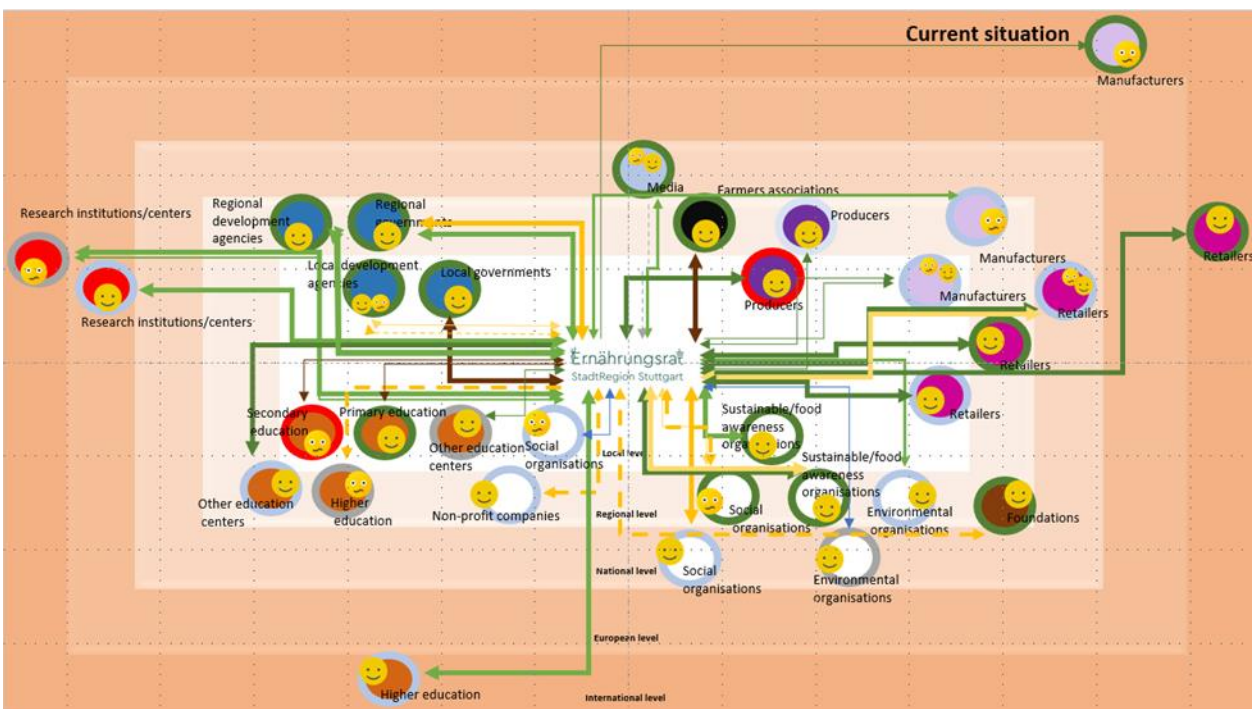
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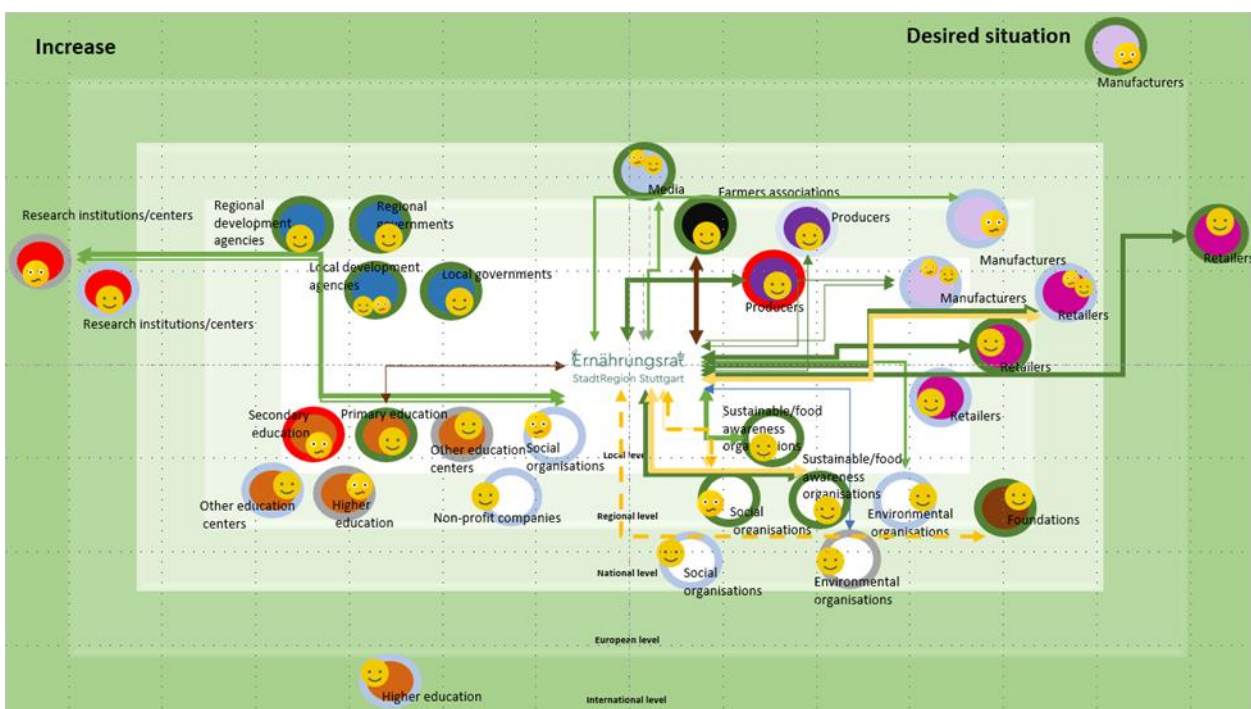
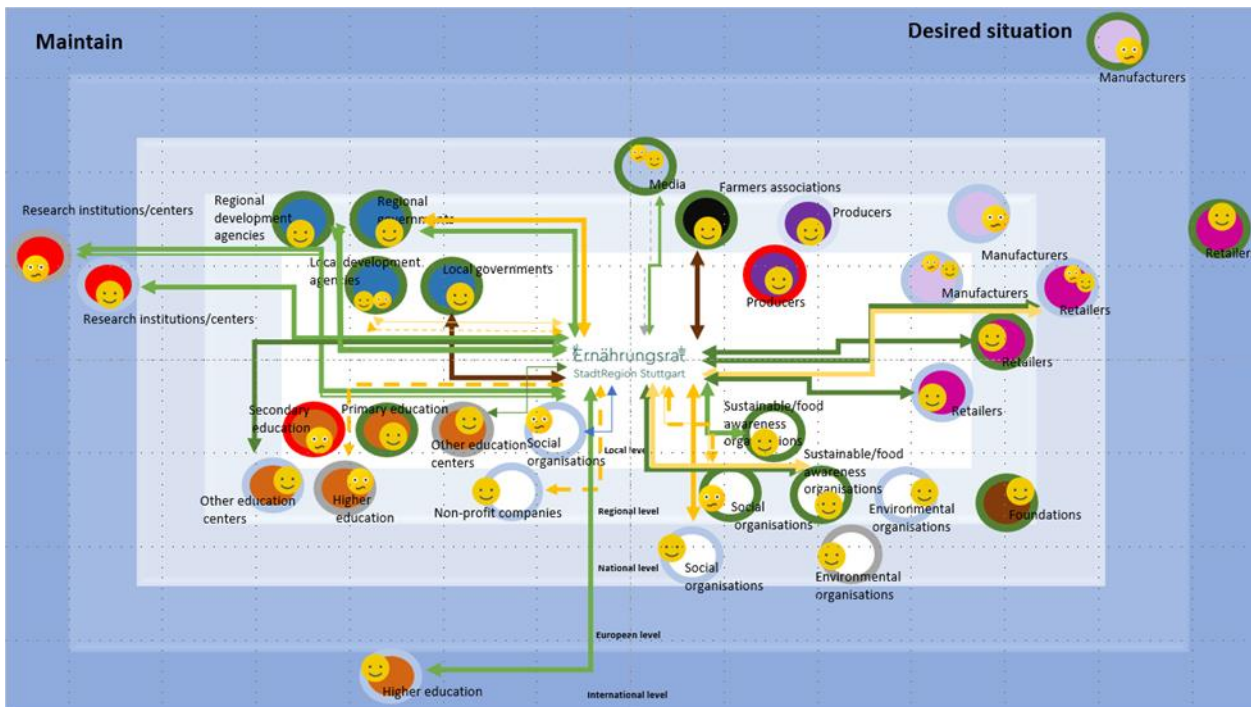
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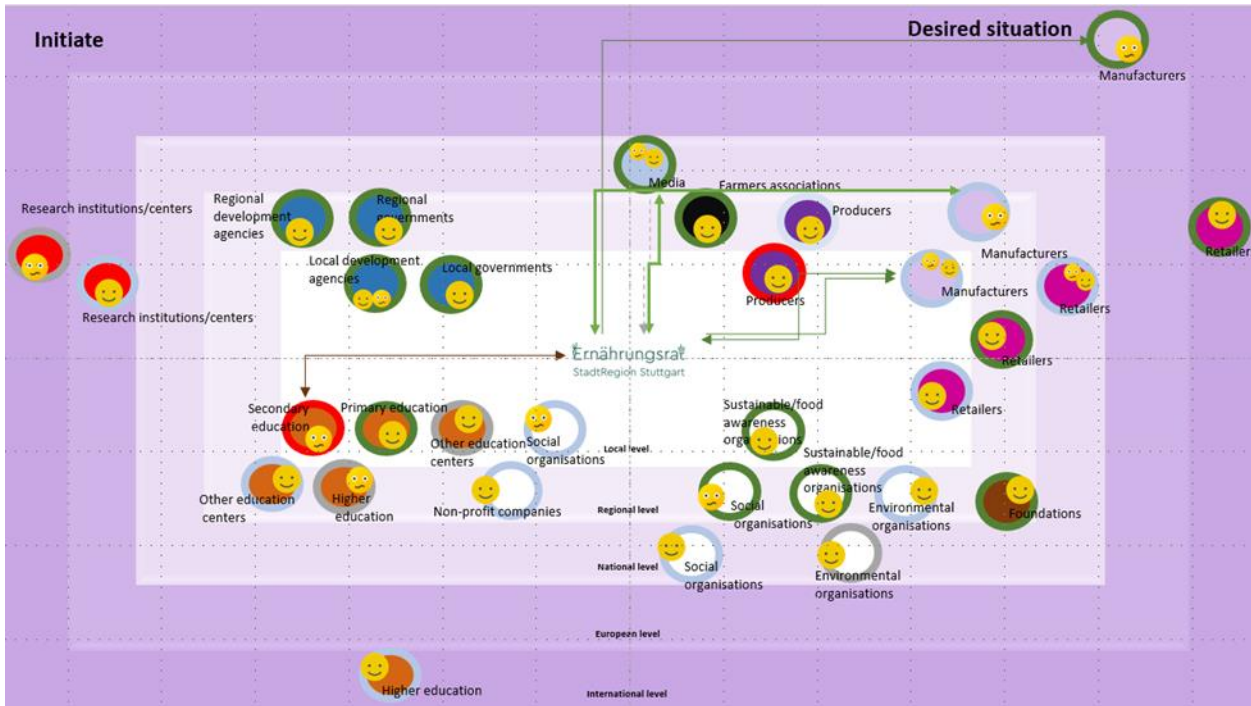
-  Critical
-  Important
-  Moderate
-  Low

Impact of stakeholder on the CDI:

- Positive 
- Neutral 
- Negative 







IrsiCaixa/FabLab

Legend

Categories - balloons	
Government agencies	Blue
Research	Red
Technology providers	Yellow
NGOs	White
Education	Orange
Advisory, consultancy, law	Grey
Financial institutions	Brown
Producers	Violet
Retailers	Pink
Industry associations	Black
Media	Light blue
Processing	Light violet

Engagement objective - arrows	
Information sharing	Yellow
Collaboration	Green
Capacity building	Brown
Advocacy	Red
Funding acquisition	Orange
Policy influence	Blue
Other	Grey

