



WP4: Develop systems and behavioral based ToCs to understand the potential impact of public and private interventions

D4.2 System and Behavioural Based Theory of Change and Proposed Interventions for the ENFASYS cases

Project funded by



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
**State Secretariat for Education,
Research and Innovation SERI**



**Funded by
the European Union**

Document Information

Grant Agreement Number	101059589	Acronym	ENFASYS	
Full Title	ENcouraging Farmers towards sustainable farming Systems through policy and business Strategies			
Start Date	1 st Sep 2022	Duration	48 months	
Project URL	www.enfasysproject.eu			
Deliverable	D4.2. System and Behavioural Based Theory of Change and Proposed Interventions for the ENFASYS cases			
Work Package	WP4			
Date of Delivery	Contractual	30 th April 2025	Actual	24 th April 2025
Nature	report	Dissemination Level	public	
Lead Beneficiary	MBS			
Responsible Author	Marija Roglic			
Contributions From	Louis Tessier, Domenico Dentoni			

Document History

Version	Issue Date	Stage	Description	Contributor
0.1	11/03/2025	Draft	V1	Marija Roglic
0.2	13/03/2025	For the reviewers	V2	Marija Roglic, Louis Tessier, Domenico Dentoni
0.3	19/03/2025	Feedback from the reviewers	V3	Giovanna Ottaviani Aalmo, Filippo Pini
0.4	21/03/2025	Final	V4	Louis Tessier, Marija Roglic

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Acknowledgments: The authors acknowledge the use of Lex AI assistant for copy editing support to improve readability and clarity of this report. All content was authored, reviewed, and approved by human researchers.

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List of abbreviations

AECM - Agri-Environmental and Climate Measures

CAP - Common Agricultural Policy

CLD - Causal Loop Diagram

CS - Case Study

CSC - Case Study Coordinator

ENFASYS - ENcouraging Farmers towards sustainable farming Systems through policy and business Strategies

EU - European Union

GMO - Genetically Modified Organism

KPI - Key Performance Indicator

MLP - Multi-Level Perspective

MS - Member State

NGO - Non-Governmental Organization

SFS - Sustainable Farming System

SME - Small and Medium-sized Enterprise

ToC - Theory of Change

TPI - Transformation Potential Index

VAT - Value Added Tax

VNM - Value Network Map

WP - Work Package

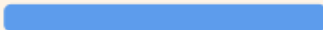
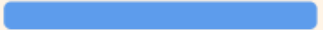
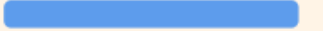


1 Visual Summary

Key Findings:

- Multi-aspect strategies outperform single-focus approaches
- Economic tools + vision-setting showed best results (+0.5 points)
- Switzerland succeeded by linking financial support to quality standards

Success Predictors:

Market orientation	 r=0.82
Clarity of aims	 r=0.79
Research integration	 r=0.74

Transformation Approaches:

- 1 Market-Led (Serbia, Germany, Belgium, Ireland)
- 2 Governance-Oriented (Switzerland, France, Wallonia)
- 3 Adaptive-Collaborative (Greece, Italy, France)

Recommendations:

- 1 Combine shallow interventions with deeper system changes
- 2 Ensure balanced stakeholder representation
- 3 Align economic incentives with environmental objectives
- 4 Create coordination mechanisms across governance levels
- 5 Implement strategic sequencing that builds momentum

Result: "Optimal Leverage Point Strategy Model"

2 Executive Summary

European farming needs to become more sustainable but faces many barriers. This study examined nine case studies across Europe where stakeholders created roadmaps for change, i.e. case study systems and behavioural based Theory of change, following a structured protocol. We systematically reviewed their Theories of change to find what works best.

Our research used three methods: analysing who participated, identifying where to intervene in the system, and evaluating success factors.

Our analysis revealed several key findings:

- Strategies that target multiple aspects of a system work better than single-focus approaches
- Combining economic tools with vision-setting showed the best results
- Switzerland's success came from linking financial support to quality standards
- Combined approaches performed 0.5 points better on our evaluation scale

Who participated made a big difference. Having balanced groups with diverse perspectives led to better outcomes.

Three factors strongly predicted success:

- Market orientation ($r=0.82$)
- Clarity of aims ($r=0.79$)
- Research integration ($r=0.74$)

We identified three different approaches to transformation:

- Market-Led Transformations (Serbia, Germany, Belgium, Ireland)
- Governance-Oriented Transformations (Switzerland, France & Wallonia)
- Adaptive-Collaborative Transformations (Greece, Italy, France)

Each type works best in different settings.

Based on these findings, we recommend:

1. Combining shallow interventions with deeper system changes
2. Ensuring balanced stakeholder representation
3. Aligning economic incentives with environmental objectives
4. Creating coordination mechanisms across governance levels
5. Implementing strategic sequencing that builds momentum through incremental changes

Our study resulted in a model called the "Optimal Leverage Point Strategy Model." This tool helps design effective transitions by assessing local governance and combining strategic interventions. Policymakers and practitioners can use this model to create changes that fit their specific regional contexts.

3 Introduction

The ENFASYS project (ENCouraging Farmers towards Sustainable Farming Systems through Policy and Business Strategies) aims to drive sustainable, productive, climate-neutral, biodiversity-friendly, and resilient farming systems (SFS) by identifying effective policies and business strategies that encourage farmers to adopt sustainable practices. This report represents the second major deliverable of Work Package 4, building upon our previous Methodological Brief (D4.1) and setting the foundation for the forthcoming European Landscape Theory of Change (D4.3).

3.1 Background and Context

Sustainable farming transitions depend on understanding both complex agricultural systems and farmer decision-making behaviours. ENFASYS addresses this challenge through an innovative approach combining systems thinking with behavioural insights using participatory Theory of Change (ToC) development.

Our work proceeded in two phases:

Phase 1: We developed a methodological framework for systems and behaviour-based Theories of Change (D4.1). We then created a structured protocol that case study coordinators applied across nine diverse European agricultural contexts. This protocol guided the development of case-specific ToCs that identified context-appropriate leverage points and interventions.

Phase 2: We created a multi-layered analytical framework to compare these nine case studies. This cross-analysis identified patterns and insights across different contexts, resulting in the findings presented in this report.

3.2 Objectives of This Report

This cross-case analysis serves four key objectives within the broader ENFASYS project:

1. **Synthesize findings across diverse contexts:** We analysed nine case studies spanning different agricultural sectors and European regions to identify patterns, commonalities, and contextual variations in transformation pathways.
2. **Identify effective leverage points and interventions:** Through systematic comparison of the proposed strategies, we determined which interventions show the greatest potential for triggering systemic change.
3. **Understand enabling conditions and success factors:** By examining contextual factors and methodological approaches, we identified what makes certain transformation strategies more effective than others.
4. **Establish foundations for the European Landscape ToC:** The patterns and insights from this cross-case analysis will inform the development of a broader European-level TOC in the next phase of our work.

3.3 Analytical Approach

Our cross-case analysis employs a multi-layered framework that integrates three complementary perspectives:

1. **Integrated Stakeholder and Methodology Analysis:** Examining how stakeholder engagement processes and methodological adaptations done by the case study coordinators influenced the quality and effectiveness of the developed ToCs.
2. **Ex-ante Systemic Strategy Assessment:** Evaluating the potential of the proposed strategies to activate deep leverage points and catalyse change across multiple system levels using Meadows' Leverage Points framework and the Multi-Level Perspective.
3. **Success Factor Evaluation:** Assessing the presence of key factors associated with transformation potential, based on the shared understanding developed in the Light Touch Review (WP1).

This integrated approach allows us to go beyond a simple comparison of case study findings to develop a deeper understanding of how context, methodology, and strategic focus interact to shape transformation potential.

3.4 Structure of the Report

Following this introduction, we outline our methodological approach to the cross-case analysis (Section 3), provide an overview of the nine case studies (Section 4), present our findings from each analytical lens (Section 5), discuss the implications for the Optimal Leverage Point Strategy Model (Section 6), and conclude with reflections on the implications for policy, business, and research (Section 7).

By systematically comparing and synthesizing these diverse case studies, this report aims to provide evidence-based insights that can inform more effective strategies for encouraging sustainable farming transitions across Europe.

4 Analytical framework

In line with the overall methodological framework of the ENFASYS project (Roglic et al. 2023), the aim of the cross-case analysis was to identify key strategies and partnerships able to trigger or stimulate sustainable food system transformations.

We developed a multi-layered analytical approach that combines different perspectives to assess the transformation potential of case-level strategies. The analysis proceeded through three distinct phases, each with:

- A specific analytical objective
- A dedicated analytical framework
- A key hypothesis that justified its inclusion

Table 1 summarizes these phases, frameworks, and their associated hypotheses.

Table 1 The phases of the cross-case analysis

Analysis Phase	Aim	Mobilized Frameworks	Key hypotheses
Integrated Stakeholder and Methodology Analysis	Assessing the quality of the stakeholder engagement and methodological adaptations	Multi-stakeholder partnership perspective (Dentoni et al., 2018) Reflexive governance (Feindt & Weiland, 2018) and	True stakeholder engagement fosters transformation Reflexive governance fosters transformation
Ex ante Systemic Strategy assessment	Assessing the potential of proposed strategies to cause systemic changes across scales	Leverage point perspective (Meadows, 1999; Abson et al., 2017) Multi-level perspective (Geels, 2011),	Strategies targeting deep leverage points are more transformative Strategies that create spill-over effects or play the scales are more transformative Strategies that deliberately play into landscape-regime-niche interactions are more transformative
Succes Factor Analysis	Assessing the presence of success factors associated with transformative initiatives	Shared understanding developed out of the ENFASYS Light Touch Review (Home et al. 2023)	Sustainability initiatives exhibiting a number of characteristics have a higher transformation potential

4.1 Multi-stakeholder partnership framework

An increasingly widespread perspective suggests that partnerships can address complex societal problems (Dentoni et al., 2018; Reed et al., 2018). **From a multi-stakeholder partnership perspective, true stakeholder engagement is essential to address wicked problems** (Fischer & Newig, 2016; Lönngren & Svanström, 2016). To assess the quality of stakeholder engagement, key dimensions to keep track of are stakeholder diversity, co-creation and mutual learning (Voinov et al., 2016; Pereira et al., 2018). Stakeholder diversity entails ensuring diversity and representation among workshop participants, making sure to include stakeholders with diverse roles in the transition process, and seeking to capture different perspectives and knowledge bases (Biggs et al., 2010; Westley et al., 2011).

4.2 Reflexive governance framework

In transdisciplinary science, rigid adherence to protocols and timelines can seriously hamper stakeholders' ability to participate meaningfully, learn, experiment, and enact transformative solutions (Djenontin & Meadow, 2018; Reed et al., 2018). Recognizing this challenge, WP leads allowed case study coordinators (CSCs) to make significant adaptations to the protocol. However, we also needed to evaluate whether these adaptations fostered or hampered the development of transformative strategies.

To assess these methodological adaptations, as part of our Integrated Stakeholder and methodology Analysis (see Table 1), we draw on reflexive governance literature (Feindt & Weiland, 2018; Patterson et al., 2017). Reflexive governance has emerged as an alternative approach to environmental policy design and planning (Köhler et al., 2019). It represents an intentional effort to shape societal transformation towards sustainability by deliberately facilitating interactions among diverse actors across overlapping regulatory contexts and interacting spheres of production and consumption (Weber et al., 2020).

Reflexive governance can be understood in two complementary ways. As a procedural concept, it acknowledges governance models necessitated by overlapping regulatory spheres, ambiguous perceptions, and conflicting norms (Dentoni et al., 2017). As a normative concept, it suggests that governance processes should encourage reflection about societal circumstances to reassess practices and adjust initiatives (Patterson et al., 2017)

Analysing Feindt & Weiland's (2018) discussion, we identified four key principles to assess whether methodological adaptations in developing the Theories of Change followed reflexive governance approaches:

- **Participation** assesses the adaptation's inclusiveness—whether it increased the ability of stakeholders across different categories (e.g., farmers, policymakers, NGOs) to be involved in meaningful ways (Reed et al., 2018).
- **Experimentation** assesses how well the adaptation enabled participants to explore and test new approaches for addressing complex sustainability challenges (Klerkx & Rose, 2020).
- **Collective learning** evaluates the extent to which the adaptation fostered learning among stakeholders—where participants learned from each other and from the process (Senge et al., 2015).
- **Adaptive management** assesses how well the adaptation incorporated flexibility and iterative changes based on stakeholder input or evolving conditions (Klerkx et al., 2010).

4.3 Leverage points perspective

The leverage points perspective (Meadows, 1999; Abson et al., 2017) offers a framework for understanding and intervening in complex social-ecological systems to promote sustainability transformations. The approach proceeds by categorizing interventions based on this hypothesized potential for systemic change, ranging from shallow (parameters and feedback) to deep (system design and intent) leverage points (Dorninger et al., 2020). The overall hypothesis by Meadows (1999) is that **the transformational capacity of a given intervention depends on the characteristics of the system properties that a given intervention acts upon**. Empirical studies have shown that this categorization of leverage points can be successfully operationalized to compare the sustainability challenges that different social-ecological systems are facing (Fischer et al., 2022), suggesting moreover that this perspective can guide the formulation of more effective interventions (Riechers et al.). As a systems analysis perspective, the Leverage points perspective frameworks is particularly interesting because it is epistemologically open¹ (not pressing a particular social-theoretical understanding a priori) and flexible (Riechers et al., 2022), while nonetheless having a track record of facilitating the development of actionable strategies.

Building on this same system dynamic understanding of sustainability transformations, Leventon et al., (2021) highlights also two promising pathways for sustainability transformations: **(1) by focusing on how to create spillover effects of favourable interventions in sub-systems to push outwards against the constraints of the current policy and regulation, and economic systems, (2) by targeting actors and interventions within higher-**

¹ While it is beyond the scope of this protocol to critically explore to what extent this system dynamic framework and the MLP bring certain ontological, epistemological and axiological assumptions from system engineering, the perspective is offered to reflect on this in future work. cfr. Lane (1999), Janssen (2009), Olsson et al. (2015),

level the policy and regulation and economic systems to create change in the paradigms and design they embody and enforce on the systems nested within them (Scale playing.)