Current engagement status

Active





Potential

Dormant




50% Active/50% Potential

Legend

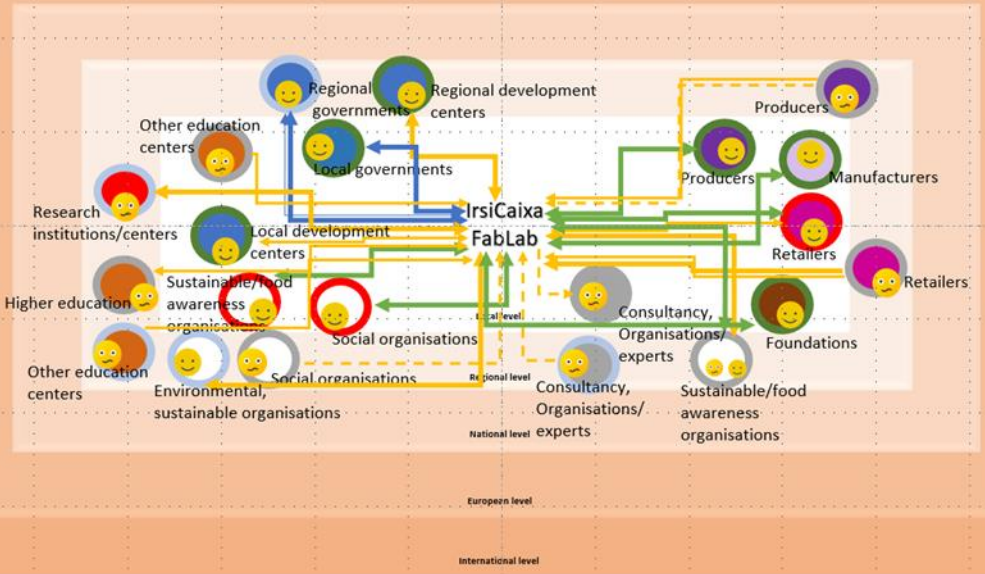
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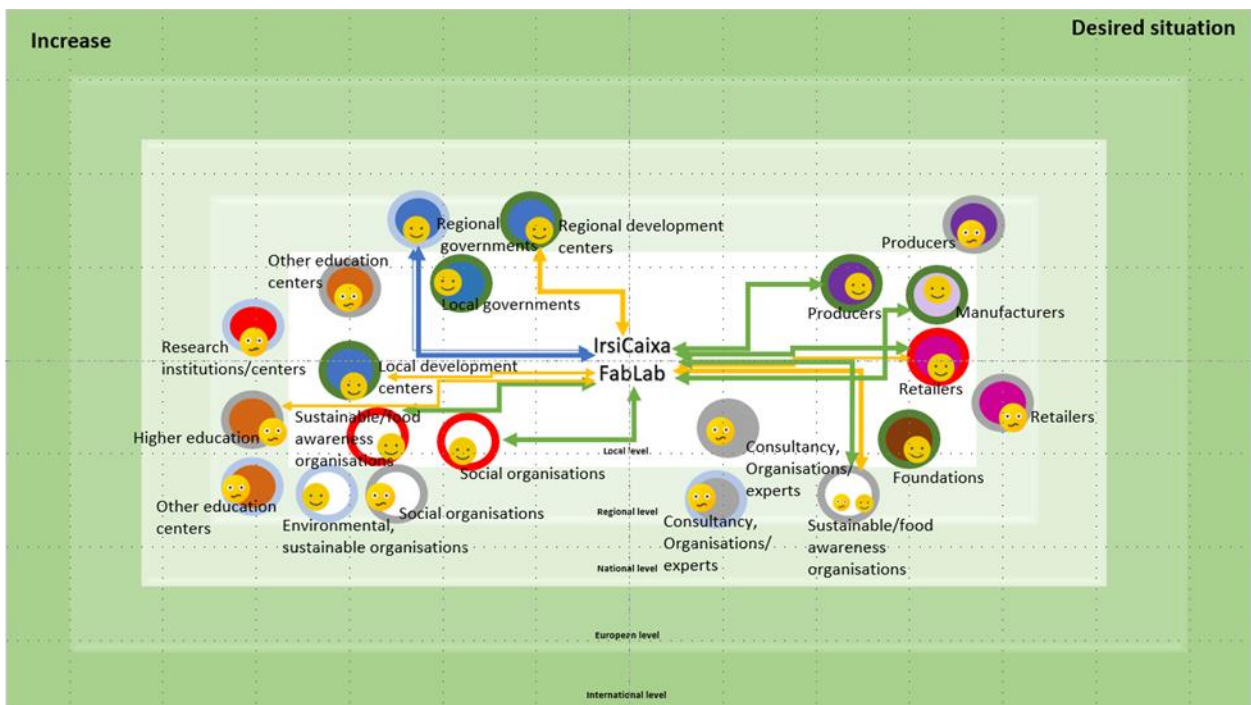
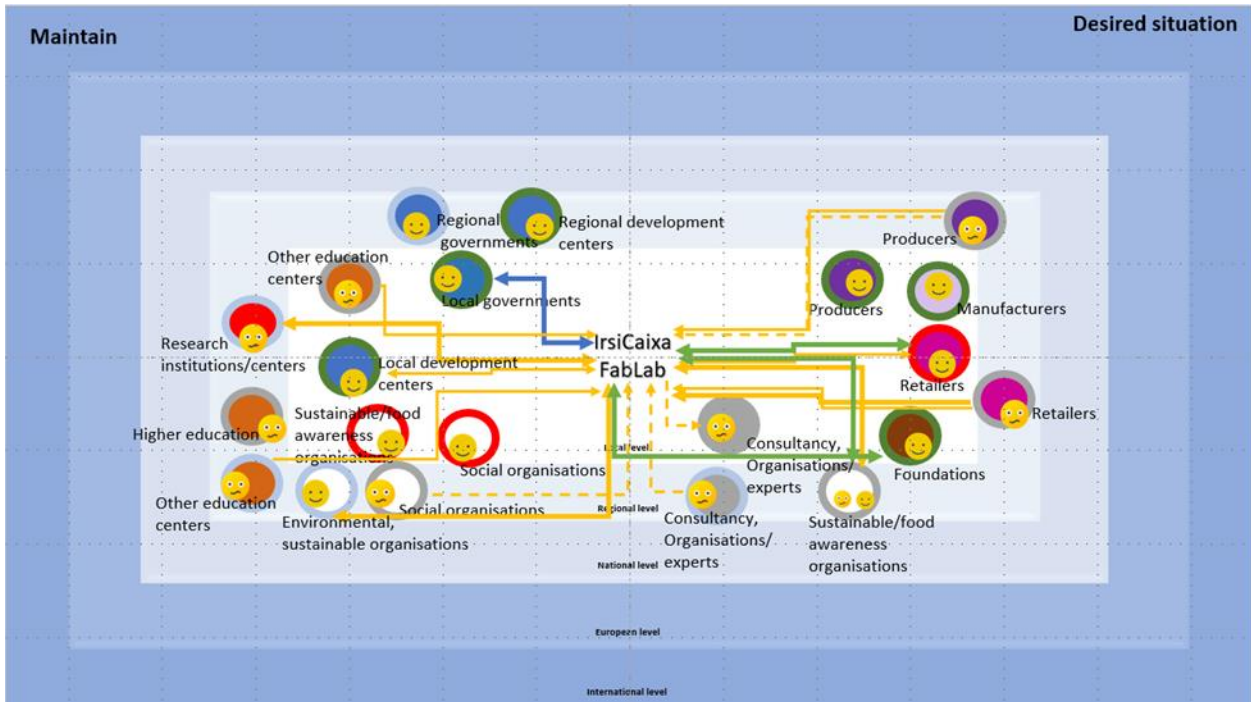
-  Critical
-  Important
-  Moderate
-  Low

Impact of stakeholder on the CDI:

- Positive 
- Neutral 
- Negative 

Current situation








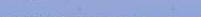
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Legend

Categories - balloons	
Government agencies	Blue
Research	Red
Technology providers	Yellow
NGOs	White
Education	Orange
Advisory, consultancy, law	Grey
Financial institutions	Brown
Producers	Violet
Retailers	Pink
Industry associations	Black
Media	Light blue
Processing	Light violet

Engagement objective - arrows	
Information sharing	Yellow
Collaboration	Green
Capacity building	Brown
Advocacy	Red
Funding acquisition	Orange
Policy influence	Blue
Other	Grey

Current engagement status



- Active 
- Potential 
- Dormant 
- 50% Active/50% Potential 

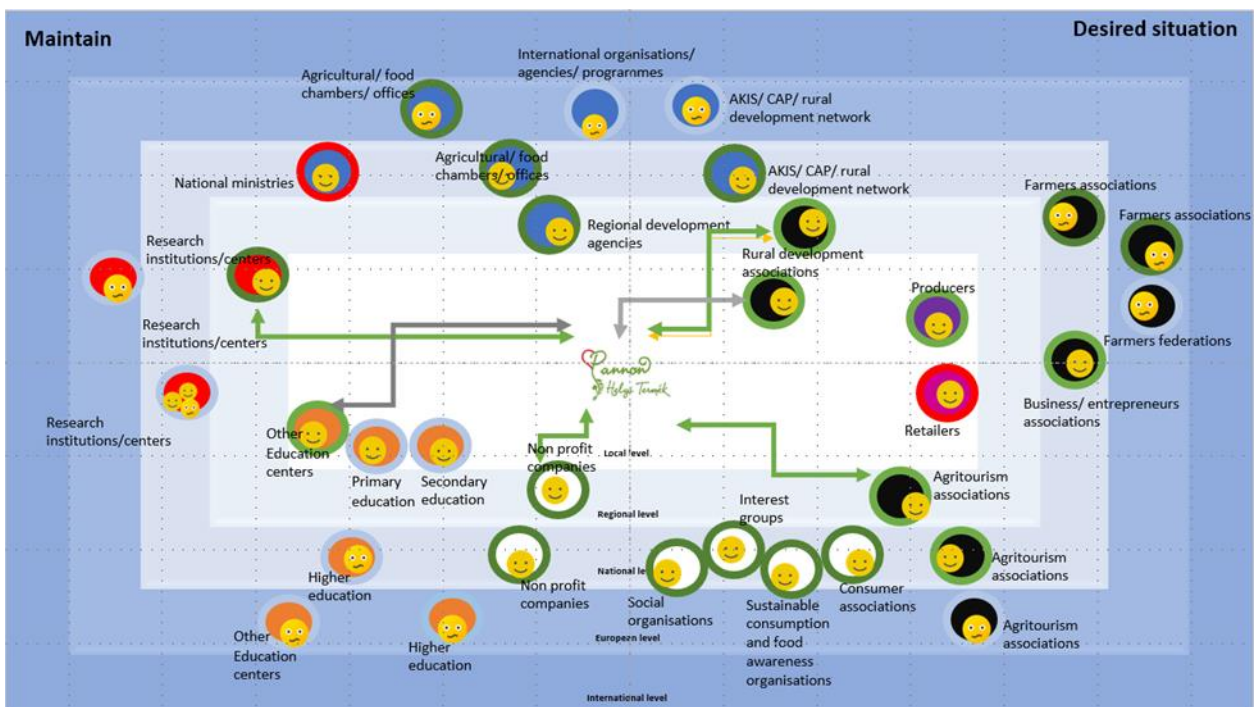
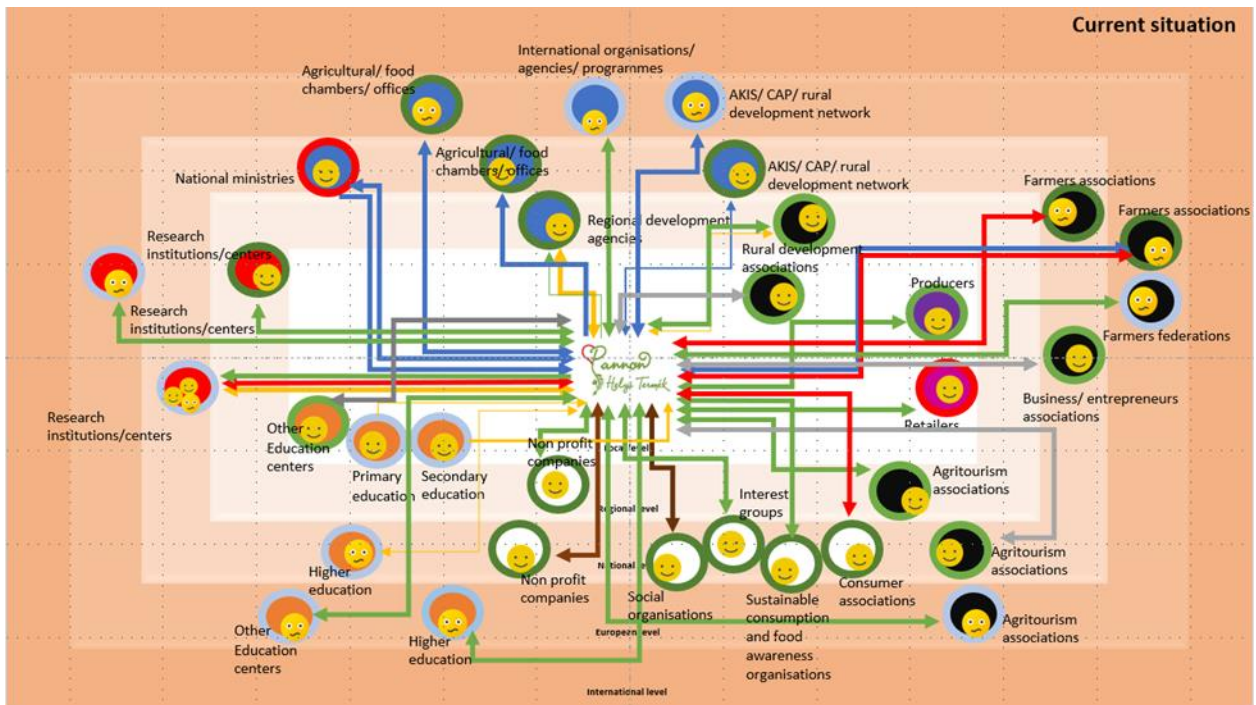
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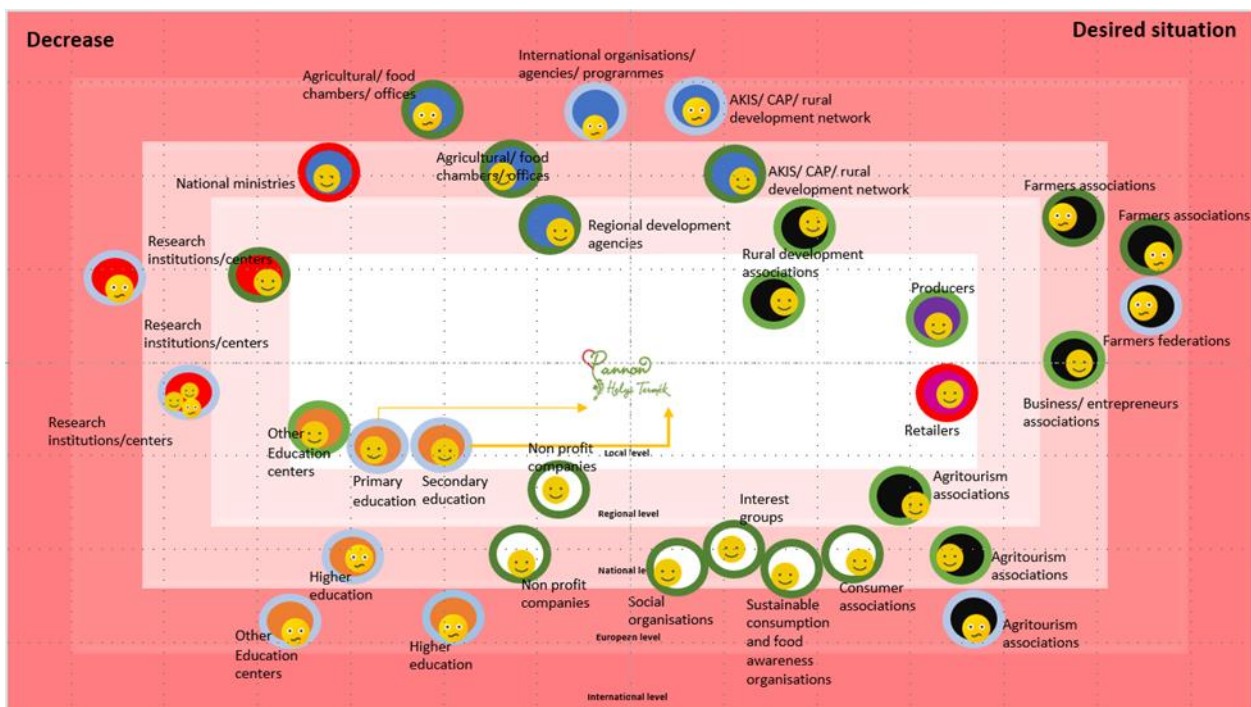
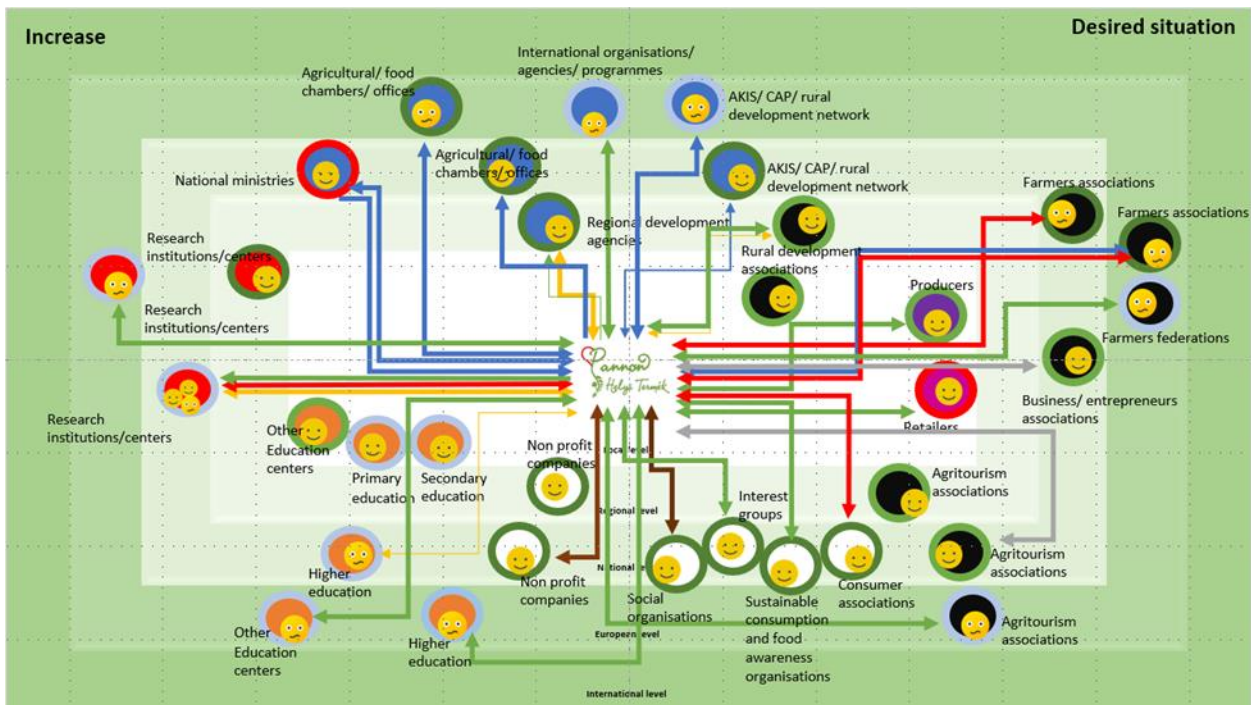
Strategic importance of connection:

-  Critical
-  Important
-  Moderate
-  Low

Impact of stakeholder on the CDI:

- Positive 
- Neutral 
- Negative 






TcV


Legend


Categories - balloons	
Government agencies	Blue
Research	Red
Technology providers	Yellow
NGOs	White
Education	Orange
Advisory, consultancy, law	Grey
Financial institutions	Brown
Producers	Violet
Retailers	Pink
Industry associations	Black
Media	Light blue
Processing	Light violet


Engagement objective - arrows	
Information sharing	Yellow
Collaboration	Green
Capacity building	Brown
Advocacy	Red
Funding acquisition	Orange
Policy influence	Blue
Other	Grey

Current engagement status

Active 





Potential 

Dormant 

50% Active/50% Potential 

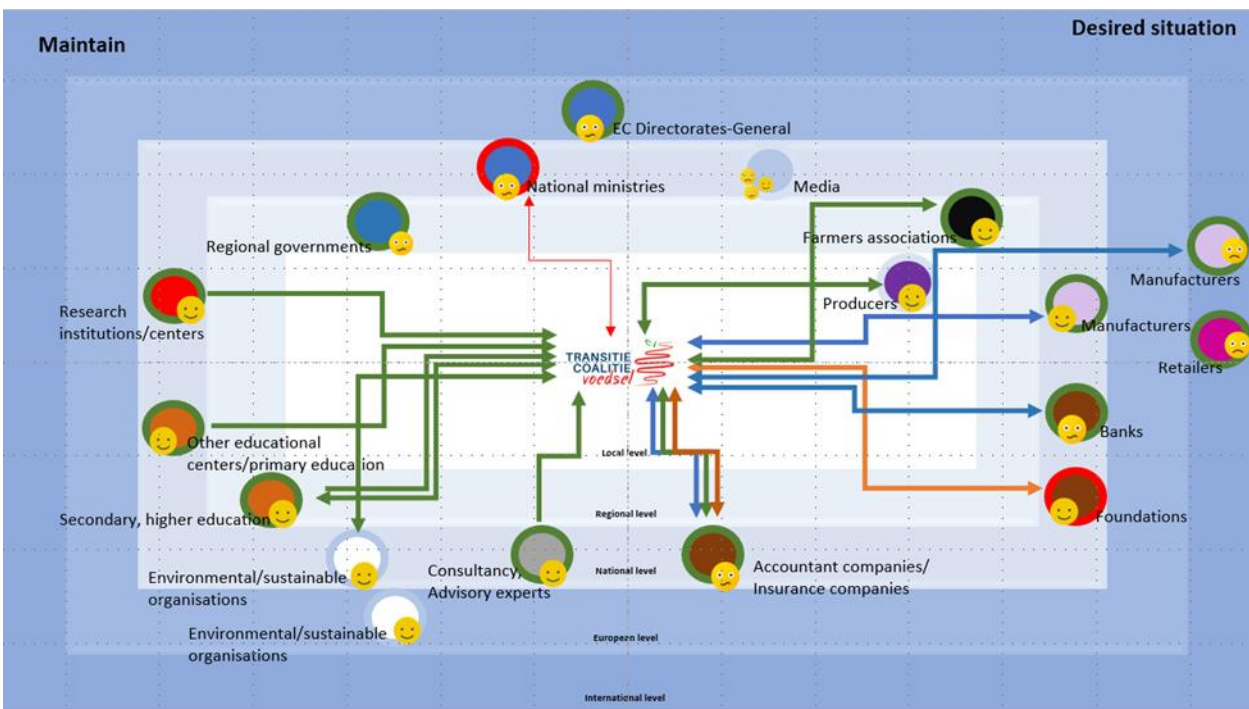
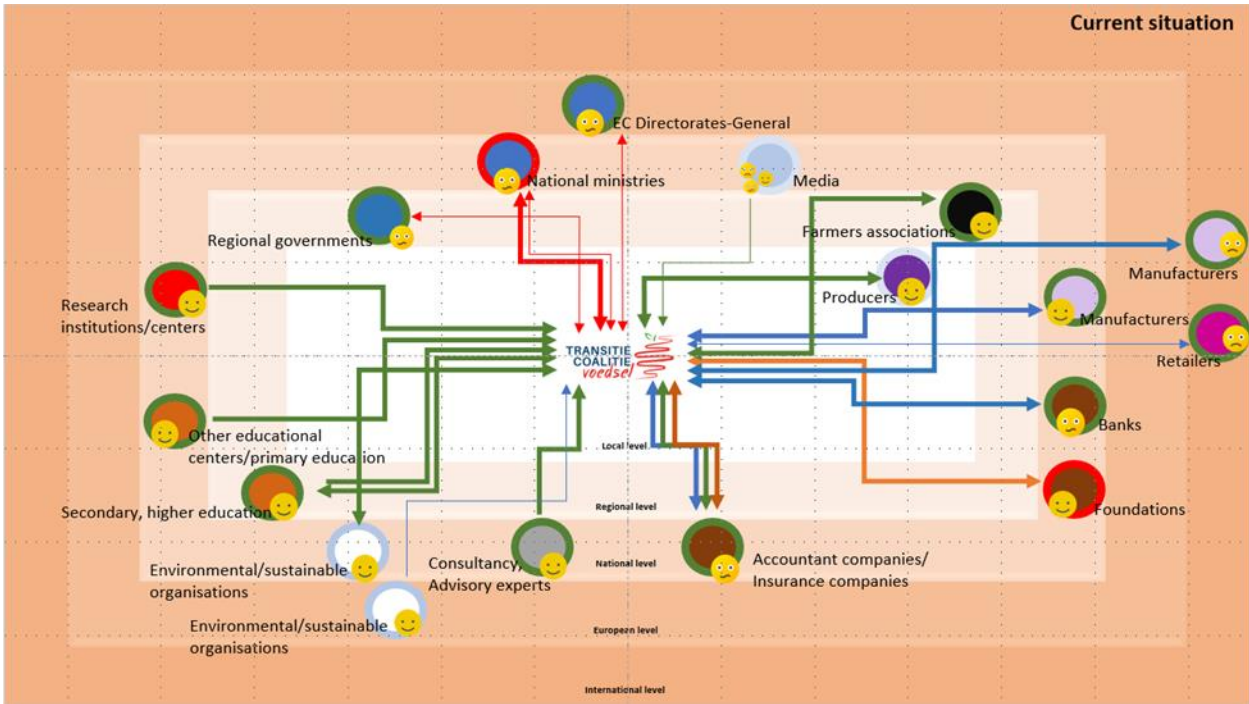
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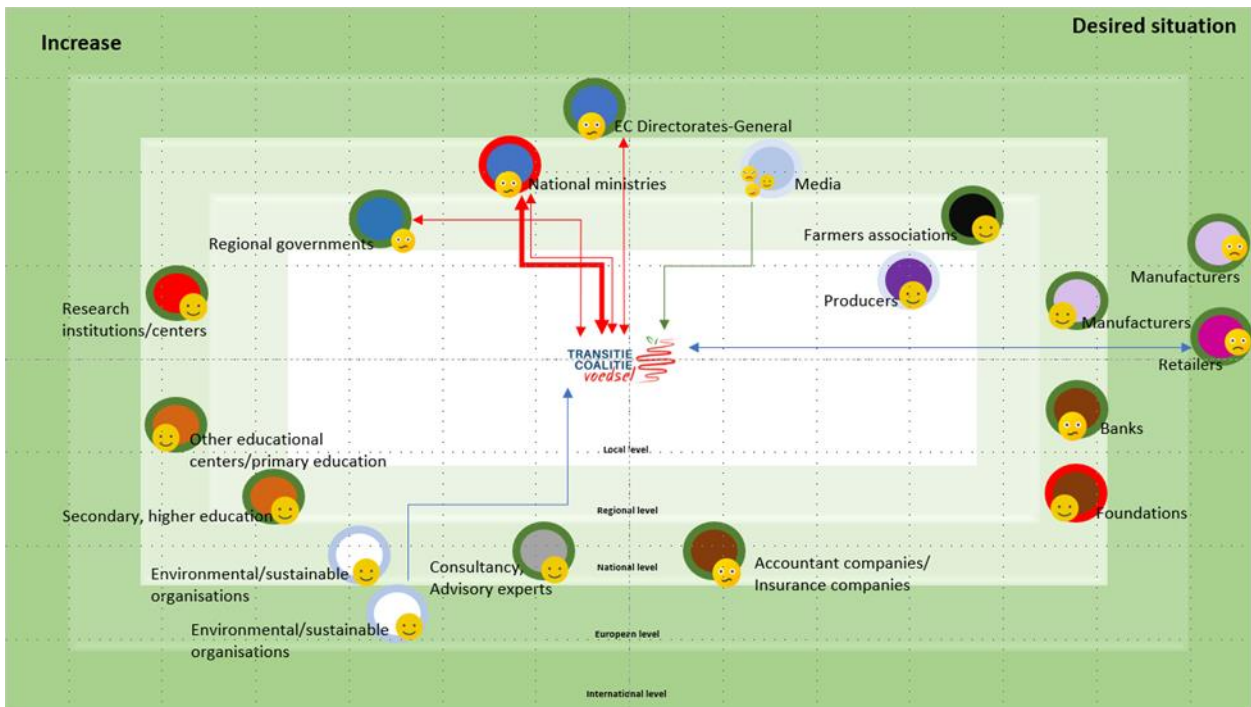
Strategic importance of connection:

-  Critical
-  Important
-  Moderate
-  Low

Impact of stakeholder on the CDI:

- Positive 
- Neutral 
- Negative 





Appendix B. Overview of K&I policy framework for food systems transformation



EU policy for Food Systems K&I: an overview

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Achterbosch, Enrico Balli, Ricardo Duarte,
Joseph Barker-Jubb

04/07/2023



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Work package	WP4
Task	T 4.1 - subtask: Overview of EU policy for Food Systems K&I
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Dissemination level	
Main authors	
Contributors	

Dissemination level codes

PU = Public, fully open, e.g., web

CO =Confidential, restricted under conditions set out in Model Grant Agreement

CI =Classified, information as referred to in Commission Decision 2001/844/EC.

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Executive Summary

The policy analysis presented in the Appendix is a part of the FOSTER's Task 4.1 and provides an overview of EU policy for knowledge and innovation (strategies, Directorates General (DGs), actors, initiatives, networks, instruments, etc.), aiming to sustain and improve our food system. These research outcomes will be used to develop a strategy for action research together with citizen-driven initiatives on their needs and opportunities for better incorporation of such initiatives in systems for knowledge & innovation (K&I), and how that can lead to an accelerated transition to a more sustainable food system at the local or regional and national level, within the EU multilevel policy framework.

- Overview of relevant policies at European level that address K&I on food systems transition, either:

- directly (i.e. policy instruments for research and innovation on food systems transition) or
- indirectly (through stimulus of food policy or innovation).

This report addresses particularly the third bullet point and together with the first two data sets provides a building block for the definition of a set of six governance principles for mission-oriented innovation on food system transition.

This will lead to the formulation of an agenda for action research in FOSTER WP4, centred around the following research question: how do the principles for K&I governance provide practical guidance for innovation actors to make headway on four dimensions of societal uptake, required for successful food systems transformation: the technological, legal, economic, and socio-cultural dimensions. Furthermore, engagement with the citizen-driven initiatives through workshops will provide a valuable input for co-designing the concepts and the strategies for empirical research.



**EU policy for Food Systems K&I:
an overview**

Objective

The objective of Task 4.1 is to conceptualize K&I governance mechanisms for fostering innovations and mission-driven orientation in food systems. To achieve this objective, this subtask focused on developing an overview of EU policy for Food Systems K&I.

Why an overview on EU policies on knowledge and innovation for food systems?

One of the main objectives of the FOSTER projects is to arrive from AKIS to FOKIS. FOSTER research is designed around the need for a new vision for a Knowledge and Innovation (K&I) governance structure for Europe's food system. FOSTER is a collaboration of scientists with citizen initiatives, innovation advisors, living labs and advocacy groups. We aim to develop an evidence-based blueprint for a future knowledge and innovation system (KIS), with a working title "FOKIS", that can effectively accelerate the transition processes towards sustainable food systems across all EU member states.