4.4 Geels' Multi-Level Perspective

The multi-level perspective (MLP) analyses transitions in terms of interactions between niches, socio-technical regimes, and landscapes (El Bilali, 2019). As a mid-range theory, it provides powerful imagery and language to compare and envision sustainability pathways. Applications of the MLP show that successful transitions typically are driven by these interactions, **suggesting that strategies that consciously engage with landscape trends, harness niche innovations, and address internal regime dynamics have strong transformational potential.**

Geels et al. (2016) provides a vocabulary to distinguish and compare socio-technical pathways, identifying four distinct types:

1. Transformation: Regime actors respond to moderate pressure through internal adaptation
2. Reconfiguration: Regime adopts niche innovations while maintaining basic structure
3. Substitution: Niche innovation replaces regime elements
4. De-alignment/Re-alignment: Regime collapse followed by niche competition

Furthermore, Büniger & Schiller (2022) developed a multi-dimensional typology of niche, regime, and hybrid actors, empirically illustrated through cluster analysis of pig and poultry farmers in Germany, France, and the Netherlands. This approach allows us to analyse agency across levels in concrete ways.

In our cross-case analysis, we mobilized the MLP framework as part of our Ex ante Systemic Strategy Assessment phase (see Table 1). We applied this framework by:

1. Classifying key stakeholders in each case as niche, regime, or hybrid actors
2. Identifying the predominant transition pathway (transformation, reconfiguration, substitution, or de-alignment/re-alignment) in each case
3. Analysing the interactions between system levels to understand how case-specific strategies facilitated or hindered multi-level coordination
4. Assessing how strategies targeted different MLP levels and their potential to create transformative change

This systematic application of MLP concepts enabled us to compare transition dynamics across different agricultural contexts and evaluate the transformational potential of proposed intervention strategies.

4.5 Success Factor Evaluation

As part of our third analytical phase (see Table 1), we developed a success factor evaluation framework based on work conducted in WP1. This framework draws on a shared understanding developed among ENFASYS consortium members who evaluated 101 sustainability initiatives in their respective regions (Home et al., 2023). Through this process, we identified 11 elements associated with transformative potential, which are detailed in Table 2.

Five elements showed particularly strong correlation with perceived transformation potential:

- Degree of stakeholder inclusion
- Degree of anchoring in farming
- Degree of autonomy and self-determination
- Scope of ambitions for change
- Scope of ambitions for reach

These 11 elements function as potential success factors that, depending on context and challenges, provide an empirically grounded framework for ex-ante assessment of transformation potential. Our central hypothesis is that **initiatives exhibiting multiple success factors have higher transformation potential than those where these elements are largely absent.** This hypothesis is further supported by the alignment between our identified elements and established theoretical foundations in sustainability transitions literature, as shown in Table 2.

Our success factor analysis approach follows recent empirical studies (Silvius et al., 2023; Tuckey et al., 2023; Oeij et al., 2024) that identify success characteristics in initiatives evaluated post-implementation. As Oeij et al. (2024) demonstrate, such analysis can provide valuable guidance for ongoing implementation and strategy refinement. Additionally, it enhances our understanding of what makes certain initiatives more transformative than others.

Importantly, our framework recognizes that these factors operate through complex interactions (Olsson et al., 2014), creating synergistic effects that can either amplify or constrain transformative potential. This interconnected approach enables a more nuanced understanding of how different elements combine to enable systemic change in agricultural systems.

Table 2 11 Elements identified by Home et al. (2023) considered as potential Success Factors for Food System Transformation, and references to scientific literature confirming their relevance.

Succes factor	Related literature
Degree of stakeholder inclusion relates to the diversity of actors that are involved in the initiative, the level to which different actors are involved, the diversity of knowledge and the extent to which deliberation takes place.	Reed et al., 2018),
Degree of anchoring in farming addresses the extent to which the initiatives focus on enabling farming by providing the conditions to become a farmer, by improving farmers' workload and decrease pressure on farmers.	van der Ploeg et al., 2019
Orientation to market/supply chain is about the role of markets, the importance of short vs. long supply chains including the direct relationship with consumers, and the establishment of new value chains.	Brunori et al., 2016
Degree of autonomy and self-determination relates to the extent to which the initiatives can make a change. It relates to autonomy in decision-making and action and dependency on external conditions such as legal requirements or governmental support.	Anderson et al., 2021
Scope of ambitions for change relates to the extent to which the initiative aims for real structural change (vs. adaptation of the current system) and the extent to which it considers different aspects of sustainability.	Duncan et al., 2020 , Dentoni et al. 2018
Scope of ambitions for reach relates to the extent to which the initiative aims at reaching many people and/or spread at broad geographical level.	Dentoni et al. 2018
Degree of research integration relates to the extent to which the initiative interacts with research and builds on scientific knowledge and theoretical insights on food system transformation.	Cfr. Darnhofer et al., 2019)
Input focus refers to the extent to which the initiative focuses on increasing efficiency in input use and/or in replacing inputs	Titonell et al., 2014
Clarity of aims refers to the extent to which initiatives have specific aims, target specific groups and/or are adapted to specific contexts.	Dentoni et al., 2017
Funding relates to the extent to which the initiative requires and has secured outside financial investment	Gerdes et al., 2018. Pigford et al., 2018,
Planned longevity refers to the time span over which the project/initiative is lasting.	Blay-Palmer et al., 2016

5 Methodological approach

The goal of the cross-case analysis was to identify key strategies, partnerships, and leverage points that can accelerate systemic change in agri-food systems across multiple case studies. To achieve this aim, WP4 developed (1)

1. A comprehensive methodology for CSC to develop community-embedded systems and behavioural-based TOCs through participatory systems mapping workshops, and
2. A structured method for a comprehensive assessment and comparison of the transformation potential of the TOCs developed at case-level.

In this section we first provide an overview of the data collection process (Section 4.1), which includes the methodological background of the ToC methodology applied, a concise description of the protocol provided to the case studies, and the debriefing process with CSCs after receiving the reports. In section 4.2 presents a concise description of the cross-case analysis protocol that applied the analytical framework on the collected data.

5.1 Data collection process

5.1.1 Methodological background

ENFASYS aims to stimulate a just and fair transition to sustainable farming systems (SFS) by improving policies and business strategies to encourage farmers to change their production systems. This requires (i) developing a shared understanding of the current situation by taking into account the already identified behavioural and systemic factors at work (system knowledge), (ii) making explicit what constitutes the desired food system transformation (target knowledge), and (iii) identifying the necessary steps to achieve the desired sustainable food system, which may encompass already identified interventions from a business and a policy perspective that could drive this positive change. To achieve this aim, the ENFASYS project has adopted a ToC methodology.

In ENFASYS, the ToCs were developed to serve as a critical tool that frames the transformation pathway in a participative way among project partners and stakeholders. It outlines the steps needed to achieve the desired long-term goal (Barbrook-Johnson & Penn, 2022), serving as a framework for planning, implementation, monitoring, and evaluation. This had the aim of enabling stakeholders engaged at the case study level to test and refine their assumptions about how change happens and to adapt their strategies accordingly. By aiming to foster a shared understanding among stakeholders about the project's objectives and the means to achieve them, the ToC methodology was put in place to enhance collaboration and strategic alignment at the case study level (Dentoni and Roglic, 2024).

ToC methodology developed for the ENFASYS project brought together the following key concepts:

- **Theory of Change** is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It is more than just a roadmap of steps; it is a detailed explanation of the causal mechanisms by which specific activities and interventions are anticipated to produce a series of outcomes that contribute to achieving the final intended impacts (Dentoni et al., 2023; Mayne & Johnson, 2015).
- **Systems-based ToC:** This approach incorporates system maps and participatory systems mapping to provide a deeper understanding of complex systems (Wilkinson et al., 2021).
- **Integrating behavioural science & systemic insights:** exploiting the complementarity of behavioural science and food systems research approaches to understanding and changing decision-making
- **Systems change:** Defined by Roglic et al. (2023), systems change is a self-organizing and emergent process in which actors across different scales who purposefully modify their interactions and networks to bring about transformation.
- **Food System Transformation:** It represents a significant and desirable shift in how social, technical, and ecological systems interact (Ejderyan et al., 2023). This shift aims for a more sustainable future by changing how we think, relate and structure interactions within the world.

5.1.1.1 Theory of change: what is it? And what is it for?

A ToC is a structured description of how and why a desired change is expected to happen in a particular context. In the realm of sustainable farming systems, it's a planning and evaluation tool that maps out the **causal pathways** from interventions to outcomes. The ToC outlines short-term, intermediate, and long-term changes, articulating the mechanisms by which these outcomes are achieved. It incorporates systems thinking by identifying preconditions, resources, and external factors influencing outcomes, while acknowledging system complexities like feedback loops and non-linear relationships. By integrating diverse stakeholder perspectives and allowing for adaptive management, the ToC may serve as a flexible framework for planning, implementing, and evaluating interventions aimed at promoting sustainable farming systems. (Dentoni et al., 2023; Mayne & Johnson, 2015).

5.1.1.2 Systems-based Theories of Change

Traditional ToC approaches are, however, criticized for being too linear, failing to consider the realities of complexity, which include unexpected feedback-loops and events (Wilkinson et al., 2020), and also insufficiently allowing the divergent perspectives and narratives that typically arise around such 'wicked problems. For this reason, Wilkinson et al. (2020) proposed to enhance this proven method of strategy evaluation, with the analytical power of systems thinking, by proposing a **systems-based ToC** methodology, which in essence means applying a participatory systems mapping approach to build theories of change. This means

1. adopting a systems thinking perspective to understand complexity and systems change.
2. using tools to visualize systems and systems change.
3. AND developing this understanding in a participatory setting

By adopting a systems-based approach, interventions are strategically guided to integrate **systems thinking** from the outset and it complements traditional ToC frameworks by providing a deeper understanding of the system's complexity and the interconnections between its various elements, and to identify leverage points and interventions to enable systems change, with **systems change** being defined by Roglic et al. (2023) as a self-organizing and emergent process in which actors across different scales purposefully modify their interactions and networks to bring about transformation.

A systems-based approach is particularly valuable for complex interventions where the pathways to impact are not straightforward, requiring a nuanced understanding of the dynamic interplay between various factors and actors that influence the change process. **Systems mapping tools** are particularly helpful in that process. In ENFASYS specifically, we build upon the **causal loop diagrams** (CLDs) that highlight major drivers influencing the system, and **value network maps** that highlight the major actors and relationships influencing the system.

By incorporating systems thinking, the ToC seeks to identify crucial preconditions, resources, and external factors influencing outcomes. With this approach ENFASYS aimed to address key questions such as what stakeholders can do now, what can be achieved in 5 years, and where the project aimed to go in the future, thereby enhancing strategic alignment and effective intervention in sustainable farming systems (Dentoni and Roglic, 2024).

The ENFASYS case study ToC aimed to create a transformation pathway that identifies specific **leverage points** and **interventions** to foster sustainable farming systems.

- **Leverage points** are strategic areas within a system where small changes can lead to significant effects, influencing the overall system behaviour (Rocha et al., 2019; Dentoni & Roglic, 2024). The focus is on identifying where to apply pressure to achieve a system-wide impact. Leverage points are key to initiating observable shifts that can lead to system transformation or tipping points (Dentoni et al., 2023).
- **Interventions** are specific actions implemented to bring about change within a system, either through behavioural shifts or systemic alterations (Ejderyan et al., 2023), their focus is to target specific actors or system components to induce change, addressing deficiencies and promoting alternative mechanisms for sustainable practices.

Allowing the approach outlined by Wilkinson et al. (2021), ENFASYS used a **participatory systems mapping** to build a systems-based ToC. This involved engaging stakeholders to collectively map the complex relationships and dynamics within the system, thereby developing a shared understanding of the current state and identifying potential

leverage points for intervention. This process also involved incorporating each relevant stakeholder's interests, motivations, values, and beliefs to have a broader and more adequate understanding of the complex reality. Aside from the knowledge-related outcomes, participatory methods had an important role in fostering collective agency through the process of recognition (Pereira et al., 2018).

5.1.1.3 Integrating behavioural science insights

In ENFASYS, agri-food systems are composed of two fundamental types of factors that drive farmer decision-making in relation to sustainable farming systems: systemic and behavioural factors (Ejderyan et al., 2023). The latter are centred around individual decision-making based on human behaviour, whereas the former deal with underlying structures. ENFASYS has studied both the behavioural and systemic dimensions to understand current and changing behaviour yet has so far not sought to integrate these perspectives in practice. The approach assumes a social ontology associated with (critical realist) Social Practice Theory.

This means that the ENFASYS case study ToC sought to ground its understanding of social reality in Social Practice Theory, which views social phenomena as arising from practices - routinized types of behaviour consisting of interconnected elements like walking, thinking, things and their use, background knowledge etc. The "critical realist" qualifier means that we assert that there is an objective reality, but that our understanding of it is shaped by social conditions (Danermark et al., 2019). However, to bridge behavioural science (focused on individual decision making) and sociology (focused on social structures and processes), system dynamics as suggested by Lane & Rouwette (2023) is used to integrate behaviour science and sociology through the language of a system dynamic framework.

The framework illustrated in the figure (Lane & Rouwette, 2023) provides a crucial bridge between systemic and behavioural approaches. It shows how individual behaviours, decision-making processes, and cognitive biases (represented in the 'Behavioural effects' box) interact with and influence the broader system dynamics.

Specifically:

1. The 'System structure' influences individual behaviours and decisions through various feedback loops and systemic pressures.
2. These behaviours and decisions, in turn, shape the 'System behaviour' over time.
3. The 'Behavioural effects' box shows how cognitive processes and biases mediate between system structure and individual actions.
4. The 'Mental models' component illustrates how individuals' understanding of the system influences their decisions and is, in turn, updated based on observed system behaviour.

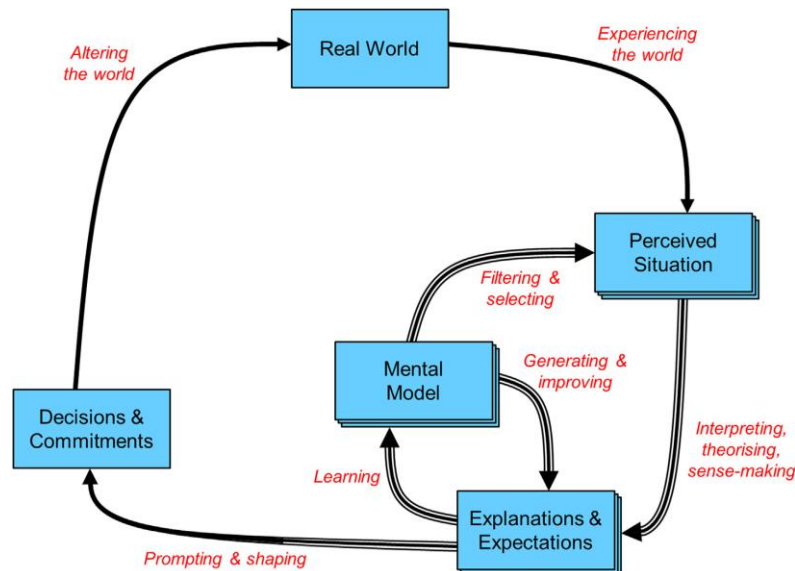


Figure 1 Framework illustrating the location and role of behavioural effects relevant to system dynamics (Lane & Rouwette, 2023)

In ENFASYS, we applied this framework by:

- Mapping farmer decision-making processes onto our systemic models of agricultural practices.
- Considering how farmers' mental models of sustainable agriculture influence their choices and how these models evolved over time.
- Identifying key behavioural effects (such as loss aversion or status quo bias) that may influence adoption of sustainable farming practices.
- Designing interventions that address both systemic barriers and individual behavioural factors.

By integrating this dynamic, recursive model of decision-making with our systemic approach, ENFASYS aimed to develop more comprehensive and effective strategies for promoting sustainable farming systems, acknowledging the complex interplay between individual behaviours and broader system dynamics.

5.1.1.4 Theories of Change for Food System Transformation

The overall goal of the ENFASYS ToC was to bring about transformative change by tackling the root causes of systemic issues rather than merely addressing their symptoms. **Transformation understood as systems change** refers then to a profound and radical reconfiguration of a system's underlying structure, often in response to complex challenges or in pursuit of a more sustainable future state. Transformation typically involves a redistribution of rights, responsibilities, and visions of development across society, driven by social movements and civil society (Dentoni et al. 2017; Weber et al. 2020; Young et al. 2022):

Transformation within a ToC encompasses several interconnected aspects:

1. **Systemic Reconfiguration:** Transformation involves fundamental shifts in system structures, processes, and interactions, integrating both social and technological innovations (Geels et al., 2017). This includes changes in technological artifacts and social practices, often requiring adjustments to institutional structures and underlying assumptions (Alijani & Wintjes, 2017; Howaldt et al., 2016)
2. **Multi-Level and Multi-Dimensional Change:** Transformation occurs across personal, relational, structural, and cultural levels, recognizing the interconnectedness of these dimensions (Köhler et al., 2019). It also spans multiple spatial scales, from local to global, with changes at one level potentially triggering shifts at others (Jessop et al., 2008; Roglic et al. 2024).
3. **Sustainability-Oriented:** The goal is to create more sustainable pathways across various system dimensions, such as food production, distribution, and consumption. This involves setting and tracking specific impact

indicators, like adoption rates of sustainable practices or improvements in biodiversity metrics (Weber et al., 2020).

4. **Participatory and Contested Process:** Transformation requires active engagement from diverse stakeholders, including civil society and marginalized groups. It involves negotiating conflicting visions and navigating power dynamics to achieve equitable and sustainable outcomes (Young et al., 2022).
5. **Innovation-Driven and Cumulative:** While transformation can involve radical shifts, it often progresses through cumulative adjustments that gradually reconfigure the system. Both social and technological innovations play crucial roles in challenging existing norms and practices (Klerkx & Rose, 2020).
6. **Agency and Deliberation:** The role of human agency is emphasized, with social movements and civil society driving change through deliberate actions and negotiations within socio-technical-ecological systems (Dentoni et al., 2017).

This integrated approach to transformation acknowledges the complex, dynamic nature of change in systems like agriculture and food, emphasizing the need for holistic, adaptive strategies in developing effective ToC.

5.1.2 Data Collection

CSCs were provided with a detailed protocol (see Annex 1) that outlined:

- A structured workplan for conducting participatory systems mapping workshops
- Specific methods for stakeholder engagement
- Techniques for analysing workshop data to identify leverage points
- Guidelines for designing effective interventions

To ensure protocol feasibility, WP leaders conducted bilateral calls with CSCs in early September 2024 to explain the draft version and assess its applicability across different case contexts. Based on CSC feedback, the protocol was refined to include more detailed instructions while allowing greater flexibility, particularly regarding the option to organize certain activities online or through bilateral exchanges rather than exclusively in group settings.

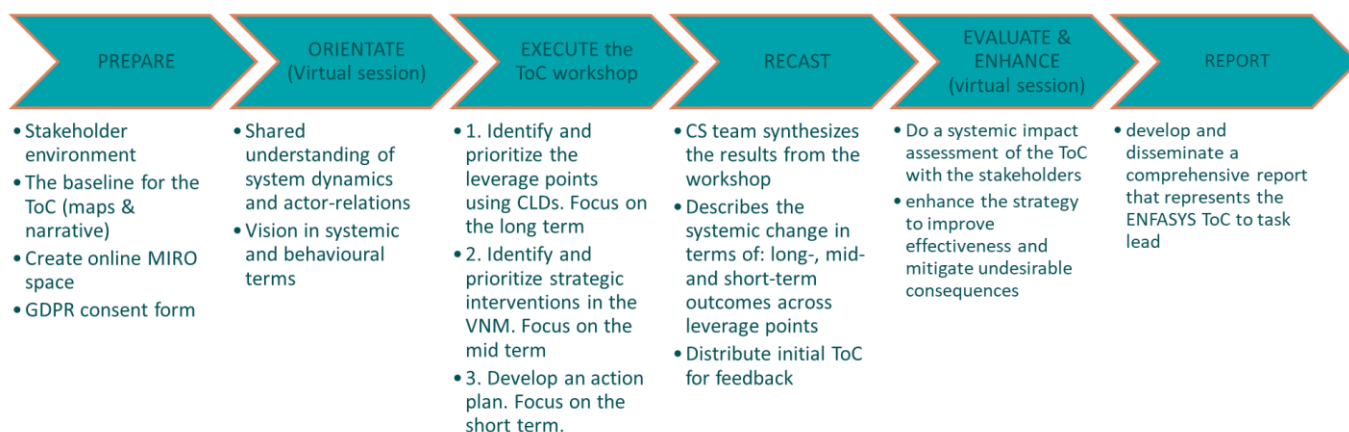


Figure 2 Overview of the work of CsC for community-embedded systems and behavioural TOCs

This protocol organized the work to be conducted by CSCs in to 6 separate steps or phases (see Figure 2)

1. In the PREPARE phase CSCs aimed to synthesize existing work, gaining a comprehensive understanding of the multi-stakeholder environment, and prepare for the ToC workshop in a reflexive and transparent manner. CSCs were instructed to develop a comprehensive narrative in the form of a presentation that took stock of the three different types of (tentative) knowledge so far generated in the different case-level activities coordinated by different WP and task leaders, and to prepare all the required workshop materials². At this stage, CSCs were also given additional guidance, in line with the ENFASYS MA-protocol (Annex 1) to create a conducive stakeholder environment, considering in particular the stakeholder composition, stakeholder selection, engagement strategy and the overall format of the activities in which these stakeholders would be engaged in. To properly prepare, guidelines were provided on how CSCs ought to reflect on and document their subjective choices in a number of areas: participant selection, presentation of research results, being transparent about certain assumptions, critical reflection among team members, supervision and acknowledgment of participant knowledge.
2. In the ORIENTATE phase, the aim is to develop in a virtual setting a shared understanding among the participants of the key current system dynamics and actor-relations by reviewing and validating the CLDs and VNMs as a along with specifying the long-term outcomes in terms of target variables and behaviours. To shorten this step, CSC could consider sharing access earlier to the online environment in which the CLD and VNM are presented, along with the accompanying questions. CS Team were also allowed to prepare the long-term outcomes themselves and propose as suggestions for validation to move this process along.
3. The EXECUTE phase entails the organization of the main in person (preferably) TOC workshop. This workshop entails three sub-phases: PRIORITIZE, STRATEGIZE, and ACT. The aim of the PRIORITIZE phase is to identify and prioritize in a participatory setting key leverage points using the CLD. In the STRATEGIZE phase the participants are invited to define and prioritize strategic interventions that target the prioritized leverage points, using the VNM, specifying altered actor-relations and mid-term outcomes in the process. In the ACT phase participants are to formulate in groups concrete short-term actions (1-3 years) that they themselves can take to implement the strategic interventions.
4. In the RECAST phase, CSCs synthesize the workshop outcomes into a systems-based ToC that explicitly maps the causal pathways between the prioritized interventions and outcomes, while highlighting feedback loops, potential emergent properties, and multi-level change processes across the food system. By sending out the initial ToC diagram and narrative to workshop participants, CSCs were instructed to gather further feedback from participants via mail or via bilateral calls and revise these accordingly.
5. In the EVALUATE and ENHANCE phase, the aim is to critically assess the ToC developed in the workshop with the participants ideally via an additional (online) workshop, or through an asynchronous questionnaire-based approach.
6. For the REPORT phase, CSCs were instructed to develop a single document including: the Evaluation of System Transformation Potential (Narrative), the Identification of Leverage Points and Strategic Interventions (Map), the Identification and Leveraging Collaboration Opportunities (Action Plan), the Methodology and Stakeholder Engagement section and further Appendices (including all relevant materials from previous phases).

Implementation support and Follow Up

Throughout implementation, WP leaders provided guidance to CSCs, tracked activities, and gave feedback on draft reports. A deadline of January 7, 2025 was set to establish a static database for analysis, with nine case study reports received by this date.

² These include:

- a validated and translated case-level CLDs and value network maps (VNMs) (based on the outcomes of WP2)
- a table of farmer target behaviors and their degree of implementation, and a table of behavioral readiness towards interventions (based on the outcomes from the behavioral workshop and farmers survey from WP3)
- List of food purchase motivators, policy aspects, policy instruments, and consumer and citizen behaviors to be surveyed for support in citizen-consumer survey (WP3)
- A table of policy goals with short description, Table of policy instruments and involved actors (WP6)
- Vision statement related to CS Goal & Lock-ins, and a table of potential business models (as per provided format) (WP7)

Following report submission, WP leads conducted eight follow-up interviews (January–February 2025) with CSCs. These semi-structured interviews gathered insights about the implementation experience and clarified specific areas of the reports, covering aspects such as stakeholder context, strategy development, future enactment, success factors, and personal perspectives.

5.2 Data Analysis and Cross-Case Synthesis

5.2.1 General process

Given the volume and complexity of data collected across nine case studies, we developed a systematic cross-case analysis approach using multiple scoring systems derived from our analytical frameworks.

Coding Process: The analysis was conducted by two independent coders with complementary expertise:• Coder 1 (Louis Tessier, ILVO): Agricultural systems researcher with expertise in participatory methods and sustainability transitions• Coder 2 (Marija Roglic, MBS): Systems mapping specialist with expertise in theory of change development and stakeholder engagement

These coders followed a multi-step process:

1. Condensing descriptive information from case study reports into structured spreadsheets
2. Independently applying scoring systems to each case (e.g., scoring stakeholder diversity on a 1-5 scale, categorizing leverage points by depth and type, evaluating success factors)
3. Comparing assigned scores to identify agreements and discrepancies
4. Resolving differences through discussion and consensus-building
5. Documenting significant disagreements as analytical insights (e.g., different interpretations of leverage point depth reflected different disciplinary perspectives)

For CS10, only one set of scores was used since Coder 1 was also the CS10 coordinator, creating a potential conflict of interest.

Analytical Methods: The quantitative elements were analysed using descriptive statistics to identify patterns and outliers. For example:

- Calculating mean scores for different leverage point combinations (Parameter-Intent: 3.75, Intent-Feedback: 3.40)
- Comparing success factor presence across cases (e.g., market orientation averaged 3.8 across cases)
- Identifying correlations between success factors and transformation potential ($r=0.82$ for market orientation)

The qualitative elements underwent interpretative content coding to identify themes and contextual insights. This included analysing stakeholder comments, implementation narratives, and case-specific adaptations.

To facilitate interpretation and presentation, we developed various visual tools:

- Scatter plots (e.g., Figure 10 showing depth vs. impact of leverage points by country)•
- Box plots (e.g., Figure 14 displaying distribution of success factor scores)
- Summary tables (e.g., Table 7 illustrating context-strategy alignment across cases)

5.2.2 Integrated stakeholder and methodological adaptations analysis

5.2.2.1 Integrated stakeholder engagement

The integrated stakeholder engagement analysis entailed a preparatory step,

1. Reviewing the Case study reports sections- (Methodology and Stakeholder Engagement, Overview of methodology used, including adaptations, as well as the provided Workshop summaries and stakeholder lists)
2. Developing and filling out a Participant Matrix, which entailed (see Table 3 for an example):
 - a. listing the individual participants involved in the ToC process for each case
 - b. assigning for each case to each participant the stakeholder category³, their role in addressing wicked problems⁴, and their involvement in the different ToC phases.
3. Calculating a number of engagement metrics of each case, which entailed:
 - a. creating a summary table with in the rows the stakeholder roles, in the columns the ToC phases, and entering in the cells the count of stakeholders involved
 - b. Calculating the engagement metrics (Diversity: Shannon's diversity index for each phase, Intensity: % of stakeholders involved in each phase, Continuity: % of stakeholders involved across all phases)

Table 3 Example of Participant matrix

Case Study	Participant	Stakeholder category	Stakeholder Role	Phases participated
CS1	farmer	Farmer & Farm workers	Problem Owner	All phases except for ORIENTATE
...

Then a qualitative assessment of the Engagement quality which was conducted by two coders separately.

4. Creating summary notes per case on the range of sectors represented, the gaps in representation, and the stakeholder engagement, summarized in a paragraph of the overall Diversity of representativeness
5. Rating the level of active participation, diversity of viewpoints and evidence of co-creation and mutual learning on a scale of 1-5 for each phase, with a brief description of each rating

5.2.2.2 Methodological adaptations analysis

First a master list consisting of all the methodological adaptations of each ToC phase for each case, documenting a short description of the methodological adaptations made, and the rationale provided in the report. This was followed qualitative assessment of the Methodological adaptations made for each participatory phase described in the protocol (ORIENTATE, PRIORITIZE, STRATEGIZE, ACT, EVALUATE & ENHANCE), by scoring each phase's alignment with reflexive governance principles derived from Feindt & Weiland; (2018) (Table 4)

³ These actor categories (following and expanding upon Antier et al. 2023) included: Agro-Input providers; Financial services; Farmers & farmworkers; Farming advisory services; Farmer unions & coops; Veterinarians; Sectoral interest groups; Collectors & Logistics; Food Processors & Manufacturers; Food distributors; Retailers; Local community groups; Consumers, citizens, voters; Government agencies; Ministries & Elected officials; Scientific Research organizations; (Agricultural) Education; Civil Society organizations or NGOs; Social media & public celebrities; Other

⁴ According to Dentoni and collaborators (e.g., Dentoni et al., 2013; Dentoni & Bitzer, 2015; Dentoni et al., 2018), actors in typically take up different roles. While the exact terminology isn't explicitly used in their work, the framework aligns conceptually with the roles they describe.