The policies on research and innovation, notably the DG RTD's Food 2030 strategy, are promoting a stronger role for science in food systems transformation via the Horizon programmes. The FOKIS should reach beyond this objective. FOKIS actors are not mainly researchers; they stem from science, (applied) research, education, advisory/consultancy organisations, extension services, policy makers, entrepreneurs, the industry, NGOs and last but not least: citizens. This is why we need a broader view on the EU policies which support K&I for food systems, beyond R&I instruments and initiatives.

Why is it important to CDIs?

It is often not clear how the network of EU policies work, is interconnected or which opportunities it provides for different actors. EU policies often still work in siloes and could unintentionally even work contradictory. With this overview we want to make this landscape easier to read and to discuss with the different actors involved. In order to arrive at an inclusive FOKIS, this landscape should be more comprehensive.

Why is this important to policy makers?

The EU policy maze of all DGS, networks and EC services is difficult to follow for an outsider. There is a need for insight how CDIs, as EU policy target groups, are connected to the EU policy system. If they are not connected, we need more understanding on the reasons why. Is this because they do not know which opportunities (for funding, networking or other initiatives) are available? Is it because they have had bad experience with e.g. legislation, public agreements, regulations or reimbursements of funding or costs? Or is it that they explicitly choose to refrain from EU policy initiatives, funds or networks out of activism or dissatisfaction?

Bridging the gap between EU policy and CDIs

Getting to understand more about ‘each other’s worlds’ could bridge the gap between EU policies and the connections with CDI’s, potentially by a.o.:

- formulating new policy initiatives;
- starting new networks;
- stimulating more citizen involvement in EU K&I for food systems.

EU policy framework for transition to sustainable food systems

Governments can promote societal transitions with various forms of policy (e.g. subsidies, taxes, facilitation and stimulation). This applies to both Dutch governments and the EU. In general, you can say that the EU often sets frameworks, national governments colour these with the diversity of food systems in the countries and local governments mainly enforce and implement them in local policies. We explain this using Figure 2.1. We define the EU policy framework for transition to sustainable food systems as the collection of existing policies from the institutions of the European Union that aim to guide EU food system outcomes towards societal goals. EU policies on agriculture, fisheries, environment, economy and trade, food safety and consumption directly influence the food system. In addition, knowledge and innovation in food systems is one of the policies in which the EU is very active. From the perspective of mission-driven innovation policy, both food policy elements and knowledge and innovation policies around food systems are an integral part of the policy framework for transition to a sustainable food system in the EU.

Figure 1 shows the interaction between food policy and knowledge-innovation policy schematically. The diagram also shows the interactions between European and national policy frameworks for food system transition. Policy frameworks related to food systems are linked to the policy fields of agriculture and fisheries, food safety, environment and climate, entrepreneurship, trade and health, among others. Policy frameworks around knowledge and innovation are related, among others, to knowledge infrastructures, knowledge, innovation and science agendas and innovation policy. In the remainder of this section, we present expert insights on the main EU policy frameworks for transition to sustainable food systems.

“There is a growing evidence and consensus that a food systems-based approach to Research and Innovation in the combined fields of agriculture, fisheries, food, environment (including climate change mitigation and adaptation), human nutrition and health is crucial for effectively addressing the large and systemic challenges the European food systems are facing. **Use a food systems lens** to create a shared understanding on what the systemic issues and R&I intervention points are; to prioritise and to focus on integrative as well as thematic research and innovation actions in the large research domain of food, nutrition and health, agriculture and farming, fisheries and natural resource use and the environment and their interactions” (SCAR policy brief, 2019).

The SDGs and the Green Deal

At a global scale, we start with the SDGs as are our overarching **international (1)** agreements at UN level (<https://www.un.org/sustainabledevelopment/>).



Figure 2: The Sustainable Development Goals (<https://www.un.org/sustainabledevelopment>)

At **EU (2)** level **the Green Deal** was developed to fasten our aims towards a more sustainable European continent. The European Green Deal sets out how to make Europe the first climate-neutral continent by 2050 (https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en).

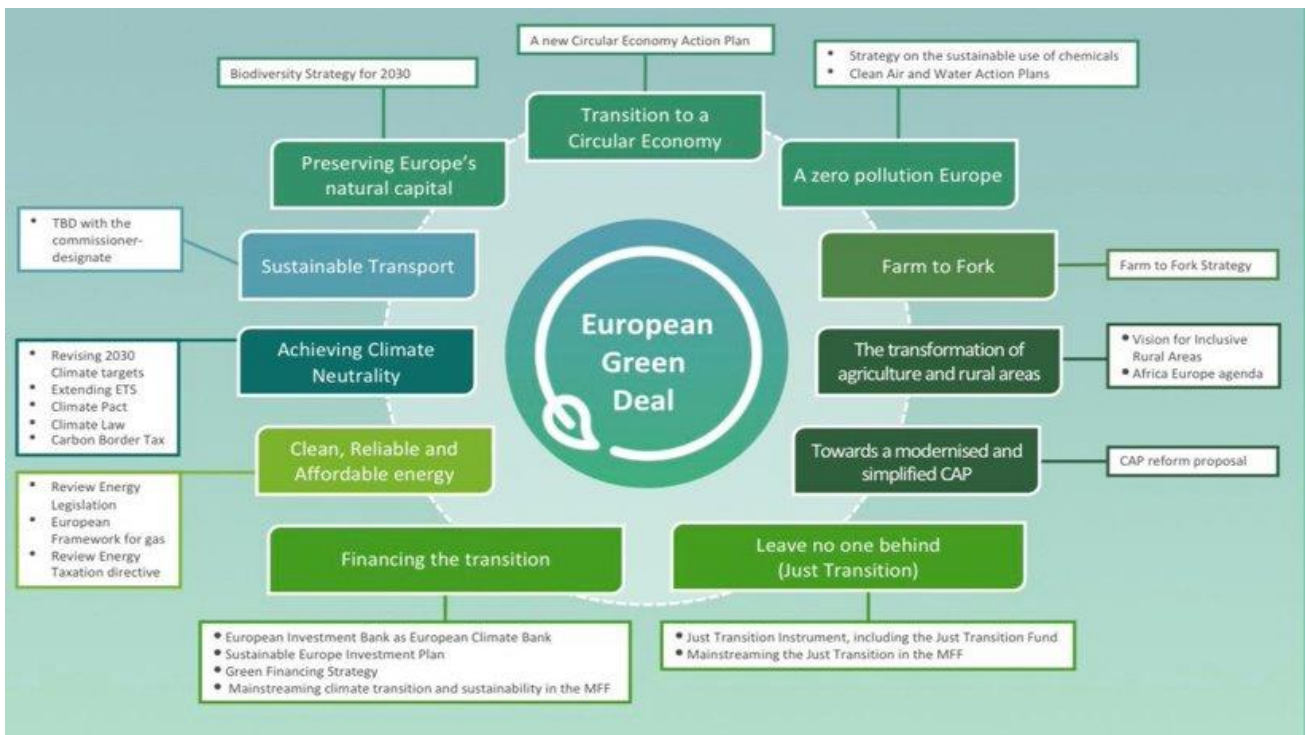


Figure 3: Overview of the EU Green Deal and its objectives. Source: <https://www.compostnetwork.info/eu-green-deal/>

The Farm to Fork Strategy (F2F)

The Farm to Fork Strategy (F2F) is at the heart of the Green Deal. It is a comprehensive and ambitious plan that sets out the European Union's (EU) vision for a sustainable food system. It aims to make the EU's food systems fairer, healthier, and more environmentally sustainable by 2030. The strategy encompasses a wide range of policies and actions across the entire food supply chain, from production to consumption ([f2f action-plan 2020 strategy-info en.pdf \(europa.eu\)](#)). The Farm to Fork strategy is intended to serve as an umbrella for the EU's food policy, bringing together different policy areas that impact the food system, such as agriculture, fisheries, environment, health, and consumer protection. The F2F strategy is an important element of the European Green Deal to ensure coherence and synergy in the overall policy approach, and is intrinsically linked to the [Biodiversity Strategy](#) which bears the motto "bring nature back into our lives". The F2F strategy includes a draft action plan with 27 specific proposals for action and a timeframe. When describing the EU food policies that indirectly impact K&I for food system transformation, the F2F strategy can be considered as an umbrella strategy.

The **F2F Action Plan 2021-2024** ([f2f action-plan 2020 strategy-info en.pdf \(europa.eu\)](#)) is a specific set of actions and initiatives that the EU will take over in the next few years to implement the F2F strategy. The Action Plan includes several key objectives, such as:

- Making food systems more sustainable by reducing greenhouse gas emissions and improving the environmental performance of food production, processing, and distribution;

- Ensuring a fair economic return for farmers and businesses by measures to support the transition to more sustainable farming practices and to improve the competitiveness of small and medium-sized enterprises in the food sector;
- Improving public health and nutrition by initiatives to promote healthy and sustainable diets, reduce food waste, and improve the nutritional value of food;
- Strengthening resilience and crisis management in food systems by measures to ensure the security of food supply and to improve the ability of food systems to withstand shocks and crises.

To achieve these objectives, the Action Plan includes a range of specific initiatives and measures, such as legislative proposals, research and innovation funding, and awareness-raising campaigns.

Initiatives completed	Initiatives in preparation (selection)
Contingency plan for ensuring food supply and food security	Legislative framework for sustainable food systems (incl. food labelling framework and public procurement standard)*
EU code and monitoring framework for responsible business and marketing conduct in the food supply chain*	Food labelling initiatives
	EU level targets for food waste reduction
	Revision of the EU school scheme
	Revision of Food Contact Materials legislation
	Revision of the animal welfare legislation
	Revision of the feed additives legislation
	Revision of the EU promotion programme for agri- food products
	Revision of EU marketing standards for agricultural products
	EU Carbon farming

Table 1: Initiatives completed and in preparation Note * Below several measures are presented in more detail.

1. Proposal for a legislative framework for sustainable food systems (F2F action plan 2021-2024)

The proposal for a legislative framework for sustainable food systems (FSFS) is one of the flagship initiatives of the F2F strategy. However, at the time of writing (Spring 2023) this framework is still being debated. At this moment there are different views on F2F strategy. The supporters of F2F strategy emphasize the urgency of enshrining proposed programs into legislation within the upcoming months, considering it is a crucial period for the F2F strategy as there are concerns that after September 2023, politicians will divert their attention towards elections. Opponents hold a different view, asserting that significant changes have occurred in Europe and the global landscape since the F2F, and Biodiversity Strategies were published in May 2020. According to Copra-Cogeca, factors such as the Covid-19 pandemic, the conflict in Ukraine, the energy crisis, and climate change are influential drivers that should be considered by the Commission and EU institutions. They argue that all legislative initiatives, both existing and forthcoming, need to consider these issues during discussions and implementation. Besides, they express apprehension that the current form of the Farm to Fork

Strategy's complete implementation could lead to excessive dependence on imports for Europe ([Farm to Fork Strategy Under Fire Ahead of European Elections in 2024 - Olive Oil Times](#)). The proposal is announced to be adopted by the European Commission by the end of 2023. It will also have as its core objective the promotion of policy coherence at EU level and national level, mainstream sustainability in all food-related policies and strengthen the resilience of food systems ([Legislative framework \(europa.eu\)](#)). The proposal will be adopted following broad consultation and impact assessment. The elements of the proposed framework are ([gfl_expg_20220520_pres_fsfs.pdf \(europa.eu\)](#))

- common definitions: e.g. (food system/ sustainable food system/ food environment/food system actors/sustainable diets);
- general objectives to be pursued vis-à-vis sustainability of the food system in all future Union and national law, anchoring in law the objectives of the F2F communication;
 - general principles targeting policy makers: future and existing legislation will be aligned/adapted where relevant to those principles;
 - governance provisions to frame and encourage multilevel engagement;
- 'favourable food environment' provisions;
 - enforcement provisions.

The proposed framework's most tangible components are a framework for sustainability labelling, sustainability requirements for products, standards for the public procurement of food and the governance framework for sustainable food systems. The governance framework as proposed will provide a frame for a multi-level cooperation of food system actors and a basis for the development of food sustainability strategies by member states.

2. EU Code of Conduct for responsible food business and marketing practices

The EU Code of Conduct for Responsible Food Business and Marketing Practices (<https://edepot.wur.nl/535257>) is one of the first deliverables of the EU F2F Strategy and an integral part of its action plan. It sets out common aspirations and indicative actions which actors 'between the farm and the fork', such as food manufacturers, food service operators and retailers, can voluntarily align, commit and contribute to in support of the transition towards sustainable food systems ([f2f_sfpd_coc_final_en.pdf \(europa.eu\)](#)). It is a voluntary initiative aimed at promoting responsible and sustainable food marketing and business practices in the EU. The Code encourages food businesses to adopt ethical and transparent practices in their marketing and advertising activities, and to promote healthy and sustainable food choices to consumers. It sets a number of aspirational objectives and the set of indicative objectives.

Related to impact on K&I for food systems transformation, the following two objectives and respective actions are worth to mention:

- improving the sustainability of the food value chain – in relation to primary producers and other actors;
- sustainable value creation in the European food supply chain through partnership.

For the first objective, the following action is proposed. Improving business resilience and competitiveness by engaging in research and innovation programmes on food sustainability. For the second objective, the following action is proposed. Supporting improved resilience and competitiveness of the supply chain by means of strengthening supply chain relations and creating shared value with partners/suppliers across the chain by identifying synergies and opportunities for collaboration, e.g. in relation to:

- ✓ promoting technology and knowledge transfer (e.g. integrated farming techniques);

- ✓ engaging in joint pre-competitive research and innovation (e.g. co-innovation product/process/technology);
- engaging in capacity-building, training, advice and skills development;
 - ✓ boosting the uptake of digital solutions and modern technologies;
 - ✓ developing common methodologies and data sharing practices to measure supply chain impacts.

The EU Code of Conduct can serve as a tool for K&I by providing a framework for the development of new technologies and approaches that support more sustainable and responsible food production and marketing practices. In general, K&I can play an important role in supporting the objectives of the EU Code of Conduct for responsible food business and marketing practices. For example, K&I can help to develop new technologies and approaches that support more sustainable and responsible food production and marketing practices. Research can also help to better understand the impact of marketing practices on consumer behaviour and health outcomes and to identify best practices for responsible marketing. In addition, funding schemes such as Horizon Europe and the LIFE program (see explained later in this report), which are both part of the EU's overall research and innovation framework, can support R&I activities related to responsible food business and marketing practices. These funding schemes provide opportunities for research and innovation projects that aim to develop new approaches and technologies for responsible food production and marketing and to promote more sustainable and healthy food consumption patterns.