1. **Problem Owner:** Stakeholders who are directly impacted by the wicked problem and have a vested interest in its resolution. These stakeholders often feel the consequences of the problem most acutely and may serve as initiators or drivers of change.
2. **Problem Solver:** Those who contribute expertise, resources, or facilitation skills to help address the problem. This group often includes academics, practitioners, or other actors who take an active role in finding and implementing solutions.
3. **Decision Maker:** Stakeholders who play a governance or leadership role in setting priorities, allocating resources, and making key strategic decisions to address the wicked problem.
4. **Problem Bystander:** Stakeholders who are aware of the problem but remain peripheral, either due to lack of direct involvement, limited influence, or minimal perceived stakes in the issue.

Table 4 Scoring Framework for Assessing Methodological Adaptations Across Theory of Change Phases

Unit of analysis = Theory of change phase x case

Dimension	Description	Scoring criteria				
		-2	-1	0	1	2
Participation	Measures the inclusiveness of the adaptation—whether it enabled stakeholders across different categories (e.g., farmers, policymakers, NGOs) to be involved in meaningful ways.	The adaptation resulted in no or very limited participation at this stage (e.g., only a few stakeholders involved with little input).	The adaptation was limited to partial or passive involvement at this stage.	Strict adherence to original methodology without changes.	The adaptation aimed at improving participation across multiple stakeholder groups to a limited depth of engagement.	The adaptation aimed at enabling excellent participation with diverse, balanced engagement and evidence of co-creation.
Experimentation	Measures whether the adaptation encouraged experimentation—testing new approaches or innovative methods to solve wicked problems.	The adaptation closed off experimentation of participants completely, fixing them to pre-established solutions and ideas.	The adaptation restricted experimentation of participants to some extent by discouraging exploring other options.	Strict adherence to protocol with no modifications.	The adaptation led to moderate experimentation of participants, by encouraging them to leave downtrodden paths.	The adaptation enabled participants to come up with and experiment with bold and creative ideas.
Collective Learning	Assesses the extent to which the adaptation fostered collective learning among stakeholders—where stakeholders learned from each other and from the process.	Adaptation closed off all collective learning opportunities for participants.	Adaptation reduced collective learning for participants, with only a few stakeholders involved in the learning process.	Strict adherence to protocol with no modifications.	The adaptation resulted in improved opportunities for collective learning where multiple stakeholders exchanged insights, but it wasn't systemic.	The adaptation resulted in opportunities for collective learning with clear evidence of mutual learning and shared knowledge leading to actionable insights.
Adaptive Management	Measures how well the adaptation incorporated flexibility and iterative changes based on stakeholder input or evolving conditions.	Significant departures from the original methodology with severe negative impacts on participation, experimentation, and collective learning.	Poor adaptive management to the detriment of stakeholder participation and collective learning outcomes.	No or minimal adaptation, with only minor adjustments to meet time or logistical constraints.	Moderate adaptation, with some iterative changes based on feedback or challenges encountered.	Exceptional adaptive management, with flexible adjustments at every stage and clear evidence of responsiveness to evolving conditions.

After resolving discrepancies, the scores were analysed to identify main patterns and outliers. In the qualitative assessment attention is paid specifically on identifying returning challenges for stakeholder engagement and reflexive governances, also on highlighting innovative solutions.

5.2.3 Ex-ante systemic strategy assessment

The ex-ante systemic strategy assessment entailed first developing systematizing and describing multiple strategies proposed in the theories of change workshops in a master list.

1. Reviewing the relevant sections of the report (Current system, desired future state, transformation assessment, leverage points, interventions, short term actions and collaborations)
2. Developing a master list of strategies that summarizes the various strategies prioritized in the ToC process, with a brief description, the associated leverage points and strategic interventions,
3. Assigning some basic values to classify the strategy (intervention type towards farmers, source level of the intervention to farmers, target level of the strategy, strategy type, and overall strategy level)
4. Identifying the actors in the short, medium and long term, as ‘source actor’ or target actor’ and assigning a type to these actors

5.2.3.1 Leverage point framework

After consolidating this master list, each strategy was assessed from the leverage points perspective as follows by two coders independently, which entailed documenting potential Spillover effects and Scale playing, while also documenting countervailing dynamics and assigning an overall score for Spillover effects and Scale playing.

1. Scoring the strategies by evaluating on a scale of 1 to 3 the extent to which each strategy modifies the different system characteristics (Parameters, Feedback, Design, Intent), and automatically calculating a Depth scores.
2. Assigning with a tag and specifying in concrete terms the primary system characteristic the strategy targets and modifies, (the focus of the intervention)
3. Assigning with a tag and specifying in concrete terms the secondary system characteristic strategy modifies (indirectly or through spillover effects)

Table 5 Leverage Point Analysis Framework

Unit of analysis = strategy

Spillover & Scale-playing Assessment

Score	Description
1	No evidence of spillover/scale-playing
2	Limited potential for spillover/scale-playing
3	Moderate potential with clear mechanisms
4	Strong potential with multiple pathways
5	Transformative potential with clear cross-scale effects

System Characteristic Scores

Parameter

Score	Description
1	Minor adjustments to existing parameters (e.g., changing subsidy amounts)
2	Moderate changes to parameters affecting multiple system elements
3	Significant alterations that reshape system parameters

Feedback

Score	Description
1	Minimal impact on existing feedback
2	Modifies strength or direction of existing feedback
3	Creates new feedback or fundamentally alters existing ones

Design

Score	Description
1	Works within existing system structures

2	Modifies aspects of system structure
3	Fundamentally redesigns system structure or creates new arrangements

Intent (Deepest)

Score	Description
1	Operates within existing goals/paradigms
2	Challenges aspects of existing goals/paradigms
3	Proposes fundamentally new goals/paradigms

Calculating Depth Score

Depth (standardized) = Sum of (Parameter, Feedback, Design and Intent Score - 4) × 10/12

Interpretation: Measures overall ability of the intervention at different levels of the system

Coders then compared the Spillover and Scale playing scores, and the System Characteristics Tags. The observed discrepancies between the initial system characteristics scores and tags for the between the coders revealed important differences in system understanding between the two coders, namely one that is primarily informed by political economy, and one that is primarily informed by systems mapping (Table 6). As these were deemed irreconcilable but at first sight internally consistent, scores and tags were consolidated along both these understandings separately, bringing forward two separate sets of scores and tags for the system characteristics. To keep this results sections manageable, this deliverable only presents the consolidated scores interpreting the system characteristics from the more commonly encountered systems mapping understanding.

Table 6 Systems characteristics and tags scoring

System characteristic	*Informed by political economy	*Informed by systems mapping perspective
Parameters:	assets (funds, production capacity, knowledge, technology, labour power, available land)	tangible and measurable economic or operational variables—such as fiscal instruments, pricing mechanisms, or infrastructure investments, VAT reductions or dedicated funding allocations
Feedback:	information & knowledge flows, investments, buying and selling, pricing, subsidies, taxes	information flows, knowledge transfer, or learning loops among stakeholders
Design:	institutional, organizational, or governance structures, including regulatory frameworks, training and subsidy programs, product requirements including labelling, formal and informal arrangements between commercial partners, knowledge hubs, public-private partnerships	institutional, organizational, or governance structures, including restructured support mechanisms, new platforms or hubs, collaborative frameworks
Intent:	the emergent tendency and direction of the system as whole (intended or otherwise), for value chains, typically profit, and as a secondary the concerned use-value produced, for more or less properly designed programs, the underlying goals of the policy designers	underlying norms, goals, or policy frameworks, e.g. changes in the way decision-makers or the market perceives sustainability (e.g., reforming policies or advocating for regulatory changes)

5.2.3.2 Multi-level perspective

The assessment of the strategies from the multi-level perspective entailed:

1. Classifying all the actors involved in the short, medium and long term, under the categories of Niche Actors, Regime Actors, Hybrid, Landscape,



2. Documenting interactions between the three MLP levels,
3. Assigning the Transition Pathway type,
4. Writing a concise MLP narrative for each case integrating the MLP levels

This was done by the two coders separately. Then the MLP pathways and narratives were compared and where possible reconciled between coders. Based on the narratives and interactions.

5.2.4 Success factor evaluation

Using a mixed-methods approach, the analytical framework developed from the inductive analysis of 101 European sustainability initiatives in WP1 (Home et al., 2023) was turned into a scoring system. Each initiative was assigned a score from 1 to 5 for each of the 11 elements (Table 7), along with a coder note justifying the score based on the 9 ToC reports and the answers that CSCs provided in the debriefing interviews in which they were specifically asked about dimensions related to the success factors, namely stakeholder participation, anchoring in farming realities, scope and ambition, resources and support.

Table 7 Success factor scoring framework

Success factor analysis (unit of analysis = case)						
Stakeholder inclusion	were stakeholders genuinely involved in the process, or was their involvement more symbolic?	5 = Absolutely	4	3	2	1= Not at all
Anchoring in Farming	does the strategy address the practical realities and challenges that farmers face every day?	5 = Absolutely	4	3	2	1= Not at all
Market Orientation	is the strategy creating new or changing existing markets, connecting producers with consumers, building cooperatives, or connecting farming activities with other sectors such as tourism	5 = Absolutely	4	3	2	1= Not at all
Autonomy	Is the initiative able to stimulate change while having autonomy in decision-making and action, independently of external actors or conditions	5 = Absolutely	4	3	2	1= Not at all
Ambitions for Change	Does the strategy bring big changes compared to the usual way of doing things?	5 = Absolutely	4	3	2	1= Not at all
Ambitions for Reach	Scaling up- and out, reaching people, disseminating at broad geographical level	5 = Absolutely	4	3	2	1= Not at all
Research Integration	Was there a high interaction with research to integrating scientific knowledge to design the strategy	5 = Absolutely	4	3	2	1= Not at all
Input Focus	Is the strategy seeking to move away from input-intensive farming systems	5 = Absolutely	4	3	2	1= Not at all
Clarity of Aims	Has the initiative set specific and measurable aims?	5 = Absolutely	4	3	2	1= Not at all
Funding	Are there enough resources (like funding, training, or staff) to make the strategy work?	5 = Absolutely	4	3	2	1= Not at all
Planned Longevity	Is the initiative set up to last to have an enduring influence?	5 = Absolutely	4	3	2	1= Not at all

A box plot analysis of the scores was conducted to describe the distribution of the scores of the initiatives among the 11 success factors to deliver a more fine-grained analysis and to identify distinct challenges and opportunities a typology was developed based on a clustering analysis of the success factor profiles to identify distinct types of transformation initiatives among the ENFASYS cases.

5.2.4.1 Transformation Potential Assessment Methodology

To systematically evaluate which success factors most strongly predict transformation potential, we developed a composite Transformation Potential Index through the following methodological steps:

Data collection:

- *Stakeholder assessments:* During the "evaluate and enhance" phase of each CSCs were asked to observe and note stakeholder's assessment of proposed strategies. Qualitative feedback was collected of the feasibility, expected impact, alignment with sustainability objectives, and anticipated adoption rates.
- *Implementation progress indicators:* Through follow-up interviews with CSCs, we collected data on initial implementation progress using a standardized protocol. This captured five dimensions: stakeholder commitment, concrete actions taken, institutional uptake, network expansion, and knowledge dissemination activities.

Data processing:

- Each implementation indicator was scored on a scale of 0-2 (0=no progress, 1=partial progress, 2=substantial progress)
- Stakeholder assessment items were averaged to create a composite perception score (1-5)
- Both datasets were standardized to z-scores to enable comparison across different measurement scales
- A weighted composite score was calculated, with stakeholder assessments weighted at 60% and implementation indicators at 40% (reflecting the earlier stage of most implementations)

Transformation Potential Index calculation:

- The final index was calculated as: $TPI = (0.6 \times \text{standardized stakeholder assessment}) + (0.4 \times \text{standardized implementation score})$
- This produced a transformation potential score for each case study ranging from -2.5 to +2.5
- As a validity check, scores were compared with qualitative assessments from CSCs, showing strong alignment

Correlation analysis:

- Each success factor (scored 1-5 as described in Section 5.3) was correlated with the Transformation Potential Index
- Pearson correlation coefficients were calculated to identify which factors most strongly predicted higher transformation potential

Cluster analysis:

- Hierarchical clustering using Ward's minimum variance method was applied to success factor patterns. To address potential scale issues, variables were standardized before clustering analysis, ensuring that factors with larger numerical ranges did not disproportionately influence the results. We verified that the data was appropriate for Euclidean distance-based clustering by examining the distribution characteristics.
- This method minimizes the total within-cluster variance by finding at each step the pair of clusters whose merger results in the minimum increase in total within-cluster variance. Unlike other clustering methods that focus on distances between individual points, Ward's method considers how much the sum of squares will increase when clusters are merged, making it particularly effective for identifying distinct typologies based on multiple variables.
- This analysis identified three distinct transformation typologies (Market-Led, Governance-Oriented, and Adaptive-Collaborative)
- These typologies were validated through qualitative assessment of case characteristics

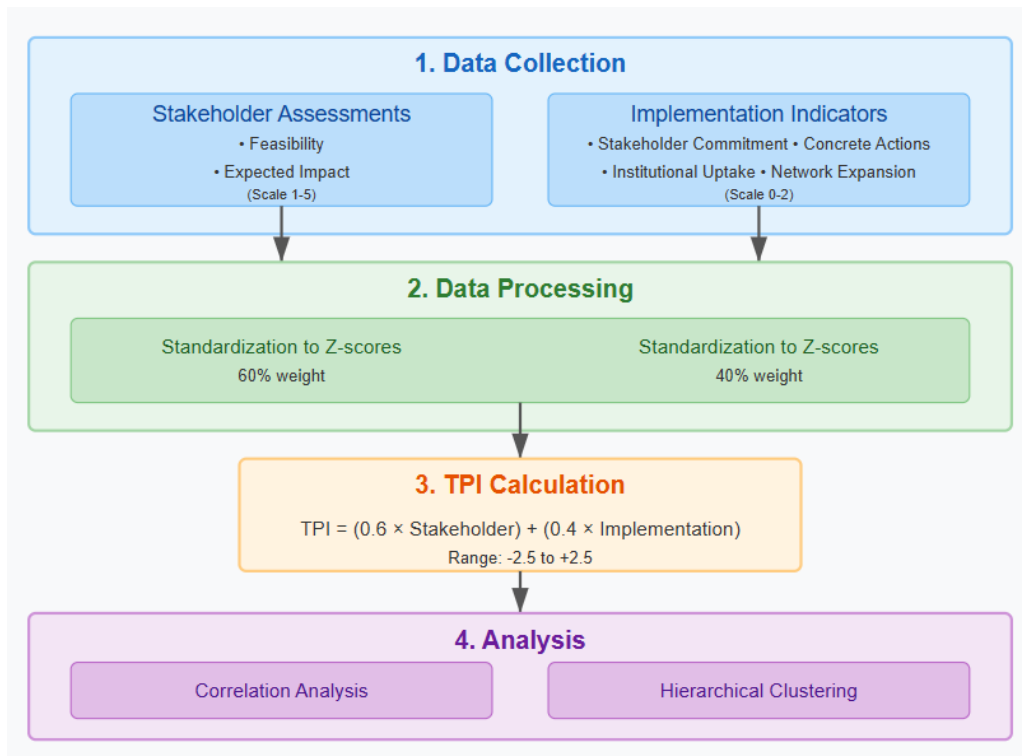


Figure 3 Transformation Potential Index Methodology

5.2.5 Synthesis and Integration

Following the multi-faceted analytical approach outlined above, we synthesized findings across all nine case studies to develop a comprehensive understanding of transformational potential. This integration process examined both case-level dynamics and individual strategy effectiveness through complementary perspectives:

1. **Quantitative Integration:** Statistical relationships between success factors and outcomes were established through correlation analysis, cross-tabulations, and cluster analysis, revealing distinct patterns across different contexts.
2. **Qualitative Typology Development:** We inductively identified three distinct transformation pathways (Market-Led, Governance-Oriented, and Adaptive-Collaborative) that characterize different approaches to food system transformation.
3. **Mixed-Methods Validation:** The Transformation Potential Index served as a unifying metric, allowing us to validate typologies against measurable outcomes while preserving the contextual richness of individual cases.

This synthetic approach enabled us to identify transferable principles for effective food system transformation while acknowledging the importance of contextual adaptation in implementation strategies.

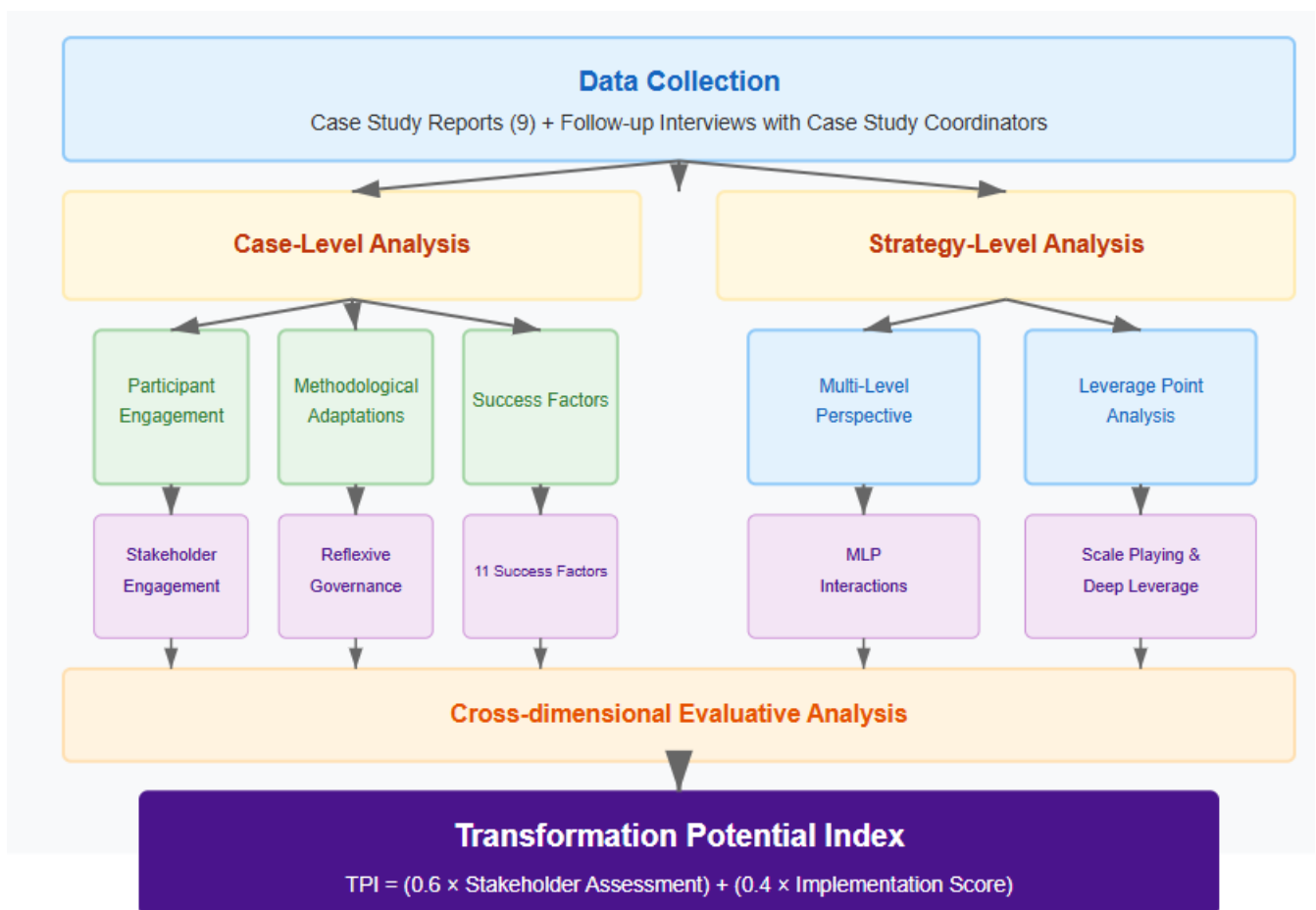


Figure 4 ENFASYS cross case ToC Analysis Methodology Framework

6 Case study overview

The ENFASYS project developed TOC that integrate systems thinking and behavioural insights to guide sustainable farming transitions. Each case-specific TOC identifies critical leverage points where interventions can catalyse change, while accounting for local contexts and constraints. Across the cases, four interconnected challenges emerged as central to the transformation process:

- **Institutional Barriers:** Economic and policy barriers that maintain the status quo in agricultural practices, requiring coordinated institutional responses.
- **Behavioural Resistance:** Farmers' reluctance to adopt new practices, stemming from uncertainty, risk perception, and established routines.
- **Governance Complexity:** Challenges in aligning multi-level governance structures to support sustainable farming transitions effectively.
- **Underdeveloped Value Chains:** Limited market access and value chain constraints that affect the economic viability of sustainable practices.

The following case analyses demonstrate how these challenges manifest differently across contexts and how specific TOCs were tailored to address them through strategic interventions as presented in the figure below.

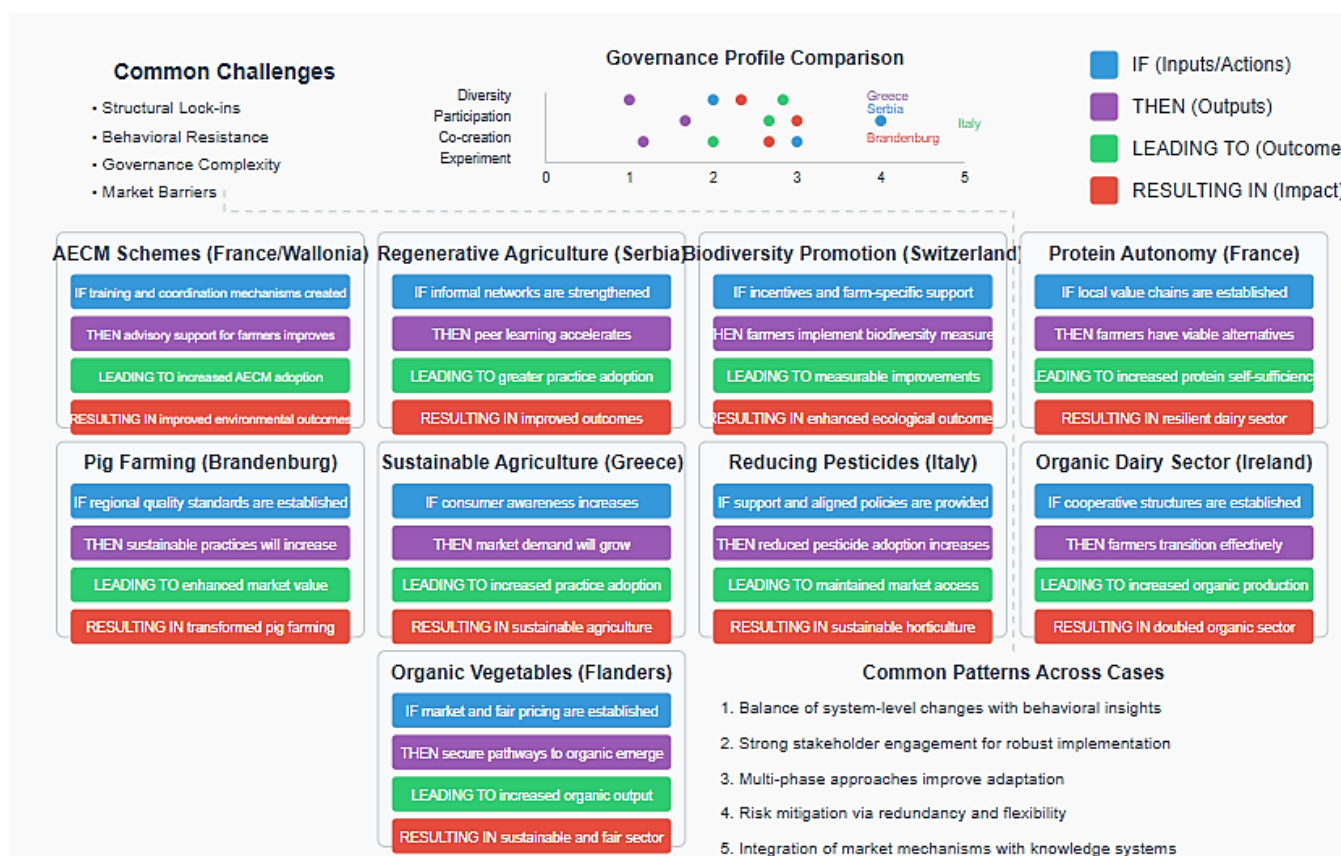


Figure 5 ENFASYS case study TOC overview

6.1 Enhancing AECM Schemes in Hauts-de-France & Wallonia

Objective: Increase the adoption and effectiveness of agri-environmental and climate measures (AECM) under the CAP framework through cross-border coordination and stakeholder engagement.

Context & Governance Profile:

- Stakeholder Diversity Score: 2.0 (Medium)
- Participation Score: 2.2 (Medium)
- Co-Creation Score: 2.8 (High)

Cross-border coordination requiring explicit governance mechanisms

Key Leverage Points & Barriers:

System Level:

- Human resource capacity in advisory services
- Cross-border policy alignment mechanisms
- Information flow between stakeholder groups

Behavioural Level:

- Farmer resistance to administrative complexity
- Advisory service adaptation to new requirements
- Cross-border institutional collaboration patterns

Strategic Interventions:

Short-term (6-12 months):

- Launch targeted training programs for advisors
- Establish cross-border coordination platform
- Develop standardized information packages

Medium-term (1-2 years):

- Implement collective programs for stakeholder collaboration
- Align regional budgets with environmental priorities
- Create feedback mechanisms for continuous improvement

Stakeholder Roles & Engagement:

Problem Owners:

- Farmers (primary beneficiaries)
- Local environmental authorities
- Advisory services

Solution Providers:

- Agricultural extension services
- Research institutions
- Policy coordination bodies

Theory of Change: IF robust training programs are implemented and cross-border coordination mechanisms are established, THEN advisory services will better support farmers, LEADING TO increased understanding and adoption of AECM measures, RESULTING IN improved environmental outcomes and more effective CAP implementation.

Success Metrics:

Quantitative:

- Number of trained advisors
- AECM adoption rates
- Cross-border coordination events
- Budget alignment percentage

Qualitative:

- Stakeholder satisfaction levels
- Quality of cross-border cooperation
- Advisory service effectiveness
- Environmental outcome improvements

Implementation Timeline:

Phase 1 (Months 1-6): Training and capacity building

Phase 2 (Months 7-12): Cross-border coordination

Phase 3 (Months 13-24): Policy alignment and scaling

Unique Features:

- Cross-border governance requiring specific coordination mechanisms
- Medium diversity score (2.0) balanced by strong co-creation (2.8)
- Effective use of validation phases and scheduling flexibility
- Strong performance in multi-level policy integration
- Successful adaptation to cross-border stakeholder expectations

Risk Mitigation:

- Develop redundancy in coordination mechanisms
- Create backup communication channels between regions
- Establish clear escalation pathways for policy conflicts
- Build flexibility into implementation timelines
- Maintain parallel regional and joint implementation tracks

6.2 Regenerative Agriculture in Serbia

Objective: Promote regenerative agricultural practices to enhance sustainability while addressing systemic challenges in an economically unstable context.

Context & Governance Profile:

- Stakeholder Diversity Score: 3.0 (High)
- Participation Score: 4.8 (Highest among cases)
- Co-Creation Score: 4.0 (High)
- Adaptive Management Score: 0.6 (Good)
- Reliance on informal networks highlights both challenges and opportunities

Key Leverage Points & Barriers:

System Level:

- Weak formal advisory infrastructure
- Underdeveloped markets
- Policy implementation gaps

Behavioural Level:

- Traditional farming practice inertia
- Risk aversion due to economic uncertainty
- Social network influence on adoption

Strategic Interventions:

Short-term (0-12 months):

- Establish informal knowledge networks through social media
- Identify and support early adopter farmers
- Create demonstration sites with leading farmers

Medium-term (1-2 years):

- Develop market connections for regenerative products
- Strengthen farmer-to-farmer learning networks
- Build capacity of local advisory services

Stakeholder Roles & Engagement:

Primary Actors:

- Innovative farmers (knowledge brokers)
- Local agricultural extension services
- Market intermediaries

Supporting Actors:

- Research institutions
- NGOs and civil society organizations
- Local government authorities

Theory of Change: IF informal knowledge networks are strengthened and early adopters are supported, THEN farmer-to-farmer learning will accelerate, LEADING TO increased adoption of regenerative practices, RESULTING IN improved environmental and economic outcomes despite institutional constraints.

Success Metrics:

Quantitative:

- Number of farmers in learning networks
- Hectares under regenerative practices
- Market connections established
- Income stability indicators

Qualitative:

- Quality of peer-to-peer knowledge exchange
- Resilience of informal advisory networks
- Market relationship strength
- Farmer confidence in new practices

Implementation Timeline:

Phase 1 (Months 1-6): Network building and early adopter identification

Phase 2 (Months 7-12): Knowledge sharing and demonstration site establishment

Phase 3 (Months 13-24): Market development and policy advocacy

Unique Features:

- Highest participation score (4.8) leveraged through informal networks
- Strong co-creation approach despite institutional limitations
- Innovative use of social media for knowledge dissemination
- Emphasis on peer-to-peer learning to overcome advisory service limitations

Risk Mitigation:

- Diversify knowledge sources beyond informal networks
- Build redundancy into market connections
- Document and formalize successful informal practices
- Create backup support systems for early adopters

6.3 Biodiversity Promotion in Switzerland

Objective: Implement results-based agri-environmental schemes to enhance farmland biodiversity through coordinated federal, cantonal, and local policy actions.