3. Integration of sustainable food systems and bioeconomy

The term “bioeconomy” can be defined as the production, utilization and conservation of biological resources, including related knowledge, science, technology, and innovation, to provide information, products, processes and services across all economic sectors aiming toward a sustainable economy (https://sc-fss2021.org/wp-content/uploads/2021/03/FSS_Brief_Bioeconomy_and_Food_Systems_Transformation.pdf). These may be achieved through reducing greenhouse gas (GHG) emissions, increasing energy and material use efficiency, fostering responsible consumption, social inclusion and innovation. F2F proposes that tackling food loss and waste is the key to achieving sustainability, aligned with the bioeconomy ([f2f_action-plan_2020_strategy-info_en.pdf \(europa.eu\)](https://ec.europa.eu/f2f/action-plan-2020-strategy-info_en.pdf)). Reducing food waste will have a considerable impact on the savings for consumers and operators, while the recovery and redistribution of surplus food or waste, can be applied in other areas, resulting in the production of high-added value products. For instance, food waste can be considered as a cheap feedstock for producing value-added products such as biofertilizers, biofuels, biomethane, biogas, and value-added chemicals (https://sc-fss2021.org/wp-content/uploads/2021/03/FSS_Brief_Bioeconomy_and_Food_Systems_Transformation.pdf). To do so, R&I needs to be promoted, to develop new technologies or processes, capable to generate high-added value products or to promote modern circular bioeconomy ([Towards sustainable bioeconomy - Lessons learned from case studies \(fao.org\)](https://www.fao.org/publications/collection/towards-sustainable-bioeconomy-lessons-learned-from-case-studies)).

On the policy horizon: towards the true cost or price of food

The F2F Action Plan makes implicit reference to the concept of the true cost or true price of food in the section on incentives for consumers to adopt sustainable consumption practices: “EU tax systems should also aim to ensure that the price of different foods reflects their real costs in terms of use of finite natural resources, pollution, GHG emissions and other environmental externalities.” A specific suggestion is to apply value tax (VAT) policy for the promotion of organic

fruit and vegetables. This could be done through a VAT scheme that reduces the price premium in retail of organic compared to mainstream produce. The assumption is that organic production schemes have lower negative impact than mainstream on the environment, e.g. through reduced use of agrochemicals, warranting the tax incentive.

True Cost Accounting (TCA) is a new way of identifying the real costs of a specific product or service. The TCA is used not only to calculate the direct costs like raw materials and labour, but also the effects on the natural and social environment in which a company operates ([True Cost Accounting: transparency about the cost of food and food production - WUR](#)).

According to FAO, the United Nations World Food Organization, the price paid for food in supermarkets is only half of the true cost. FAO calculations have indicated that the hidden costs of food production are about the same as the market value, meaning that, on average, food would be twice as expensive if all of the current hidden costs were charged to consumers. If done so, and pollution is added to the price of a product (like CO₂-taxes for fossil fuels), consumers would choose food products with less environmental and health costs ([True cost accounting: a tool to improve the sustainable production and consumption of food \(wur.nl\)](#)). According to 'The true price of meat' pork should be +53% more expensive, beef +40% and chicken meat +26%, if all costs were to be included (<https://cedelft.eu/publications/the-true-price-of-meat>). Applying a true meat/dairy products cost, such in the form of a tax, can help the reduction of meat and dairy products consumption, which have a considerable high carbon footprint and health problems associated. While some EU countries are already discussing the meat taxes, the revenues of efficient fair meat prices in the EU could reach a total of €32 billion/year, possibly used for: €10-15 billion/year payments to EU farmers for sustainability income support; €7-12 billion/year for subsidies/lower VAT on vegetables, fruits, plant-based food and healthy/organic food; €6 billion can be used for compensations of low-income households to make meat affordable for all; €4 billion can be used for developing countries to double nature reserves/forests, reduce greenhouse gasses, and adapt to climate change. If a true meat price is included immediately considering all environmental costs like CO₂ equivalent emissions, air pollution and biodiversity loss, this would be unbearable for the consumer. So, the [True Animal Protein Price \(TAPP\) Coalition](#) advises, for a small increment in meat prices, e.g., 10 eurocents /100 grams of meat in 2022, increasing and differentiating (based on type of meat) the tariffs every year up to 2025. From 2025-2030, EU countries should meet the previously specified. The funding collected this way, could also be applied in new R&I funding policies to promote alternative meat proteins, from sustainable vegetable sources, such as pulses.

Overview of the EU policy landscape and Directorates-General (DGs)

The Commission is steered by a group of 27 Commissioners, known as 'the college'. Together they take decisions on the Commission's political and strategic direction. A new college of Commissioners is appointed every 5 years. The Commission is organised into policy departments, known as **Directorates-General (DGs)**, which are responsible for different policy areas. DGs develop, implement and manage EU policy, law, and funding programmes. In addition, service departments deal with particular administrative issues. Executive agencies manage programmes set up by the Commission. The EC has Commission offices throughout the world. Inside the EU, representation offices act as the Commission's voice in their host country. Offices outside the EU, known as delegations, are managed by the European External Action Service. They help promote EU interests and policies as well as undertake a variety of outreach programmes on how the Commission is organised ([How the Commission is organised \(europa.eu\)](#)).

The lists of the EC-DGs are described in appendix , in alphabetical order.

DGs responsible for K&I strategies, policies and implementation

The European Commission is organised in 33 policy departments, or Directorates-General (DGs). The majority, if not almost all DGs have relations to K&I on food systems. Comprehensive study and a strict conceptual framework is needed to assess the manifold relations of the DGs to K&I on food systems. In this limited overview we highlight five DGs with strong connections. Apart from DG RTD (Research and Innovation), these are DG CONNECT (Communications Networks, Content and Technology), DG AGRI (Agriculture and Rural Development), DG GROW (Internal Market, Industry, Entrepreneurship and SMEs) and DG REGIO (Regional and Urban Policy). Whereas DG SANTE (Health and Food Safety) coordinates the Farm to Fork strategy, to date their K&I interests relate mainly to food safety and consumer trust as well as to food loss and waste.

Below, an overview of top 5 DGs is provided under the EC, which are directly involved in Food System K&I as example. Disclaimer: we strongly state that this overview is not complete and others DGs also contribute to K&I with respect to our food system, since it concerns an overall connected network ([Departments and executive agencies \(europa.eu\)](#)). The overview of other DGs is provided in the Annex of this document.

1. Directorate-General Research & Innovation (RTD)

This Directorate-General is responsible for the development and implementation of EU research and innovation policies ([DG RTD - DG for Research and Innovation | Knowledge for policy \(europa.eu\)](#)). It manages the European Framework Programmes that support research and innovation. The main tasks are:

- to develop EU policy in the field of research and technological innovation, with special emphasis on the improving the competitiveness of European businesses;
- to coordinate the European research activities in the member states;
- managing the EU's research programmes;
- to promote a better understanding of the role of science in modern society and to stimulate public debate on a European level about matters related to research.

Food 2030 is the EU's research and innovation policy (EC DG RDT) to transform food systems and ensure everyone has enough affordable, nutritious food to lead a healthy life. It was originally launched in October 2020, and has guided the implementation of research and innovation policy and development of a stakeholder community on EU food systems transition. The policy document on the Food 2030 agenda is revised in 2023. The primary objective of Food 2030 is to

establish a resilient and future-ready food system that not only caters to people's health but also considers the well-being of the climate, planet, and communities ([Food 2030 \(europa.eu\)](#)). Food 2030 serves as a policy framework to expedite this transition while operating within safe ecological limits. It aligns with and supports the objectives of key EU initiatives such as the European Green Deal, the Farm to Fork strategy, and the bioeconomy strategy. The need for change in food systems arises from their current unsustainable nature. These systems are affected by and contribute to issues such as climate change, resource scarcity, pollution and waste, environmental degradation, biodiversity loss, population growth, malnutrition, and diet-related non-communicable diseases. To address these challenges comprehensively, Food 2030 covers the entire food system, connecting various sectors ranging from primary production and processing to retail, distribution, waste management, and consumption. It integrates research and innovation endeavours across different domains to find solutions for interconnected problems. Its aims are to enhance policy coherence, stimulate and leverage funding and investment, bridge the innovation gap, increase the adoption of innovative food products and services in the market, and support the role of disruptive technologies, novel approaches, and business models in the transition of food systems. Food 2030 is driven by four primary goals related to food and nutrition. Achieving these goals will yield multiple co-benefits:

- 1) Nutrition for sustainable and healthy diets:
 - Addressing malnutrition and obesity;
 - Personalizing nutrition, including for healthy aging;
 - Developing and promoting alternative protein sources to encourage plant-based diets;
 - Enhancing food authenticity, traceability, and safety systems;
 - Encouraging the consumption of underutilized crops for improved nutrition and resilience;
 - Supporting healthier and more sustainable diets, with a focus on Europe and Africa.
- 2) Food systems supporting a healthy planet:
 - Developing climate-smart food systems that adapt to climate change, preserve natural resources, and reduce greenhouse gas emissions;
 - Promoting biodiversity, healthy ecosystems, and soil conservation;
 - Fostering environmentally friendly and sustainable agriculture and aquaculture practices.
- 3) Circularity and resource efficiency:
 - Achieving zero food waste;
 - Utilizing unavoidable biomass and waste as valuable resources;
 - Reducing water and energy consumption through more efficient industrial food processes;
 - Facilitating tailored and local food production to meet demand;
 - Promoting sustainable and biodegradable food packaging while reducing plastics in food.
- 4) Innovation and empowering communities:
 - Establishing thriving innovation ecosystems and living labs to generate new business models and products;
 - Encouraging sustainable and accessible food systems in urban areas, towns, cities, and regions;
 - Raising awareness and engaging people in food science and local food policies;
 - Supporting place-based food sharing economies and fostering social innovation;

- Developing data-driven food and nutrition systems that address societal needs.

To achieve these goals, funding will be allocated through the Horizon Europe program to support research and innovation projects focused on Food 2030 priorities. **Ten specific pathways for action** have been identified, including governance and systems change, urban food system transformation, utilizing ocean and freshwater resources, alternative proteins and dietary shifts, food waste reduction and resource efficiency, understanding the microbiome, promoting healthy, sustainable, and personalized nutrition, developing future food safety systems, addressing food systems in Africa, and leveraging the potential of data in food systems. An eleventh pathway “zero-pollution food systems” was later added. Through Food 2030, the EU seeks to drive a transformative shift in its food systems to create a sustainable, equitable, and healthy future for all. The pathways function as a knowledge agenda for programming research and innovation topics and calls. The FOSTER project contributes to the pathway on governance and system Change. An update of the Food 2030 strategy is in preparation and will be delivered towards summer 2023.

2. Directorate-General Connect (DG Connect)

This Directorate-General is responsible for policies related to communications networks, content, and technology carries out the Commission's policies on Digital Economy and society and Research and innovation ([Communications Networks, Content and Technology \(europa.eu\)](https://ec.europa.eu/digital-economy/)).

- Digital Economy and society include topics such as
 - Digital society which among others focuses on areas of e.g. 1) Cybersecurity and Data Protection-formulating policies to strengthen cybersecurity measures and protect personal data,2) Green digital sector-policies that bring digitalisation and EU green deal together 3) Media and digital culture-defending European media and digital culture with policies that empower citizens and encourage media pluralism, etc.
 - Advanced Digital Technologies, which among others focuses on areas of e.g.1) accelerating the development and uptake of Advanced Technologies, 2) Build trustworthy Artificial Intelligence that puts people first, 3) Internet of Things Policy- actively cooperates with industry, organisations and academia to unleash the potential of the Internet of Things across Europe and beyond, etc.
 - *International Cooperation in Digital*, where it focuses on 2 topics: 1) International Relations-DG Connect represents the EU in international discussions and collaborations related to digital issues. It works with global partners to harmonize standards, promote digital trade, and address common challenges in areas such as internet governance, data flows, and emerging technologies 2) Digital in the EU-US Trade and Technology Council-transatlantic forum fostering cooperation on trade- and technology-related issues, based on shared democratic values.
 - *Digital Economy* with focus on 1) Digital skills-policies and initiatives to increase digital skills in both the workforce and consumers,2) Supporting industry-supports businesses across Europe to adapt to the digital world by coordinating initiatives, focusing investments, and boosting skills.,

3)Connectivity-creating a Europe with harmonised rules for connectivity services 4) Online platforms and e-commerce-ensure businesses and citizens can use online platforms and e-commerce services no matter where they are in the EU.

- Research and Innovation consists of 3 pillars: 1) Funding- which provides funding opportunities for EU research and innovation 2) Research projects and results-involves range of project related to research and innovation 3) Strategy and policy- includes strategies and EU regulation related to Research and innovation.

3. Directorate-General for Agriculture and Rural Development (AGRI)

This Directorate-General is responsible for the implementation of the agricultural and rural development policies of the Commission ([DG AGRI - DG for Agriculture and Rural Development | Knowledge for policy \(europa.eu\)](#)). The DG deals with all aspects of the CAP. The main tasks of the DG are:

1. to ensure the competitiveness of the European agricultural sector without the use of overly high subsidies;
2. environment, animal welfare, security and quality of products;
3. preserving landscapes and developing rural areas;
4. promotion of the European agricultural sector;
5. promote and implement clear, transparent and solid financial policy.