Context & Governance Profile:

- Stakeholder Diversity Score: 2.4 (Medium)
- Participation Score: 3.4 (High)
- Co-Creation Score: 3.4 (High)
- Experimentation Score: 0.4 (Only positive score among cases)
- Strong multi-level governance coordination

Key Leverage Points & Barriers:

System Level:



- Federal-cantonal policy coordination
- Results-based payment mechanisms
- Site-specific monitoring and evaluation systems

Behavioural Level:

- Farmer risk perception in relation to participation in results-based schemes
- Capacity (technical, financial, time-related) for biodiversity management
- Cultural attitudes toward environmental stewardship
- Farmers perception of how their work is valued in society

Strategic Interventions:

Short-term (0-12 months):

- Launch tailored financial incentive programs
- Establish farm-specific advisory services
- Implement biodiversity monitoring protocols

Medium-term (1-2 years):

- Develop cross-cantonal learning networks
- Create result-based payment systems
- Build public-private partnerships

Stakeholder Roles & Engagement:

Primary Actors:

- Farmers and farm enterprises
- Cantonal agricultural offices
- Environmental authorities
- Technical advisors

Supporting Actors:

- Research institutions
- Environmental NGOs
- Market actors
- Public communication channels

Theory of Change: IF robust financial incentives are combined with personalized and farm-specific technical support, THEN farmers will have both motivation and capacity to implement biodiversity measures, LEADING TO measurable improvements in farmland biodiversity, RESULTING IN enhanced ecological outcomes while maintaining farm profitability.

Success Metrics:

Quantitative:



- Biodiversity indicator scores
- Participation rates in schemes
- Financial performance of participating farms
- Number of personalized advisory sessions

Qualitative:

- Farmer satisfaction with support
- Effectiveness of multi-level coordination
- Advisory service performance

Implementation Timeline:

Phase 1 (Months 1-6): Financial mechanism establishment and advisory service setup

Phase 2 (Months 7-12): Implementation of monitoring systems and initial farmer engagement

Phase 3 (Months 13-24): Scale-up and cross-cantonal coordination

Unique Features:

- Only case with positive experimentation score (0.4)
- Balanced high scores across participation and co-creation (3.4)
- Successful integration of federal and cantonal policies
- Strong performance in adaptive management (0.6)
- Effective balance of economic and environmental objectives

Risk Mitigation:

- Establish baseline biodiversity measurements
- Create flexible payment mechanisms
- Maintain multiple advisory service providers
- Build redundancy into monitoring systems
- Develop clear conflict resolution procedures
- Create feedback loops for continuous improvement

6.4 Protein Autonomy in French Dairy Farms

Objective: Increase protein self-sufficiency and reduce dependency on soybean imports through local value chain development and farmer network strengthening with the support of advisors.

Context & Governance Profile:

- Stakeholder Diversity Score: 2.0 (Medium)
- Participation Score: 2.6 (Medium)
- Co-Creation Score: 2.4 (Medium)
- Limited experimentation (-0.2)
- Strong participation despite limited diversity

Key Leverage Points & Barriers:

System Level:



- Existing value chain structures
- Market demand for non-GMO products (with noted need for development)
- Grass feed production as key lever for protein autonomy
- Infrastructure for local processing

Behavioural Level:

- Farmer risk perception of crop changes practices
- Knowledge gaps in protein crop management including grassland management
- Network dynamics among dairy farmers
- Market actor engagement willingness (constrained by limited consumer demand)

Strategic Interventions:

Short-term (0-12 months):

- Map existing protein value chains
- Identify pioneer farmers for non-GMO and self-sufficiency transition
- Establish farmer learning networks and develop advisors' skills, including information and training about grass management
- Launch initial market partnerships

Medium-term (1-2 years):

- Develop local processing infrastructure
- Scale up non-GMO milk production
- Strengthen regional market connections
- Expand farmer-to-farmer knowledge exchange

Stakeholder Roles & Engagement:

Primary Actors:

- Dairy farmers
- Protein crop producers
- Local processors
- Market intermediaries

Supporting Actors:

- Agricultural advisors
- Research institutions
- Regional authorities
- Consumer organizations

Theory of Change: IF local protein value chains are established and non-GMO milk production is incentivized, THEN farmers will have viable alternatives to imported soybean, LEADING TO increased regional protein self-sufficiency, RESULTING IN a more resilient and sustainable dairy sector.

Success Metrics:

Quantitative:



- Reduction in soybean import dependency
- Volume of locally produced protein crops
- Number of farmers in networks
- Non-GMO milk production volume
- Market premium for non-GMO products
- Area of grassland and amount of grass in feed rations

Qualitative:

- Value chain relationship strength
- Farmer satisfaction with transition
- Knowledge exchange effectiveness
- Market actor commitment levels

Implementation Timeline:

Phase 1 (Months 1-6): Network establishment and value chain mapping

Phase 2 (Months 7-12): Initial transitions and market development

Phase 3 (Months 13-24): Infrastructure development and scaling

Unique Features:

- Medium participation (2.6) despite low diversity (1.6)
- Strong focus on value chain transformation
- Integration of production and market innovation
- Effective adaptations despite limited experimentation score
- Balance of economic and environmental objectives

Risk Mitigation:

- Diversify protein crop sources
- Build redundancy in processing capacity
- Establish multiple market channels
- Create safety nets for transitioning farmers
- Maintain conventional options during transition
- Develop crisis management protocols

6.5 Pig Farming Transformation in Brandenburg, Germany

Objective: Achieve a sustainable and regional pig production system through market-driven transformation and policy alignment.

Context & Governance Profile:

- Stakeholder Diversity Score: 3.2 (High)
- Participation Score: 4.0 (High)
- Co-Creation Score: 3.6 (High)
- Collective Learning Score: 0.6 (Good)
- Adaptive Management Score: 0.6 (Good)
- Strong performance across all governance dimensions

Key Leverage Points & Barriers:



System Level:

- Regional value chain structures
- Policy framework alignment
- Market communication channels
- Quality assurance systems

Behavioural Level:

- Consumer purchasing patterns
- Farmer adoption willingness
- Retailer engagement
- Stakeholder collaboration readiness

Strategic Interventions:

Short-term (0-12 months):

- Develop regional quality meat label
- Establish stakeholder platform
- Launch consumer awareness campaign
- Initialize policy alignment process

Medium-term (1-2 years): • Scale up quality assurance system

- Strengthen regional market integration
- Implement policy support mechanisms
- Expand producer participation

Stakeholder Roles & Engagement:

Primary Actors:

- Pig farmers
- Regional processors
- Retailers
- Consumer groups
- Policy makers

Supporting Actors:

- Agricultural advisory services
- Marketing specialists
- Research institutions
- Environmental organizations

Theory of Change: IF regional quality standards are established and supported by aligned policies, THEN farmers and market actors will engage in sustainable production practices, LEADING TO increased market value and regional identity, RESULTING IN a transformed, sustainable regional pig farming sector.

Success

Quantitative:

Metrics:



- Market share of labelled products
- Number of participating farmers
- Price premium achievement
- Policy alignment indicators
- Sustainability performance metrics

Qualitative:

- Stakeholder collaboration quality
- Regional brand recognition
- Consumer trust levels
- Policy coordination effectiveness

Implementation Timeline:

Phase 1 (Months 1-6): Label development and stakeholder engagement
 Phase 2 (Months 7-12): Market system development and policy alignment
 Phase 3 (Months 13-24): Scale-up and system integration

Unique Features:

- Exceptional diversity (3.2) and participation (4.0) scores
- Strong co-creation performance (3.6)
- Balanced approach across all dimensions
- Successful integration of market and policy mechanisms
- High collective learning and adaptive management scores
- Effective preparatory data integration

Risk Mitigation:

- Develop multiple market channels
- Create flexible quality standards
- Establish stakeholder conflict resolution mechanisms
- Build redundancy in supply chains
- Maintain conventional market access during transition
- Create crisis communication protocols
- Ensure policy support backup mechanisms

6.6 Sustainable Agriculture in Greece

Objective: Leverage consumer brand initiatives to promote sustainable agricultural practices while addressing systemic constraints in knowledge and market systems.

Context & Governance Profile:

- Stakeholder Diversity Score: 1.6 (Low)
- Participation Score: 2.4 (Medium)
- Co-Creation Score: 1.8 (Low)
- Experimentation Score: -0.8 (Significant concern)
- Collective Learning Score: -0.8 (Significant concern)
- Limited participant availability and methodological constraints

Key Leverage Points & Barriers:

System Level:

- Market infrastructure for sustainable products
- Knowledge dissemination channels
- Financial support mechanisms
- Consumer awareness platforms

Behavioural Level:

- Consumer purchasing decisions
- Farmer risk perception
- Market actor engagement
- Traditional practice attachment
- Financial risk aversion

Strategic Interventions:

Short-term (0-12 months):

- Launch targeted consumer education campaign
- Establish initial farmer training programs
- Develop basic financial support framework
- Create market connectivity platform

Medium-term (1-2 years):

- Scale up sustainable product marketing
- Strengthen farmer capacity building
- Expand financial support mechanisms
- Build market actor networks

Stakeholder Roles & Engagement:

Primary Actors:

- Farmers
- Consumer groups
- Market intermediaries
- Financial institutions

Supporting Actors:

- Agricultural advisors
- Marketing specialists
- Local authorities
- Environmental organizations

Theory of Change: IF consumer awareness is increased and farmers receive adequate support, THEN market demand for sustainable products will grow, LEADING TO increased farmer adoption of sustainable practices, RESULTING IN a more environmentally and economically sustainable agricultural sector.



Success Metrics:

Quantitative:

- Sustainable product sales volume
- Number of trained farmers
- Financial support utilization
- Market price premiums
- Consumer awareness levels

Qualitative:

- Brand recognition strength
- Farmer confidence levels
- Market relationship quality
- Support mechanism effectiveness

Implementation Timeline:

Phase 1 (Months 1-6): Consumer education and initial farmer engagement

Phase 2 (Months 7-12): Market system development and support mechanism establishment

Phase 3 (Months 13-24): Scale-up and system integration

Unique Features:

- Market-driven approach despite low governance scores
- Focus on consumer behaviour as key driver
- Integration of financial and knowledge support
- Adaptation to limited stakeholder availability
- Creative solutions to methodological constraints

Risk Mitigation:

- Diversify market channels
- Create stepped transition pathways
- Establish multiple support mechanisms
- Build flexible training programs
- Maintain conventional market access
- Develop crisis response protocols
- Create peer support networks
- Establish feedback mechanisms despite low learning scores

6.7 Reducing Pesticides in Emilia-Romagna, Italy

Objective: Transition horticultural SMEs towards reduced pesticide use while maintaining profitability and market access through collaborative networks and policy alignment.

Context & Governance Profile:



- Stakeholder Diversity Score: 3.8 (Highest among all cases)
- Participation Score: 3.6 (High)
- Co-Creation Score: 2.6 (Medium)
- Experimentation Score: -0.4 (Limited)
- Collective Learning Score: -0.2 (Area for concern)
- Adaptive Management Score: -0.2 (Area for concern)

Key Leverage Points & Barriers:

System Level:

- Existing pesticide use patterns
- Policy framework adaptation (including financial incentives like VAT reduction for organic products)
- Market quality requirements • Knowledge transfer systems
- Supply chain dynamics

Behavioural Level

- Risk perception among farmers
- Technical capacity for alternatives
- Market actor expectations
- Collaboration willingness
- Innovation adoption patterns

Strategic Interventions:

Short-term (0-12 months):

- Launch targeted training programs
- Establish stakeholder platform
- Initiate policy dialogue
- Create demonstration sites

Medium-term (1-2 years):

- Implement alternative pest management systems
- Develop market assurance mechanisms
- Scale up collaborative networks
- Strengthen policy support framework

Stakeholder Roles & Engagement:

Primary Actors:

- Horticultural SMEs
- Policy makers
- Agricultural advisors
- Market actors
- Research institutions

Supporting Actors:



- Environmental organizations
- Consumer groups
- Local authorities
- Supply chain partners

Theory of Change: IF farmers receive adequate technical support and policy frameworks are aligned, THEN adoption of reduced pesticide practices will increase, LEADING TO maintained market access with lower environmental impact, RESULTING IN a more sustainable horticultural sector.

Success Metrics:

Quantitative:

- Pesticide reduction rates
- Number of trained farmers
- Market retention rates
- Policy compliance levels
- Economic performance indicators

Qualitative:

- Stakeholder collaboration quality
- Technical capacity improvement
- Market confidence levels
- Environmental impact assessment

Implementation Timeline:

Phase 1 (Months 1-6): Training and stakeholder engagement

Phase 2 (Months 7-12): Practice implementation and policy alignment

Phase 3 (Months 13-24): Scale-up and system integration

Unique Features:

- Highest diversity score (3.8) among all cases
- Strong participation (3.6) despite limited experimentation
- Complex stakeholder landscape successfully managed
- Balance of environmental and market objectives
- Integration of multiple knowledge sources
- Creative approaches to overcome learning limitations

Risk Mitigation:

- Develop staged transition pathways
- Create multiple technical support channels
- Establish market backup mechanisms
- Build flexible compliance frameworks
- Maintain conventional options during transition
- Create crisis management protocols
- Strengthen peer support networks
- Implement early warning systems for pest pressures

6.8 Growing the Organic Dairy Sector in Ireland

Objective: Double organic milk production by 2030 through strengthened supply chains and cooperative structures while ensuring economic viability for transitioning farmers.

Context & Governance Profile:

- Stakeholder Diversity Score: 2.0 (Medium)
- Participation Score: 2.6 (Medium)
- Co-Creation Score: 2.0 (Medium)
- Experimentation Score: -0.8 (Significant concern)
- Collective Learning Score: -0.8 (Significant concern)
- Strong focus on economic outcomes influencing engagement patterns

Key Leverage Points & Barriers:

System Level:

- Cooperative infrastructure
- Processing capacity
- Market access channels
- Financial support mechanisms
- Supply chain coordination

Behavioural Level:

- Farmer transition willingness
- Cooperative participation readiness
- Market actor engagement
- Consumer trust building
- Risk perception management

Strategic Interventions:

Short-term (0-12 months)

- Establish initial cooperative structure
- Identify pioneer organic farmers
- Launch farmer recruitment campaign

Medium-term (1-2 years):

- Develop processing facilities
- Scale up farmer participation
- Strengthen market relationships
- Implement support systems

Long-term (2-6 years):

- Secure infrastructure funding

Stakeholder Roles & Engagement:

Primary Actors:



- Dairy farmers
- Cooperative leaders
- Processors
- Market intermediaries
- Financial institutions

Supporting Actors:

- Agricultural advisors
- Certification bodies
- Policy makers
- Research institutions

Theory of Change: IF robust cooperative structures and processing infrastructure are established, THEN farmers will have secure pathways to organic transition, LEADING TO increased organic milk production, RESULTING IN a doubled organic dairy sector by 2030.