- **Agricultural Knowledge and Innovation Systems (AKIS)¹⁷ is an important concept and approach that DG AGRI promotes and supports within its policies and programs**

To link the relevance of the advancement and (immediate) applications of knowledge flows to enhance innovation, a systemic approach of agricultural knowledge and innovation (AKIS) has been and is being implemented in societies worldwide). Like the food systems concept, AKIS has had a knock-on effect and evolved from an academic methodology (Klerkx, Van Mierlo and Leeuwis, 2012; Roling and Wagemakers, 1998) into a policy and practical approach e.g. by the EU and its member states with respect to the CAP, in combination with the R&I framework programme Horizon 2020 (Knierim et al., 2015; Moreddu, 2013; Poppe et al., 2018a). It is a useful concept to indicate and describe the overarching combination and organisation of interactions and knowledge flows between the different AKIS actors: agricultural entrepreneurs, knowledge workers (from extension, education, advisory services and research), the government and all other actors in the agri-food value chain (from input suppliers up to the consumers), banks, NGOs, media, etc. (EU SCAR, 2012, 2013, 2015). The idea to improve this part of the food system by enhancing connections between science and practice and to boost knowledge exchange and innovation for the benefit of sustainable agriculture has gained significant support and importance (Lapple, Barham and Chavas, 2020). However, the emphasis on an integrated approach for knowledge and innovation within food systems, to address the challenges and trade-offs, raises the question if AKIS systems are fit for purpose. First, the focus on traditional agriculture and forestry knowledge and innovation is strongly

¹⁷ For all the references about AKIS in this part see (Sustainable_food_systems_do_agricultural_economist.pdf, Fresco et al., 2021)

dominant. The usual suspects involved are the traditional agricultural faculties and research institutes, focusing e.g. either on crops or animal husbandry. Apart from the combination of agriculture and information and communication technology (ICT), cross-sectoral research with other disciplines related to e.g. water, energy and health is often still limited. Second, there is much attention for the role of advisors as intermediaries in AKIS as pivots in enhancing the match between knowledge and practice, while the role of research and education to take up a more intermediary, hybrid function in this process, is still underexposed. A third barrier refers to the risks of the multi-actor approach within AKIS, to involve all actors in co-creating knowledge for optimal impact and co-ownership of solutions, stimulating knowledge transfer and exchange to speed up innovation (EU SCAR, 2019). It is e.g. a time-consuming process to involve as many relevant actors as possible: it takes experienced know-how and expertise to come to a collective goal and mind-set and to define and manage all actors' roles along the process. Hence, multi-actor research can easily lead to different perspectives, expectations and loss of focus in research aims, like blindly trying to define an elephant together. At the same time there is however a call for more transdisciplinary research with a citizens' science approach, which means with public participation in gathering, interpreting or analysing data. Essentially it implies the production of knowledge and innovation by a collective. Examples can be found in local food systems and (farm) nature management. To conclude, AKIS systems are an integral part of and form important steppingstones in many countries as building bricks for the development of food knowledge and innovation systems. But more work is needed on the highlighted issues in connecting different types of knowledge and linkages among knowledge, innovation and practical implementation in food systems.

- **European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI):** This is a European network that brings together farmers, researchers, businesses, and other stakeholders to promote innovation in agriculture and rural areas. The partnership supports projects that promote sustainable and innovative farming practices, and offers funding opportunities for projects related to sustainable food systems.

4. Directorate General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)

The Directorate General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) is working to uphold and manage the Single Market for goods and services and to strengthen its governance ([Internal Market, Industry, Entrepreneurship and SMEs \(europa.eu\)](https://ec.europa.eu/economy_finance/)).

The DG GROW supports the competitiveness, growth and resilience of the EU economy. This DG is responsible for European policy on the internal market, industry, entrepreneurship, and SMEs. DG GROW has a platform for consultation with the food industry and a platform for retailers. DG GROW is involved in drawing up the EU Code of conduct for responsible food business and marketing under the Farm to Fork strategy.

Instruments of DG GROW related to R&I in food sector:

- 1) The new Circular Biobased Europe Joint Undertaking was established in 2021 to fund projects advancing competitive circular bio-based industries in Europe. Bio-based Industries Joint Undertaking (BBI JU) is a public-private partnership that aims to support the development of a sustainable, competitive, and innovative bio-based industries sector in Europe. The BBI JU provides funding for research and innovation

projects in the food sector, including projects aimed at developing new and sustainable food and beverage products (https://commission.europa.eu/system/files/2022-05/annual-activity-report-2021-grow_en.pdf).

- In 2021, DG GROW contributed in the draft Horizon Europe work programmes under Cluster 4 “Digital, Industry and Space” and Cluster 6 “Food, Bioeconomy, Natural Resources, Agriculture and Environment (https://commission.europa.eu/system/files/2022-05/annual-activity-report-2021-grow_en.pdf):

(a) Horizon Europe: Horizon Europe is the EU's new research and innovation framework program, with a budget of €95.5 billion for the period 2021-2027. The program provides funding for research and innovation projects across a range of sectors, including the food sector.

- Cluster 4 aims to drive innovation and competitiveness in the EU's manufacturing and industrial sectors, including the food and beverage industry and is managed by DG GROW. It provides funding and support for research and innovation projects in these areas and helps to bring new and innovative products and technologies to market. Cluster 6 is managed by DG RTD.

2) While DG GROW maintains policy control of its support programmes, financial management is largely taken care of by external bodies:

(a) European Innovation Council and SMEs Executive Agency (EISMEA) which implements the European Innovation Council and manages other EU programmes focusing on SME support, innovation and the single market including parts of the Single Market Programme.

- European Innovation Council (EIC) Pilot: The EIC Pilot is a new EU funding program aimed at providing support for highly innovative and high-risk projects. The program is open to companies and researchers working in the food sector and provides funding for the development of new and innovative food products and technologies.

3) The DG GROW leads efforts on digitisation and decarbonisation of European industry and SMEs.

(a) Promoting the uptake of Industry 4.0 technologies: the Advanced Technologies for Industry (ATI) project provides a systematic monitoring of technological trends and data on advanced technologies to properly support the implementation of policies and initiatives and finally promote a competitive European industry (<https://ati.ec.europa.eu/events/monitoring-uptake-advanced-technologies-effective-industry-40-policies>).

- Supports the development of Digital Innovation Hubs (DIHs) across Europe, which provide SMEs with access to digital technologies, expertise, and support to help them adopt Industry 4.0 technologies and digital solutions. In their strategy document 2020-2024 (https://commission.europa.eu/system/files/2020-12/grow_sp_2020_2024_en.pdf) under the specific objective 2 “More specific EU SMEs have access to cross border business by digital means.

5. Directorate-General for Regional and Urban Policy (DG REGIO)

DG REGIO is responsible for the development and implementation of regional and urban development policies within the European Union. It plays a key role in supporting the regions of the EU in their efforts to enhance their economic

growth, competitiveness, and innovation capacities. Smart Specialisation Strategy (S3) is one of interesting policies of DG REGIO, which link to food system and K&I.

- **Smart Specialisation strategy (S3)** is a place-based innovation policy concept to support regional prioritisation in innovative sectors, fields or technologies through the ‘entrepreneurial discovery process (EDP)’, a bottom-up approach to reveal what a region does best in terms of its scientific and technological endowments. In 2012 the European Commission introduced the S3 concept in the EU Cohesion Policy 2014-2020 as an ‘ex-ante conditionality’ for European regions to obtain funding for research and innovation from the European Regional Development Fund (ERDF) https://www.interregeurope.eu/sites/default/files/inline/Smart_Specialisation_Strategy_S3_-_Policy_Brief.pdf). In 2015, the EC services launched three thematic smart specialisation (S3) platforms related to Agri-Food, Energy and Industrial Modernisation to provide an interactive and participatory environment supporting interregional cooperation. Thematic smart specialisation (S3) partnerships support regions to improve their regional knowledge base, leading to new paths of development and a better position in global value chains and to transnational joint strategies of innovation (see the box below).

S3P Thematic Platforms as enablers of new European Value Chains

Katerina Ciampi-Stancova, Joint Research Centre S3 Platform, Seville

Interregional collaboration plays a crucial role in the implementation of the smart specialisation strategies. Since the launch of S3P Thematic Platform on Energy in 2015 and the Agri-food and Industrial Modernisation Thematic Platforms in 2016, the European Commission's S3 Platform has become an important facilitator of the implementation of interregional cooperation on smart specialisation. In total 179 national and subnational authorities from 28 EU and non-EU countries as well as representatives of the European Commission participate. The S3P Thematic Platforms offer a structure **to learn, network, build capacities and prepare joint bankable co-investment projects.**

The objective is to develop **new European value chains** in key smart specialisation niches and/or to improve the position of European stakeholders in existing global value chains **to generate more added value for the European economy and society.** By participating in the S3P Thematic Platforms, regions can: (a) identify new opportunities for investments and unlock new business opportunities, (b) share resources to achieve joint goals more efficiently, (c) improve their competitiveness, resilience and sustainability by promoting a shared value economy, (d) connect partners in a better way, (e) enable regional representatives to improve their skills or gain new ones in networking, project management, diplomacy.

All 32 existing partnerships have put in place leadership, capacities and innovative ideas and they are ready to contribute to the achievement of the European Green Deal and Sustainable Development Goals objectives. In fact, **the partnerships are prepared to address increasing societal and environmental issues** by developing and deploying environmentally friendly solutions and solutions required to achieve systemic changes. with a better focus on **high potential projects and ambitious outcomes and impacts.**

Figure: Source https://www.interregeurope.eu/sites/default/files/inline/Smart_Specialisation_Strategy_S3_-_Policy_Brief.pdf.

With this policy, the EC encourages the design of national/regional research and innovation strategies for smart specialisation as a mean to deliver a more targeted structural fund support focused on regional knowledge strengths and a strategic and integrated approach to connect the potential for smart growth and the knowledge economy in all regions. This is called Research and Innovation Smart Specialisation Strategy (or RIS3). Regional Smart Specialisation Strategies (RIS3) can be used to support agri-food sector and drive food system transition towards sustainability, resilience, and inclusivity.

Instruments of RIS3 related to R&I in the food sector are:

- Sustainable agriculture research and development programs: supporting R&D projects that focus on developing innovative solutions for sustainable agriculture, such as new methods for reducing the use of chemical fertilizers and pesticides, and promoting agroforestry and regenerative agriculture.
- Agricultural innovation hubs: creating physical and virtual spaces where farmers, researchers, and entrepreneurs can collaborate and share knowledge, and where new ideas and technologies can be tested and developed.
 1. Agricultural training and skills development programs: providing training and skills development opportunities for farmers, to support their transition to new methods and technologies, and to improve the sustainability and competitiveness of their operations.
 2. Agricultural clusters: supporting the development of regional clusters of agricultural businesses, to promote collaboration and knowledge-sharing among companies, and to increase their competitiveness.
 3. Agricultural networking and cooperation: The Smart Specialisation Platform for Agri-Food (S3P Agri-Food) ([Agri-food - Smart Specialisation Platform \(europa.eu\)](https://s3platform.jrc.ec.europa.eu)); S3 Agri-food partnerships [S3 Agri-food partnerships - Smart Specialisation Platform \(europa.eu\)](https://s3platform.jrc.ec.europa.eu); S3 Agri-food meetings-promoting collaboration and cooperation between different actors in the agricultural sector, including farmers, processors, retailers, researchers, and policymakers, to support the transition to a more sustainable food system.
- Key Enabling Technologies (KETs) for Smart Specialisation Strategies (RIS3) in Agro-food (<https://s3platform.jrc.ec.europa.eu/documents/20125/304716/8ae4f432-6ac1-4e59-b914-ded44fc73093.pdf/092fe725-2f87-cb41-0b2a-6422f2cc8ad9?version=1.1&t=1619530735286>).
- In the Netherlands various specialisations have arisen especially around the larger municipalities that are strongly embedded in the local economy and the nearest knowledge institutes. As a result, there are several specialisations in East Netherlands, facilitated on a local level by local, regional and provincial authorities. Gelderland for example has multiple Valleys, linked to specific sectors: Food (Food Valley region, between Ede, Barneveld, Nijkerk, Wageningen and Veenendaal), Health (Arnhem Nijmegen area), Legal (Arnhem Nijmegen, Zutphen region) where various activities are bundled on the basis of Triple Helix cooperation [Smart Specialisation Strategy \(RIS3\) East Netherlands 2021-2027 \(s3vanguardinitiative.eu\)](https://www.s3vanguardinitiative.eu).

When analysing the possible instruments of RIS3 related to R&I in food sector it can be seen that there are numerous instruments and incentives that contribute directly to food system transformation and development of R&I in food system. Some examples are provided above. As RIS3 is a regional strategy it is very comprehensive and presenting all the possible activities and opportunities EU wide is not feasible. The EU RIS3 strategy has been also extended to pre-ascension countries (e.g. Western Balkan countries) to stimulate R&I development in agriculture. On the 5th and 6th of October 2021, the Joint Research Centre (JRC) held the first online thematic Smart Specialisation workshop on interregional cooperation in the Western Balkans with the focal point on the agrifood sector. The workshop aimed at fostering a debate to identify main opportunities and possible challenges in order to strengthen research, innovation and business

connections for the six Western Balkans economies in a sector that has been emerging among the most promising ones in the region (<https://s3platform.jrc.ec.europa.eu/w/agrifood-as-the-focal-point-during-a-smart-specialisation-workshop-on-interregional-cooperation>).

EU financial funding instruments and beneficiaries

The EU provides funding for a range of projects and programmes ([Funding, grants, subsidies | European Union \(europa.eu\)](#)).

It applies strict rules to ensure tight control over how funds are used and that the money is spent in a transparent, accountable manner. EU funding comes in many different forms:

- grants – partly funded by the EU and partly from other sources – that usually follow public announcements known as calls for proposals;
- subsidies managed by national and regional authorities;
- loans, guarantees and equity as forms of financial assistance to support EU policies and programmes;
 - prizes to winners of Horizon 2020 contests.

Management of EU funding:

- Direct: funding managed by the EU usually in the form of grants for specific projects related to EU policies. You can apply for this type of funding by answering calls for proposals.
- Shared management: a system of funding managed in partnership with national and regional authorities, accounting for around 80% of the EU budget. Five main funds are used for this, under the umbrella of the European structural & investment funds:
 - European Regional Development Fund – regional and urban development
 - European Social Fund – social inclusion and good governance
 - Cohesion Fund – economic convergence by less developed regions
 - European Agricultural Fund for Rural Development
 - European Maritime and Fisheries Fund
- Indirect: funding managed by national and regional authorities, not the EU. Also known as subsidies, you can apply for this type of funding at national level.

Beneficiaries of EU funding related to K&I Food Systems policies ([Funding, grants, subsidies | European Union \(europa.eu\)](#)):

Research and innovation funding programmes

Target groups for R&I programmes concerning food systems, are not only researchers but include multiple actors in the K&I chain, from the industry with specific targets for SMEs, public representative organisations, other knowledge entities (from education, extension and advisory organisations), NGOs and citizens.