Success Metrics:

Quantitative:

- Organic milk production volume
- Number of organic dairy farmers
- Processing capacity utilization
- Market penetration rates
- Price premium achievement
- Cooperative membership growth

Qualitative:

- Farmer satisfaction levels
- Cooperative functionality
- Market relationship strength
- Supply chain resilience

Implementation Timeline:

Phase 1 (Months 1-6): Cooperative establishment and initial recruitment

Phase 2 (Months 7-12): Infrastructure development and system building

Phase 3 (Months 13-24): Scale-up and market integration

Unique Features:

- Strong economic focus driving engagement
- Quantitative target-driven approach (doubling production)
- Infrastructure-led transformation strategy
- Balance of individual and collective approaches
- Focus on practical economic outcomes despite low experimentation scores
- Adaptation to limited collective learning capacity

Risk Mitigation:

- Create staged transition pathways
- Establish multiple market channels
- Develop price protection mechanisms
- Build processing redundancy
- Maintain conventional options during transition
- Create emergency support systems
- Design flexible membership structures
- Implement financial safety nets

6.9 Organic Vegetable Sector in Flanders, Belgium

Objective: Promote sustainable growth of organic open-air vegetable farming

Context & Governance Profile:

- Stakeholder Diversity Score: 2.0 (Medium)
- Participation Score: 2.2 (Medium)
- Co-Creation Score: 2.8 (High)
- Effective use of validation phases and scheduling flexibility
- Strong performance in non-predefined VNM approach
- Balanced approach to stakeholder engagement

Key Leverage Points & Barriers:

System Level:

- Market channel infrastructure
- Price setting mechanisms
- Knowledge transfer systems
- Regional policy framework
- Supply chain coordination

Behavioural Level:

- Stakeholder learning capacity
- Market actor relationships
- Price perceptions & Perceived added value
- Production practice adoption
- Collaboration willingness

Strategic Interventions:

Short-term (0-12 months):

- Establish market channels mapping
- Launch stakeholder education program
- Task force public procurement
- Create learning networks

Medium-term (1-2 years):

- Scale up market integration
- Strengthen knowledge platforms
- Improve consistency of pricing systems
- Increase public procurement
- Expand producer participation

Stakeholder Roles & Engagement:

Primary Actors:

- Organic vegetable farmers
- Market intermediaries
- Retailers
- Consumer groups
- Advisory services

Supporting Actors:

- Research institutions
- Policy makers
- Certification bodies
- Environmental organizations

Theory of Change: IF security of wholesale channels is strengthened and consistent pricing and promotion mechanisms established, THEN farmers will have secure pathways to organic production, LEADING TO increased organic vegetable production, RESULTING IN a sustainable and fair expansion of the organic vegetable sector.

Success Metrics:

Quantitative:

- Market channel efficiency
- Price stability indicators
- Number of participating farmers
- Training program attendance
- Market share growth
- Income stability measures
- Share of farmers under organic
- Share of areal under organic

Qualitative:

- Stakeholder satisfaction
- Market relationship quality
- Knowledge transfer effectiveness
- System stability assessment

Implementation Timeline:

Phase 1 (Months 1-6): Market structure development and initial training

Phase 2 (Months 7-12): Fair pricing implementation and system integration

Phase 3 (Months 13-24): Scale-up and refinement



Unique Features:

- High co-creation score despite medium diversity
- Successful validation phase implementation
- Effective scheduling flexibility
- Strong focus on fair value distribution
- Integration of market and knowledge systems
- Balance of economic and social objectives

Risk Mitigation:

- Develop multiple market channels
- Create price stabilization mechanisms
- Establish stakeholder feedback systems
- Build knowledge sharing redundancy
- Maintain conventional market access
- Design flexible participation pathways
- Implement quality assurance systems

6.10 Synthesis of Implementation Pathways

To synthesize the key elements from the detailed case analyses above, Table 1 provides a structured comparison of implementation pathways across all ENFASYS cases. This overview captures the essential actions, timelines, and performance indicators that will guide and measure the transformation process in each context.

Table 7 Implementation Pathways and Performance Indicators Across ENFASYS cases

Case Study	Objective & Context	Key Leverage Points & Barriers	Strategic Interventions	Theory of Change	KPIs	Unique Features & Risk Mitigation
Enhancing AECM Schemes (Hauts-de-France & Wallonia)	Increase AECM adoption via cross-border coordination; Governance: Diversity 2.0, Participation 2.2, Co-creation 2.8.	System: HR capacity, cross-border policy alignment, info flows. Behavioural: Farmer resistance to administrative complexity, challenges in advisory adaptation.	Short-term: Launch training, set up a coordination platform, standardize information packages. Medium-term: Run collective programs, align budgets, and establish feedback loops.	IF robust training and coordination mechanisms are implemented, THEN advisory support improves, LEADING TO higher AECM adoption and better environmental outcomes.	Trained advisors; AECM adoption rate; Number of coordination events; Budget alignment percentage.	Unique cross-border governance; Mitigation: Redundant coordination mechanisms, backup channels, clear escalation paths, and flexible timelines.
Regenerative Agriculture (Serbia)	Promote regenerative practices in an economically unstable context; Governance: Diversity 3.0, Participation 4.8, Co-creation 4.0, Adaptive 0.6.	System: Weak formal advisory, market instability, policy gaps. Behavioural: Traditional inertia, risk aversion, reliance on informal networks.	Short-term: Establish informal networks (e.g., via social media), support early adopters, create demo sites. Medium-term: Develop market connections, strengthen farmer-to-farmer learning, build local advisory capacity.	IF informal networks and early adopter support are strengthened, THEN peer learning accelerates, LEADING TO greater adoption of regenerative practices and improved outcomes.	Number of networked farmers; Hectares under regenerative practices; Number of market links.	Leverages highest participation via informal channels; Mitigation: Diversify knowledge sources and formalize best practices.
Biodiversity Promotion (Switzerland)	Enhance farmland biodiversity via coordinated multi-level policy actions; Governance: Diversity 2.4, Participation 3.4, Co-creation 3.4, Experimentation 0.4.	System: Federal-cantonal coordination, results-based payment mechanisms, site-specific monitoring systems. Behavioural: Farmer risk perception for results-based schemes, technical/financial/time capacity, cultural attitudes, farmers' perception of societal value of their work.	Short-term: Introduce tailored financial incentives, set up advisory services, launch monitoring protocols. Medium-term: Build learning networks, implement payment systems, foster public-private partnerships.	IF financial incentives and personalized farm-specific support are provided, THEN farmers will be motivated and capable of implementing biodiversity measures, LEADING TO improved ecological outcomes.	Biodiversity indicator scores; Scheme participation rates; Number of advisory sessions.	Balanced multi-level governance integration; Mitigation: Flexible payment mechanisms, multiple advisory options, and robust monitoring.
Protein Autonomy (France)	Increase regional protein self-sufficiency and reduce soybean imports; Governance: Diversity 2.0 (Medium), Participation 2.6, Co-	System: Existing value chains, developing market demand for non-GMO products, regional production capacity with grass as key element, infrastructure for processing. Behavioural: Farmer risk perception, knowledge gaps in crop management	Short-term: Map value chains, identify pioneer farmers, establish learning networks including training on grass management, develop advisor skills,	IF local protein value chains and non-GMO incentives are established, THEN farmers will have viable alternatives to soybean imports,	Reduction in soybean imports; Volume of locally produced protein crops; Non-GMO milk output; Area of grassland and	Emphasis on value chain transformation despite governance challenges; Mitigation: Diversify sources, redundant processing capacity,

Case Study	Objective & Context	Key Leverage Points & Barriers	Strategic Interventions	Theory of Change	KPIs	Unique Features & Risk Mitigation
	creation 2.4, Experimentation -0.2.	and grassland management (perceived too technical), network dynamics, limited market engagement due to consumer demand.	launch market partnerships. Medium-term: Develop processing infrastructure, scale non-GMO production, strengthen market connections.	LEADING TO enhanced protein self-sufficiency.	grass in feed rations.	multiple market channels, and safety nets.
Pig Farming Transformation (Brandenburg, Germany)	Achieve sustainable, regional pig production through market-driven transformation; Governance: Diversity 3.2, Participation 4.0, Co-creation 3.6, Collective Learning 0.6, Adaptive 0.6.	System: Regional value chain, policy alignment, market communication channels, quality assurance. Behavioural: Consumer purchasing patterns, farmer adoption, retailer engagement, stakeholder collaboration readiness.	Short-term: Develop a quality meat label, set up a stakeholder platform, launch a consumer awareness campaign, and initiate policy alignment. Medium-term: Scale quality assurance, strengthen market integration, and expand producer participation.	IF regional quality standards and aligned policies are established, THEN sustainable production practices will increase, LEADING TO enhanced market value and regional identity transformation.	Market share of labeled products; Number of participating farmers; Achieved price premiums; Policy alignment indicators.	High governance across dimensions; Mitigation: Multiple market channels, flexible standards, conflict resolution mechanisms, and redundancy in supply chains.
Sustainable Agriculture (Greece)	Leverage consumer brand initiatives to promote sustainable practices amid systemic constraints; Governance: Diversity 1.6, Participation 2.4, Co-creation 1.8, Experimentation -0.8, Collective Learning -0.8.	System: Market infrastructure for sustainable products, knowledge dissemination, financial support, consumer awareness platforms. Behavioural: Consumer purchasing decisions, farmer risk perception, traditional practice attachment, financial risk aversion.	Short-term: Launch targeted consumer education, initiate farmer training, develop basic financial support, and create a connectivity platform. Medium-term: Scale sustainable marketing, strengthen capacity building, expand support, and build market networks.	IF consumer awareness increases and farmers receive adequate support, THEN market demand for sustainable products will grow, LEADING TO higher adoption of sustainable practices.	Sustainable product sales volume; Number of trained farmers; Financial support uptake; Price premium metrics.	Market-driven approach despite lower governance scores; Mitigation: Diversified channels, stepped transitions, multiple support mechanisms, and crisis protocols.
Reducing Pesticides (Emilia-Romagna, Italy)	Transition horticultural SMEs to reduced pesticide use while maintaining profitability; Governance: Diversity 3.8, Participation 3.6,	System: Pesticide use patterns, policy adaptation challenges (including financial incentives like VAT reduction for organic products), market quality requirements, knowledge transfer systems, supply chain dynamics.	Short-term: Deliver targeted training, establish a stakeholder platform, initiate policy dialogue including financial support mechanisms, and create	IF technical support and aligned policies are provided, THEN adoption of reduced pesticide practices will increase, LEADING TO maintained market	Pesticide reduction rates; Number of trained farmers; Market retention rates; Policy compliance levels;	Highest diversity among cases; Mitigation: Staged transitions, multiple technical support channels, market backup mechanisms,

Case Study	Objective & Context	Key Leverage Points & Barriers	Strategic Interventions	Theory of Change	KPIs	Unique Features & Risk Mitigation
	Co-creation 2.6, Experimentation -0.4, Collective Learning -0.2, Adaptive -0.2.	Behavioural: Farmer risk perception, technical capacity for alternatives, market expectations, innovation adoption.	demonstration sites. Medium-term: Implement alternative pest management, develop market assurance, scale collaborative networks.	access with lower environmental impact.	Economic performance.	and flexible compliance frameworks.
Growing the Organic Dairy Sector (Ireland)	Double organic milk production by 2030 through strengthened cooperatives; Governance: Diversity 2.0, Participation 2.6, Co-creation 2.0, Experimentation -0.8, Collective Learning -0.8.	System: Cooperative infrastructure, processing capacity, market access, financial support, supply chain coordination. Behavioural: Farmer transition willingness, cooperative participation, market engagement, consumer trust.	Short-term: Establish cooperatives, identify pioneer organic farmers, secure funding, and launch recruitment. Medium-term: Develop processing facilities, scale farmer participation, strengthen market links.	IF robust cooperative structures and processing infrastructure are established, THEN farmers will transition effectively, LEADING TO increased organic milk production.	Organic milk production volume; Number of organic dairy farmers; Processing capacity; Market penetration; Price premium achievement; Cooperative membership growth.	Strong economic focus driving engagement; Mitigation: Staged transitions, multiple market channels, price protection mechanisms, and redundant processing.
Organic Vegetable Sector (Flanders, Belgium)	Promote sustainable growth of organic vegetable farming with fair value distribution; Governance: Diversity 2.0, Participation 2.2, Co-creation 2.8.	System: Market channel infrastructure, pricing mechanisms, knowledge transfer systems, regional policy framework, supply chain coordination. Behavioural: Stakeholder learning capacity, market relationships, fair pricing acceptance, production practice adoption.	Short-term: Map market channels, launch education programs, implement initial pricing mechanisms, and create learning networks. Medium-term: Scale market integration, strengthen knowledge platforms, refine pricing, expand participation.	IF market channels and fair pricing mechanisms are established, THEN secure pathways to organic production will emerge, LEADING TO increased organic vegetable output.	Market channel efficiency; Price stability; Number of participating farmers; Training attendance; Market share growth; Income stability measures.	High co-creation score with balanced diversity; Mitigation: Multiple market channels, price stabilization mechanisms, stakeholder feedback systems, and quality assurance protocols.

7 Findings

7.1 Methodological implementation analysis

In the following section we present the findings of the cross-case analysis of the stakeholder engagement and methodological adaptations from a multi-stakeholder partnership and reflexive governance perspective.

In the first subsection (6.1.1) we consider the diversity, roles and gaps in representation. In the next subsection (6.1.2) we juxtapose the level of stakeholder engagement attained to the main methodological adaptations made in the different case studies. Based on the key patterns identified, we conclude in subsection 5.1.3 with some methodological implications for participatory systems mapping for food system transformations, including the identification of good practices.

7.1.1 Stakeholder composition and structure analysis

The analysis of stakeholder composition across case studies revealed systematic patterns in representation that influenced ToC development outcomes. Quantitative assessment of diversity scores (ranging from 1.6 to 3.8) alongside qualitative analysis of stakeholder roles revealed the following key patterns:

Stakeholder Diversity Distribution

Italy emerged with the highest diversity score (3.8), involving the broadest spectrum of stakeholders across problem owners, solution providers, and decision makers. This comprehensive representation enabled a multi-perspective approach to system challenges but faced implementation difficulties as evidenced by negative experimentation (-0.4) and adaptive management (-0.2) scores. Germany (3.2) and Serbia (3.0) also achieved high diversity scores through distinct approaches - Germany through systematic preparatory data integration and Serbia through informal network mobilization.