- Horizon Europe (HEU):** Horizon Europe is the EU's research and innovation programme for 2021-2027 with a budget of €95.5 billion. It tackles climate change, helps to achieve the UN's Sustainable Development Goals and boosts the EU's competitiveness and growth. The programme facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges. It supports creating and better dispersing of excellent knowledge and technologies. It creates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness and optimises investment impact within a strengthened European Research Area. Horizon Europe is mainly governed by DG RTD. It is the European Union's flagship research and innovation program for 2021-2027. It includes several funding opportunities related to sustainable food systems, including research on climate-smart agriculture, circular bioeconomy, sustainable and healthy diets, and food systems governance. HEU funding opportunities are open to a wide range of applicants, including universities, research centres, and businesses. Under Horizon 2020, the Commission is preparing an additional call for proposals for Green Deal priorities in 2020 for a total of around EUR 1 billion. Under Horizon Europe, it proposes to spend EUR 10 billion on R&I on food, bioeconomy, natural resources, agriculture, fisheries, aquaculture and the environment as well as the use of digital technologies and nature-based solutions for agri-food. A key area of research will relate to microbiome, food from the oceans, urban food systems, as well as increasing the availability and source of alternative proteins such as plant, microbial, marine and insect-based proteins and meat substitutes ([f2f action-plan 2020 strategy-info en.pdf \(europa.eu\)](#)).
- Health Programme (HP):** the third EU Health Programme with a budget of € 449.4 million is the main European Commission instrument to implement the EU health strategy.
- Cohesion Fund (CF):** The Cohesion Fund is aimed at EU countries whose gross national income (GNI) per inhabitant is less than 90% of the EU average. It aims to reduce economic and social disparities and to promote sustainable development.
- Environment and climate action (LIFE):** the LIFE programme is the EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU. Since 1992, LIFE has co-financed more than 4.500 projects ([LIFE Programme \(europa.eu\)](#)). It provides funding opportunities for projects that promote sustainable practices, reduce greenhouse gas emissions, and protect biodiversity. As such, the LIFE program is a crucial funding source for initiatives that support the goals of the F2F strategy, such as reducing food waste, promoting sustainable consumption patterns, and supporting sustainable farming practices. Here are some ways in which the LIFE program can be a tool for KL&I [LIFE - Climate action sub-programme \(europa.eu\)](#), [LIFE - Calls for proposals \(europa.eu\)](#), [LIFE Integrated Projects \(europa.eu\)](#):
- Innovation and demonstration projects: The LIFE program supports innovation and demonstration projects that aim to develop and test new technologies, practices, and approaches for environmental and climate action. This includes R&I projects related to renewable energy, circular economy, and sustainable transport.
- Integrated projects: The LIFE program also supports integrated projects that address multiple environmental and climate objectives through coordinated and strategic actions. R&I projects can be an important part of integrated projects, contributing to the development and implementation of innovative solutions and approaches.

- Capacity building and knowledge sharing: The LIFE program supports capacity building and knowledge sharing activities that promote the uptake and dissemination of R&I results and best practices. This includes training and education programs, networking and collaboration activities, and the development of online platforms and tools.
- Technical assistance: The LIFE program provides technical assistance to support the development and implementation of R&I projects, including project preparation, monitoring, and evaluation. This can help to ensure that R&I projects are effectively designed, implemented, and communicated.
- **European Maritime Fisheries and Aquaculture Fund (EMFAF)** [EMFAF \(europa.eu\)](https://europa.eu). This is a funding program that supports the sustainable development of the European Union's fisheries and aquaculture sectors. It provides support for developing innovative projects ensuring that aquatic and maritime resources are used sustainably. The EMFAF provides financial support for a wide range of activities, including research and innovation (R&I) projects. Under the EMFAF, funding can be provided for R&I projects related to fisheries and aquaculture, including the development and application of new technologies and practices, and the promotion of sustainable and innovative approaches to fisheries and aquaculture management. For example, funding can be provided for projects that develop new fishing gear or aquaculture systems that reduce environmental impacts, improve efficiency, or increase sustainability. In particular, it facilitates:
 - ✓ the transition to sustainable and low-carbon fishing
 - ✓ the protection of marine biodiversity and ecosystems
 - ✓ the supply of quality and healthy seafood to European consumers
 - ✓ the socio-economic attractiveness and the generational renewal of the fishing sector, in particular as regards small-scale coastal fisheries
 - ✓ the development of a sustainable and competitive aquaculture contributing to food security
 - ✓ the improvement of skills and working conditions in the fishing and aquaculture sectors
 - ✓ the economic and social vitality of coastal communities
 - ✓ innovation in the sustainable blue economy
 - ✓ maritime security towards a safe maritime space
 - ✓ international cooperation towards healthy, safe and sustainably managed oceans
- **European Regional Development Fund (ERDF)**. The European Regional Development Fund aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. The ERDF focuses its investments on several key priority areas, including innovation and research. The ERDF is one of the main financial instruments of the EU's cohesion policy. Its purpose is to contribute to reducing disparities between the levels of development of European regions and to improve living standards in the least-favoured regions ([European Regional Development Fund \(ERDF\) | Fact Sheets on the European Union | European Parliament \(europa.eu\)](https://europa.eu)). In the 2014-2020, the ERDF spending focus priorities were:
 - ✓ research and innovation;
 - ✓ information and communication technologies;
 - ✓ small and medium-sized enterprises (SMEs);
 - ✓ the promotion of a low-carbon economy.

In the 2021-2027 period the ERDF will provide significant funding opportunities for R&I projects that contribute to the economic and social development of the regions in the EU. The ERDF will prioritize investments in R&I infrastructure, business activities, and partnerships that can foster innovation and contribute to the transition to a more sustainable and resilient economy. Here are some key aspects of the ERDF in the 2021-2027 period ([Info regio - New Cohesion Policy \(europa.eu\)](#), [Info regio - European Regional Development Fund \(europa.eu\)](#), [European Regional Development Fund \(ERDF\) | Fact Sheets on the European Union | European Parliament \(europa.eu\)](#)):

The ERDF has a budget of €200 billion for the 2021-2027 period, which represents an incremental increase compared to the previous funding period (€199 billion). The ERDF has defined several investment priorities for the 2021-2027 period, which include R&I, digital transition, low-carbon economy, and sustainable transport. The ERDF has several objectives for the 2021-2027 period, including smart and sustainable growth, social and territorial cohesion, and the transition to a low-carbon and circular economy. Investment priorities. Within the R&I priority, the ERDF will support investments in research and innovation infrastructure, business R&I activities, and R&I partnerships between academia, industry, and public authorities. Synergies with other funds: The ERDF will seek to enhance synergies with other EU funds, such as the Cohesion Fund, the European Social Fund, and the European Agricultural Fund for Rural Development, to ensure a coordinated and complementary approach to regional development.

- **European Structural and Investment Funds (ESIF):** Over half of EU funding is channelled through the European structural and investment funds (ESIF). They are jointly managed by the-EC and the EU countries. The purpose of all these funds is to invest in job creation and a sustainable and healthy European economy and environment. Open calls for proposals related to research and innovation are available via the following funds of which, some are already listed above:
 - the European regional development fund (ERDF);
 - the European social fund (ESF);
 - the Cohesion fund (CF);
 - the European agricultural fund for rural development (EAFRD);
 - European maritime, fisheries and aquaculture fund (EMFAF);
- **DG REGIO open calls.** Examples are:
 - Call for proposals 2022CE160AT291 - Empowering youth in the EU Outermost Regions – YOUTH 4 OUTERMOST REGIONS (#YOUTH4ORS) – deadline 31 May 2023 – 17h00.
 - The objective of the grant is to empower and mobilise youth in the outermost regions. Young people can become agents of change, entrepreneurs and innovators in their local communities.
- A call for peer-exchanges and experts as part of the just transition platform (JTP) - deadline 31 May 2023 – 23h00.

The programme facilitates:

- ✓ Exchange between JTF territories and other relevant Just Transition stakeholders, including regional and public authorities as well as socio-economic partners such as NGOs, universities, unions, or businesses;
- ✓ Sharing knowledge and best practices between experts, JTF territories and other relevant stakeholders, offering them the opportunity to learn from each other's experiences.

- **Structural Reform Support Programme (SRSP):** The [Structural Reform Support Programme \(SRSP\)](#) is an EU programme that provides tailor-made support to all EU countries for their institutional, administrative and growth-enhancing reforms, to support job creation and sustainable growth. The SRCP is demand driven, not requiring co-financing from EU countries, providing a tailor-made entire reform process, from preparation and design to implementation of the reforms. In 2020, the European Commission Directorate-General for Structural Reform Support (DG REFORM) has partnered up with the Council of Europe to support member states in effectuating structural reforms in governance and public administration and the financial sector.

Implementation of funding programmes for innovation: farmers & rural businesses (connected to AKIS)

EU countries implement national and regional **rural development programmes (RDPs)**, which are co-financed by the **European fund for rural development (EAFRD)** and national budgets. The EAFRD budget for the 2014-20 programming period amounted to roughly €100 billion. Under the CAP transitional regulation (adopted on 23 December 2020), RDPs have been conditionally extended for 2021 and 2022. During these years, RDPs will be provided with €26.9 billion from the EAFRD budget for 2021-27 and an extra €8.1 billion from the next generation EU recovery instrument. Due to this extension, many of the projects and schemes included in RDPs will continue to run until the end of 2025. The EAFRD forms the second pillar of the CAP and is mainly governed by DG AGRI ([CAP funds \(europa.eu\)](#)). The EAFRD is the EU's funding program for rural development, and it provides financial support for a wide range of projects that aim to promote economic, environmental, and social sustainability in rural areas. R&I projects can be funded under the EAFRD such as projects that involve the development and application of new technologies and practices in agriculture, forestry, and other rural sectors. For example, funding can be provided for projects that promote sustainable and innovative farming practices, such as precision agriculture, organic farming, and sustainable water management. In addition, the EAFRD can also provide funding for projects that aim to promote the uptake and dissemination of new knowledge and innovations in rural areas. This includes projects related to training and knowledge transfer, networking and collaboration, and the development of innovation clusters and hubs. From 2023 onwards, all new rural development actions will be incorporated into **national CAP strategic plans, including national AKIS Plans**. Each national plan will be built around key social, environmental and economic objectives for EU agriculture, forestry, and rural areas.

Specific funding programmes for Education and young people

Funding opportunities per target group:

- Education, training, youth and sport: **Erasmus+** is the EU programme that aims to improve the skills and employability of young people, promote their social inclusion and well-being, and foster improvements in youth work and youth policy at local, national and international level. Funding activities are managed centrally by the European Education and Culture Executive Agency (EACEA) or by national agencies in each country.
- Fellowships for researchers: **Marie Skłodowska-Curie Actions** are open to researchers in all disciplines, from life-saving healthcare to 'blue-sky' science. The activities are implemented by the Research Executive Agency (REA).
 - Young entrepreneurs: **Erasmus for Young Entrepreneurs** is an exchange programme for entrepreneurs offering the opportunity to work alongside an experienced entrepreneur in another participating country for a period between one and six months.

- Young unemployed: The Youth Employment Initiative supports unemployed young people who are currently not enrolled in education or training in regions with a youth unemployment rate above 25%. For the period 2021-2027, the Youth Employment Initiative was integrated into the European Social Fund Plus (ESF+), while preserving the focus on youth employment.
- The reinforced **Youth Guarantee** is a commitment by all Member States to ensure that all young people under the age of 30 receive a good quality offer of employment, continued education, apprenticeship and traineeship, within four months of leaving education or becoming unemployed. These schemes are set up by the managing authorities in EU countries and can provide more details on both the Youth Employment Initiative and the Youth Guarantee.

Specific funding programmes for Public Bodies

Public bodies have access to several funds already mentioned above and furthermore:

- Public bodies can act as contracting authorities for **funding opportunities in the field of development**. Depending on the programme, such bodies can also participate in calls for proposals to receive a grant under the EU's external action.
- Eurostat publishes calls for proposals open to national statistical institutes and other national authorities responsible for collecting/producing and publishing official statistics. These bodies may benefit from grants under the **European Statistical Programme**.
 - Public bodies can also apply for projects under the **Citizens, equality, rights and values programme**.
 - Specific funding opportunities are available for cities.

EU networks for Food Systems K&I

The EU policy network for food systems K&I comprises at least 5 official expert groups and 22 stakeholder networks (see Figure 4 below based on Achterbosch and Bogaardt, 2022).¹⁸ Six EC expert groups serve as advisory bodies for DG RTD and DG SANTE on knowledge and innovation policy for the transition to sustainable food systems in the EU. These are: the Horizon Europe Strategic Programme Committee, the Group of Chief Scientific Advisors, the SCAR Strategic Working Group Food Systems, the Expert Group on General Food Law and Sustainability of Food Systems, and the Advisory Group Food Chain and Animal and Plant Health. A 6th expert group, the High-Level Expert Group International Platform for Food Systems Science, completed its operations in 2022.

¹⁸ Thom Achterbosch and Marc-Jeroen Bogaardt, "Adviezen voor een actieve rol van Nederland in Europees kennis- en innovatiebeleid voor transitie naar duurzame voedselsystemen" (Recommendations for an active role of the Netherlands in European knowledge and innovation policy for transition to sustainable food systems, in Dutch) (Wageningen Economic Research, 2022), <https://doi.org/10.18174/569549>.

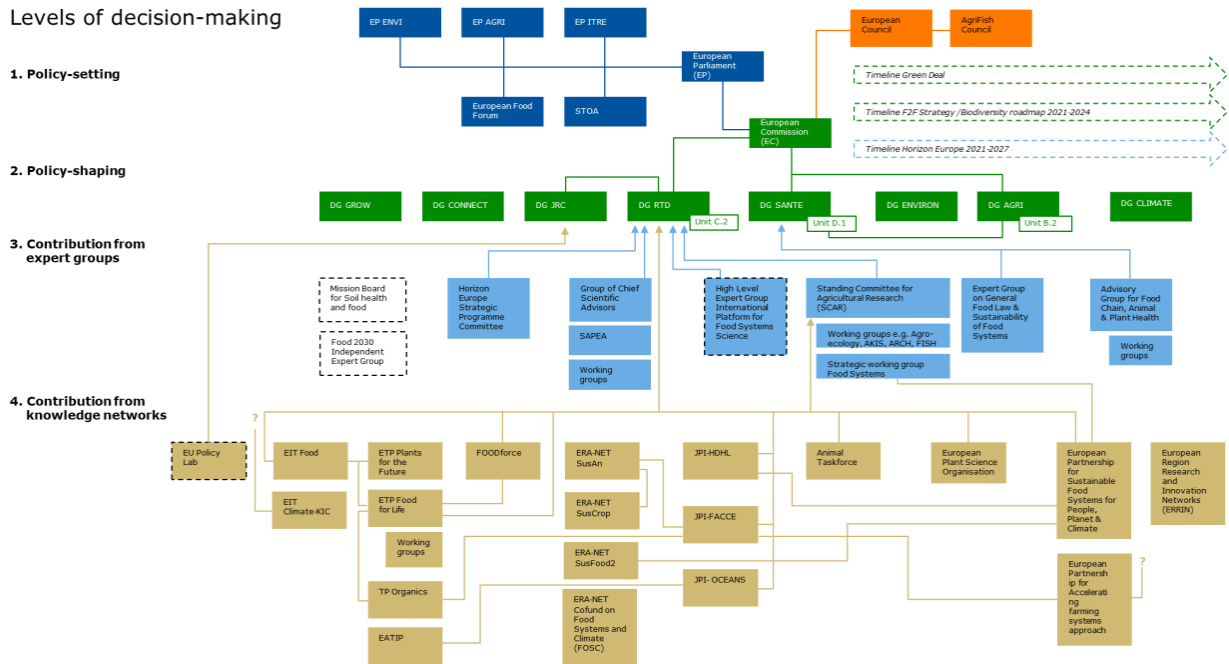


Figure 4. Network map of the EU policy framework for transition to sustainable food systems (source: Achterbosch and Bogaardt, 2022)

These committees make use of policy information and technical assessments from member states, sector associations, advisors. Scientific materials are also used as input in policy cycles. The Horizon Europe Strategic Programme Committee discusses and advises DG RTD officials on the content of the Horizon Europe framework programme's strategic plans before the plans are finally adopted by the EC. There are 20 subgroups under this expert group. One of these is the subgroup 'Food, Bioeconomy, Natural Resources, Agriculture and Environment'. This subgroup is important because this group prepares the draft texts of theme 9 Food, Bioeconomy, Natural Resources, Agriculture and Environment of the Horizon Europe Work Programme 2021-2022 and discusses them in their meetings. This subgroup is co-chaired by DG AGRI and DG RTD.

A network of 22 self-organised groups - i.e. not set up by the EC, the Council or the EP - also provide advice and advocacy to the EC on the European knowledge and innovation policy, the F2F strategy or other European frameworks related to the transition of food systems. These professional interest groups are the Animal Taskforce, 2 European Innovation and Technology innovation communities (EITs), European Plant Science Organisation (EPSO), European Region Research and Innovation network (ERRIN), 6 European Technology Platforms (ETPs), 3 Joint Programming Initiatives (JPIs), 2 European Partnerships (on agroecology and sustainable food systems), 4 ERA-NETs (joint national and EU funding mechanisms), and Food Force network. ETP Food for Life collaborates with the European Partnership for Safe and Sustainable Food Systems. ETP Food for Life, TP Organics, ETP Plant for the Future, European Aquaculture Technology and Innovation Platform (EATIP) have made themselves increasingly relevant as a source of ideas and sounding board for knowledge and innovation policy through positioning and collaboration. EIT Food receives funding from the EC to organise the flow of knowledge into business innovation and education. However, EIT Food is further removed from policy. The 22

professional advocacy organisations are part of a wide-ranging network of organisations and partnerships in the field of agriculture, food and bioeconomy.

In the same study, a number of other bodies were identified as relevant in the wider agriculture, food, natural resources and bioeconomy. These are: marine network organisations such as The European Fisheries and Aquaculture Research Organisations (EFARO); the EURAGRI think tank, a platform of European public research institutes in the field of agriculture, food, forests and fisheries; EU Platform on Food Losses and Waste; European Regions for Innovation in Agriculture, Food and Forestry (ERIAFF) and regionally oriented networks such as Bioeast, with a focus on new EU member states; Circular Bio-based Europe Joint Undertaking (CBE-JU), a Horizon Europe partnership between the European Commission and the Bio-based Industries Consortium (BIC); the International Bioeconomy Forum and its European branch; the Milan Urban Food Policy Pact, a learning network of cities with active food policies

For a selection of most relevant expert groups and networks more details are provided below.

- **SCAR**

The European Green Deal has positioned Europe favorably as a pioneer in the shift towards sustainable agriculture, forestry, and food systems. Research and innovation (R&I) efforts in these domains within Europe play a crucial role in expediting the implementation of the European Green Deal agenda.

The Standing Committee on Agricultural Research (SCAR) advises the European Commission (EC), EU Member States, and Associated Countries on R&I priorities to tackle Europe's challenges in agriculture, fisheries, food systems, forestry, and the broader bioeconomy. Working closely with the European Commission, SCAR collaboratively develops impactful R&I strategies. SCAR fosters R&I by conducting foresight studies and providing recommendations, serving as an inspirational force. Moreover, it contributes to strengthening the European Research Area, serving as a pivotal platform for co-creating five Horizon Europe Partnerships. These partnerships are ambitious instruments that align EU and national R&I agendas, resulting in tangible outcomes in key priority areas of the Green Deal. The SCAR Working Groups form a network of motivated peers, offering unique platforms to shape R&I agendas, co-construct European R&I partnerships, and exchange experiences and best practices. Membership in SCAR empowers delegates and scientists to implement national research priorities at the European level and foster alignment between national and European R&I agendas (<https://scar-europe.org/>).

- **SWG Food Systems**

Food systems encompass not only the vital role of supporting human life and good health but also possess significant social, cultural, environmental, and economic dimensions. However, these systems are currently struggling with global challenges such as population growth, urbanization, migration, climate change, and resource scarcity. To effectively address the impacts of these complex social and ecological challenges, we must innovate within our food systems, adapt to changing circumstances, and prepare them for the future.

Furthermore, it is imperative for food systems to ensure food security and nutrition security. The provision of food and nutrition security (FNS) in a changing world necessitates urgent political action, long-term approaches, and commitment

from civil society. The European research and innovation (R&I) policy plays a crucial role in safeguarding the future resilience of food systems and contributes to achieving the Sustainable Development Goals by 2030. In this context, the primary mission of the SCAR FOOD SYSTEMS STRATEGIC WORKING GROUP (SCAR FS SWG) is to offer strategic advice and guidance, supporting the EU R&I policy framework FOOD2030 and its four key priorities:

- NUTRITION for sustainable and healthy diets.
- CLIMATE smart and environmentally sustainable food systems.
- CIRCULARITY and resource-efficient food systems.
- INNOVATION and empowerment of communities.

To accomplish this mission, the SCAR FS SWG has established five objectives:

- Monitoring the outcomes of food systems in relation to governance and future-proofing.
- Increasing diversity within food systems.
- Analyzing the drivers and outcomes of the "Food Environment."
- Striving for zero waste from food systems.
- Managing knowledge through education, dissemination, training, and awareness.

Moreover, the work of SCAR FS SWG will contribute to ensuring policy coherence, adopting a systemic approach, and avoiding fragmentation within food systems. This will be achieved through the analysis of various national and regional initiatives and the funding programs related to food systems. To this end, the FOOD SYSTEMS SWG has conducted a comprehensive quantitative and qualitative mapping of research and innovation investments (<https://scar-europe.org/food-mission-and-aims>).

- **HEU European Partnership for Safe and Sustainable Food Systems – cluster 6 (partnership under SCAR).**

The European Commission launched the Partnership Sustainable Food Systems (P-SFS) under HEU to achieve sustainable food systems. P-SFS is one of ten partnerships targeting food systems, collaborating with other partnerships to implement system approaches and engage multiple actors. P-SFS aims to develop an EU-wide research and innovation partnership that promotes healthy, safe, and sustainable diets within resilient food systems. It identifies four thematic areas (R&I Areas) and formulates four transversal activities (Activity Areas) to gain insights and share knowledge. The partnership encourages collaboration among participating EU countries, respecting local contexts and responding to sustainability demands. It recognizes the urgency of addressing threats to our planet, societies, and food security and emphasizes collective approaches involving diverse actors. P-SFS fosters inclusivity by involving public and private actors, policymakers, foundations, NGOs, and citizens at different levels. It pools resources, monitors progress transparently, showcases inspiring practices, and seeks synergies within Europe. Ultimately, P-SFS contributes to a common language on systemic food systems and supports the Legislative Framework on SFS. It facilitates clear descriptions of complex interactions and enables transformative actions through multi-actor collaboration. https://scar-europe.org/images/FOOD/Main_actions/SFS_Partnership_SRIA_31012023.pdf

- **SWG AKIS**

Mission of the SCAR AKIS is to build an EU-wide knowledge and innovation network focusing specifically on working with and for farmers <https://scar-europe.org/akis-mission-and-aims>. The objectives are

- Improving the functioning of knowledge and innovation systems in the bioeconomy.
- Pursuing the outcomes of all foresight studies to stimulate appropriate research and innovation activities, knowledge generation and knowledge exchange.
- Covering all agri-food and biomass chains, from producer to consumer, in a systemic approach.

Planned activities:

- Focus on improving the functioning of knowledge and innovation systems in the bioeconomy.
- Achieve greater impact of the Multi-Actor Approach (MAA) implementation in EU AKIS.
- Define the role of education in EU AKIS.
- Define the role of digitisation and E-infrastructures in knowledge exchange.
- Define the role of social innovation and inclusivity in EU AKIS.

- **EIT Food**

EIT Food is a community focused on addressing critical issues within the food system to improve outcomes for people and the planet. By adopting a mission-based approach, EIT Food prioritizes investments, funding, advocacy, and interventions to make a tangible difference. The community plays a pivotal role in shaping the goals and direction of EIT Food's missions, and individuals can contribute by joining the community. EIT Food collaborates with various partnerships, including FACCE-JPI and ERA-NET Cofund on Food Systems and Climate, to integrate and align national research resources in Europe. This collaboration aims to tackle challenges related to agriculture, food security, and climate change, bringing together 20 countries committed to building an integrated European Research Area ([EIT Food partnerships - EIT Food](#))

- **FACCE-JPI and ERA-NET Cofund on Food Systems and Climate (FOSC)**

FACCE-JPI (Joint Programming Initiative on Agriculture, Food Security, and Climate Change) and ERA-NET Cofund on Food Systems and Climate are collaborative initiatives focused on addressing the challenges at the intersection of food systems and climate change. FACCE-JPI aims to integrate and align national research efforts in Europe to develop a common research strategy for agriculture, food security, and climate change. It brings together 20 countries committed to building a cohesive European Research Area in these areas.

ERA-NET Cofund on Food Systems and Climate is a funding program that supports research projects addressing the complex relationship between food systems and climate change. It provides financial support to collaborative projects involving multiple countries, promoting the development of innovative solutions and strategies.

Both initiatives recognize the need for coordinated action and research to tackle the interconnected challenges posed by climate change and the food system, aiming to foster collaboration, knowledge sharing, and innovation in these critical areas. FACCE-JPI brings together 20 countries committed to building an integrated European Research

Area. <https://www.faccejpi.net/en/faccejpi.htm>, <https://www.faccejpi.net/en/faccejpi/actions/core-theme-2/era-net-cofund-on-food-systems-and-climate-fosc.htm>

Appendixes

DGs linked to food systems K&I

- Directorate-general AGRI: Agriculture and Rural Development. DG AGRI is responsible for the EU Commission's policies on agriculture, rural development and the common agricultural policy (CAP).
- Directorate-general CLIMA: Climate Action. This department leads the European Commission's efforts to fight climate change at EU and international level.
- Directorate-general Connect: Communications Networks, Content and Technology. Connect develops and implements policies to make Europe fit for the digital age.
- Directorate-general: EAC: Education, Youth, Sport and Culture. This Directorate-General (DG EAC) is responsible for the EU Commission's policies on education, youth, sport and culture.
- Directorate-general EMPL: Employment, Social Affairs and Inclusion. DG EMPL is responsible for the EU Commission's policies on employment and social affairs.
- Directorate-general ENV: Environment. DG ENV is responsible for the EU Commission's policies on the environment.
- Directorate-general EUROSTAT: Eurostat - European statistics. Eurostat collects and publishes comparable statistics from all countries in the EU.
- Directorate-general SANTE: Health and Food Safety. DG SANTE is responsible for the EU Commission's policies on health and food safety.
- Directorate-general GROW. Internal Market, Industry, Entrepreneurship and SMEs. The department for growth (DG GROW) is responsible for the EU Commission's policies on the single market, industry, entrepreneurship and small businesses.
- Directorate-general JRC. Joint Research Centre. The Joint Research Centre is the Commission's science and knowledge service.
- Directorate-general MARE: Maritime Affairs and Fisheries. DG MARE is responsible for the EU Commission's policies on maritime affairs and fisheries.
- Directorate-general REGIO: Regional and Urban Policy. The department for regional and urban policy (DG REGIO) is responsible for the EU Commission's policies on regions and cities.
- Directorate-general RTD: Research and Innovation. This Commission department is responsible for EU policy on research, science and innovation.
- Directorate-general INTPA: International Partnerships. The department for International Partnerships (DG INTPA) is responsible for formulating the EU's international partnership and development policy.
- *DGs with potential links to food systems K&I*
- Directorate-general DEFIS: Defence Industry and Space. This Commission department is responsible for EU policy on defence industry and space.

- Directorate-general JUST: Justice and Consumers. The department for justice (DG JUST) is responsible for the EU Commission's policies on justice, consumer rights and gender equality.
- Directorate-general MOVE: Mobility and Transport. The department for mobility and transport (DG MOVE) is responsible for the EU Commission's policy on transport for private and professional purposes.
- Directorate-general REFORM: Structural Reform Support. The Directorate-General for Structural Reform Support helps EU countries to design and implement reforms as part of their efforts to support job creation and sustainable growth.
- Directorate-general TRADE: Trade. The department for trade (DG TRADE) is responsible for the European Commission's policies and agreements on trade with countries outside the EU.
- *DGs with limited links to food systems K&I*
- Directorate-general BUDG: Budget. The European Commission's department for budget (DG BUDG) is responsible for managing the EU budget.
- Directorate-general COMM: Communication. The department for communication (DG COMM) is responsible for explaining EU policies to the public and informing the Commission on trends in public opinion.
- Directorate-general COMP: Competition. The department for competition (DG COMP) is responsible for the EU Commission's policies on competition and antitrust law.
- Directorate-general ECFIN: Economic and Financial Affairs. DG ECFIN is responsible for the EU Commission's policies promoting economic growth, higher employment, stable public finances and financial stability.
- Directorate-general ENER: Energy. DG ENER is responsible for the EU Commission's policies on energy.
- Directorate-general ECHO: European Civil Protection and Humanitarian Aid Operations. The department for Civil Protection and Humanitarian Aid Operations (DG ECHO) is responsible for the EU Commission's policies on aid and protection.
- Directorate-general NEAR: European Neighbourhood and Enlargement Negotiations. DG NEAR is responsible for the EU Commission's policies on enlargement, neighbour countries and economic cooperation.
- Directorate-general FISMA: Financial Stability, Financial Services and Capital Markets Union. The department for financial stability and capital markets (DG FISMA) is responsible for the EU Commission's policies on financial services.
- Directorate-general HR: Human Resources and Security. DG HR is the department responsible for human resources and security in the Commission.
- Directorate-general DIGIT: Informatics. The EU Commission's department for informatics (DG DIGIT) is responsible for digital infrastructure and services in the Commission.
- Directorate-general HOME: Migration and Home Affairs. The department for migration and home affairs (DG HOME) is responsible for the EU Commission's policies on citizenship, migration and home affairs.
- Directorate-general TAXUD: Taxation and Customs Union. DG TAXUD is responsible for the EU Commission's policies on taxation and customs.

- Directorate-general DGT: Translation. Directorate-General for Translation translates texts for the European Commission into and out of the EU's official languages.