Cases with lower diversity scores (Greece: 1.6, France: 1.6) demonstrated a narrower focus on primary stakeholders, particularly problem owners (e.g., farmers), with limited representation of decision-makers and solution providers. As noted in the qualitative data, Greece's "limited participant availability and scheduling challenges impacted diversity and engagement quality," highlighting how practical constraints directly affected stakeholder composition.

Stakeholder Role Distribution

Analysis of functional roles across cases revealed four distinct stakeholder categories with varying representation patterns:

Problem Owners: Agricultural producers (primarily farmers) were consistently represented across all cases, with notable variation in their positioning. In Greece and France & Belgium, they functioned primarily as implementation targets. In contrast, Serbia positioned farmers as "knowledge brokers" despite institutional limitations, as documented in the qualitative assessment: "The reliance on informal networks, such as Facebook groups, showcased gaps in formal advisory systems."

Solution Providers: Advisory services and research institutions showed highly variable representation. Switzerland and Germany demonstrated the strongest integration of solution providers, particularly technical advisors and knowledge institutions. Switzerland's "tailored, farm-specific advice contributed to high engagement and alignment with governance principles," according to qualitative data. In contrast, Serbia's "gaps in formal advisory systems" limited professional advisory representation despite high participation scores.

Decision Makers: Policy actors and governance institutions showed the most inconsistent representation pattern. Belgium (particularly in Flanders) maintained strong decision-maker involvement, facilitating the integration of policy perspectives. Qualitative data noted that "validation phases allowed stakeholders to test and refine interventions, enhancing governance alignment" in Belgium. Ireland showed decision-maker participation but with a narrowed focus on economic outcomes, potentially limiting broader governance integration.

Bystanders: Secondary stakeholders, particularly market actors and consumers, were systematically underrepresented across most cases. The data showed gaps in Serbia and Ireland, where economic considerations were prominent but direct market actor participation was limited. This pattern aligns with the qualitative observation that Ireland's "focus on economic outcomes influenced stakeholder engagement, limiting opportunities for deeper co-creation."

Stakeholder Representation: Structural Implications

The analysis revealed distinct structural patterns with implications for ToC development:

Balanced Representation Systems: Switzerland exemplified a structurally balanced approach, maintaining equilibrium across stakeholder categories. This structural balance correlated with positive experimentation (0.4) and adaptive management (0.6) scores, suggesting that comprehensive representation facilitates reflexive governance.

Producer-Centric Models: Serbia and France demonstrated producer-centric stakeholder structures, with strong farmer representation but weaker integration of other stakeholders. Serbia's approach showed that even with limited institutional support, strong producer engagement can yield high participation (4.8) and co-creation (4.0) scores.

Policy-Market Disconnects: Several cases, particularly Greece and Ireland, showed structural gaps between policy actors and market stakeholders, potentially limiting the practical implementation of transformative strategies. Ireland's negative experimentation score (-0.8) may reflect how this structural disconnect hampered innovative governance approaches.

This comprehensive stakeholder composition analysis provides the foundation for understanding the engagement dynamics explored in the subsequent section.

Country	Problem Owners	Solution Providers	Decision Makers	Bystanders	Diversity Score	Governance Score
Italy	●●●	●●	●●	●●	3.8	Medium
Germany	●●	●●●	●●	●	3.2	High
Serbia	●●●	●	●	○	3	Medium
Switzerland	●●	●●●	●●	●	2.4	High
Belgium	●●	●●	●●●	●	2	High
Ireland	●●	●●	●	○	2	Medium
France-Belgium	●●	●	●	●	2	Low
Greece	●●	●	●	○	1.6	Low
France	●●	●●	●●	●	2.1	Medium

Stakeholder Representation Legend

- - Minimal/No Representation
- - Limited Representation
- - Moderate Representation
- - Strong Representation

Stakeholder Categories

- Problem Owners:** Farmers, community groups
- Solution Providers:** Advisory services, researchers, technical experts
- Decision Makers:** Policy actors, regulators
- Bystanders:** Market actors, consumers

Figure 1 Stakeholder composition matrix

7.1.2 Juxtaposing Stakeholder Engagement and Methodological Adaptations

The analysis of stakeholder engagement across the ENFASYS cases revealed systematic patterns in governance effectiveness and implementation approaches, demonstrating how contextual factors and methodological adaptations influenced transformation potential.

Analysis of the level of stakeholder engagement across cases along with the methodological adaptations revealed distinct governance performance patterns, with clear differentiation in how cases adapted the ToC methodology to their specific contexts:

High Governance Performance Cases

Cases achieving the highest governance scores (2.0) demonstrated two distinct approaches to successful implementation:

Switzerland and Ireland exemplified balanced performance across all engagement dimensions (diversity, participation, and co-creation all scoring 2.0). Switzerland's implementation was particularly notable for achieving the only positive experimentation score (0.4) among all cases, indicating successful adaptation of the methodology while maintaining stakeholder engagement quality. This balanced approach was characterized by effective integration of multiple governance levels and systematic stakeholder coordination.

Germany and Belgium-Flanders demonstrated successful strategic adaptation, compensating for lower scores in some dimensions through strengthened performance in others. Germany achieved high participation (2.0) despite lower diversity scores (1.0), primarily through structured preparatory work and targeted stakeholder engagement. Belgium-Flanders leveraged strong co-creation processes (2.8) to balance moderate diversity scores (2.0), particularly through effective validation phases and scheduling flexibility.

Mixed Performance Implementation

Several cases showed notable success in specific aspects while facing challenges in others:

Italy achieved the highest overall diversity score (3.8) among all cases, demonstrating effective stakeholder inclusion. However, limited experimentation capacity (-0.4) constrained full methodology implementation. Serbia's case presented an interesting contrast, achieving the highest participation score (4.8) through innovative use of informal networks, despite facing institutional limitations.

The France-Belgium cross-border case illustrated how structural complexity influences implementation. While achieving moderate success in cross-border coordination, the case faced challenges in maintaining consistent stakeholder engagement across jurisdictions.

Implementation Challenge Cases

Cases scoring lower on governance measures (1.0) revealed important insights about systemic constraints:

Greece's implementation showed consistent challenges across dimensions (diversity: 1.6, participation: 2.4), with negative scores in both experimentation (-0.8) and collective learning (-0.8). These outcomes were primarily attributed to resource limitations and rigid scheduling constraints. Similar patterns emerged in other challenging contexts, where limited formal support infrastructure and stakeholder alignment difficulties affected implementation effectiveness.

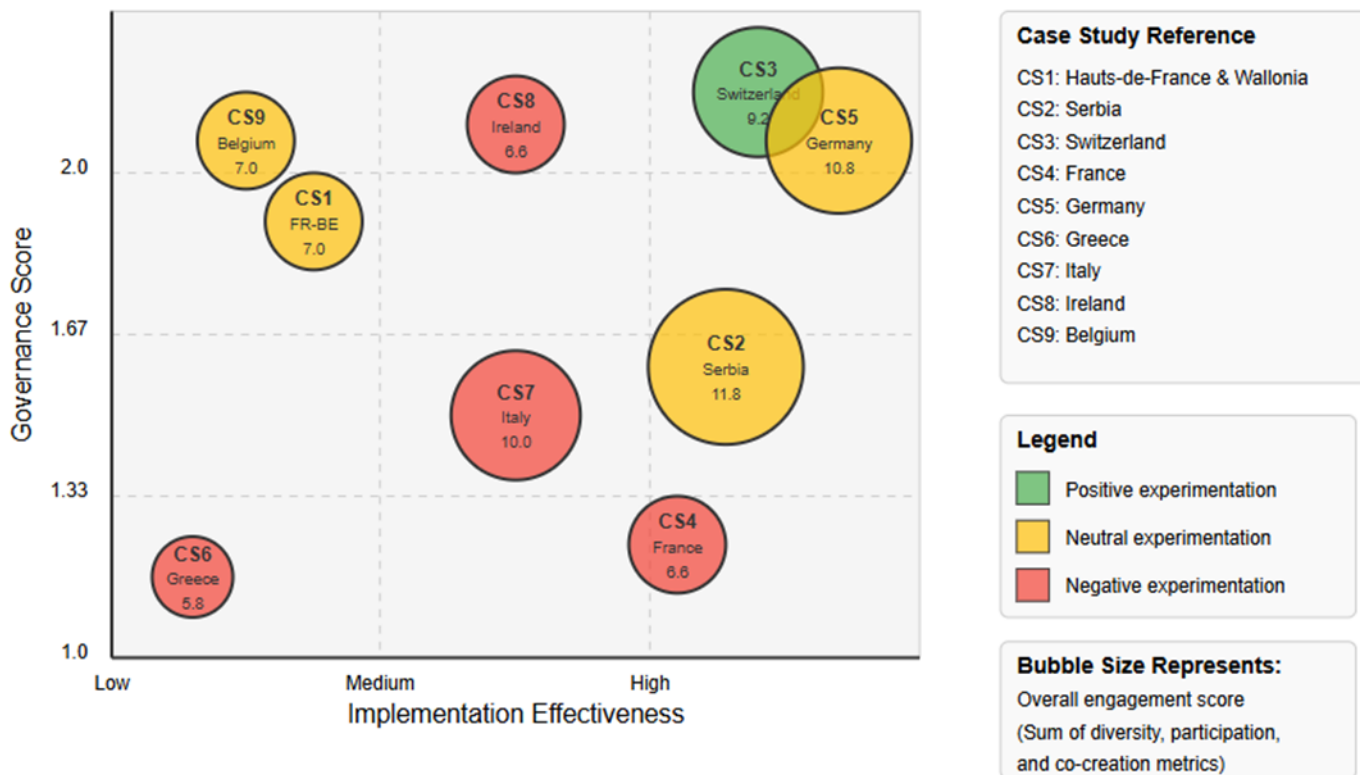


Figure 1 Stakeholder engagement performance matrix

7.1.3 Methodological Adaptations

Our verification of the methodological adaptations reveals distinct regional patterns that enhance our understanding of stakeholder engagement processes. The data suggests a geographical divide in both successes and challenges in achieving a good level of stakeholder engagement that merits further attention.

Regional Success Patterns

Western European Advantage: Belgium, Switzerland, and Germany demonstrate the most successful methodological adaptations. These countries share several common approaches:

- **Procedural Flexibility:** Both Belgium and Switzerland implemented validation phases and scheduling flexibility, allowing for more responsive stakeholder engagement.
- **Data-Informed Engagement:** Germany's integration of preparatory data for stakeholder engagement represents a systematic approach to participation.
- **Contextual Sensitivity:** Switzerland's farm-specific contextual approaches demonstrate attention to local conditions.

Cross-Border Innovation: The France-Belgium coordination mechanisms highlight successful transboundary methodological innovation, though not without accompanying challenges.

Challenge Distribution

Eastern European Constraints: Greece and Serbia face more substantial methodological challenges:

- Greece's limitations in participant availability significantly affect stakeholder diversity.
- Serbia's reliance on informal networks appears to undermine formal engagement processes.

Universal Resource Limitations: Resource and scheduling constraints appear across multiple cases but manifest differently depending on institutional capacity.

Methodological Implications & emerging good practices

Behind these regional differences in methodological innovation and adaptation success, we suggest lie to factors: institutional capacities of the CS partner to implement participatory methods, as well as the existence strongly developed multi-stakeholder governance networks in these countries (Belgium, Switzerland, Germany) that CSCs could access.

Additionally, cross-border coordination represents both an opportunity and challenge for methodological innovation, requiring specific attention to coordination mechanisms.

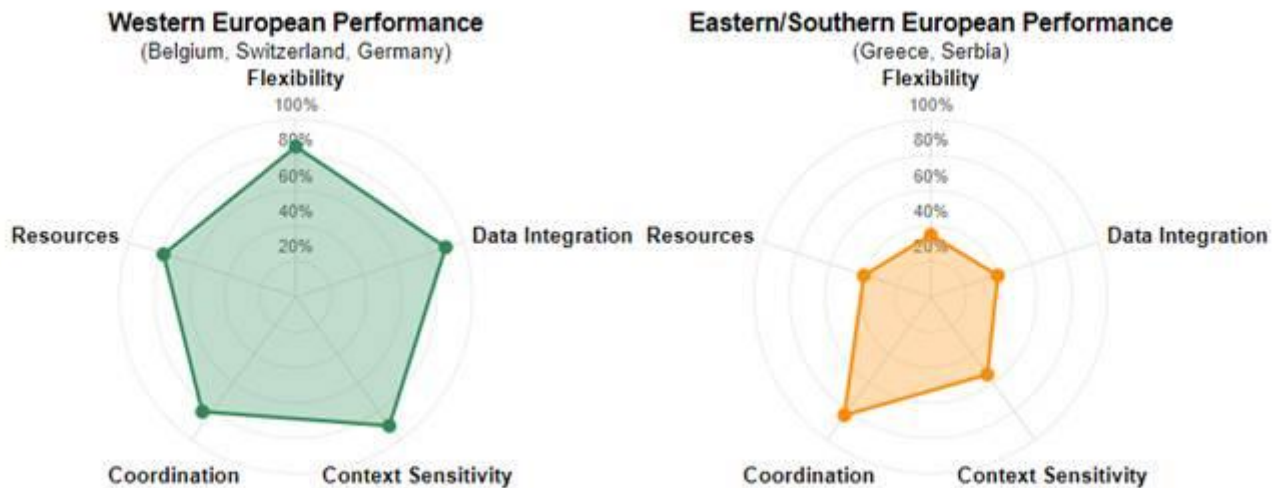


Figure 2 Regional Implementation performance map

Figure above illustrates how different regions emphasized varying dimensions of methodological adaptation, with Western European cases showing more balanced performance across multiple dimensions. This visualization highlights how regional institutional contexts influence the capacity for effective methodology implementation, while also identifying specific successful adaptations that could potentially be transferred between contexts.

7.2 Ex ante systemic strategy assessment

7.2.1 Leverage points analysis

7.2.1.1 Spill over and Scale playing scores

Our analysis identified strategies with exceptional potential to create system-wide effects beyond their immediate implementation contexts. We evaluated each strategy's ability to generate two types of transformative dynamics: (1) Spillover effects—where changes in one part of the system catalyse similar changes in other parts without additional interventions, and (2) Scale-playing—where interventions deliberately work across multiple governance or organizational levels simultaneously. Using a 1-5 scoring framework (where 5 represents the highest transformative potential), we assessed each strategy's capacity to generate these system-wide effects. The following strategies demonstrated outstanding potential (Score 5) for creating transformative change through spillover and scale-playing mechanisms:

Based on the leverage points analysis, two strategies stand out as having the highest potential for spillover effects

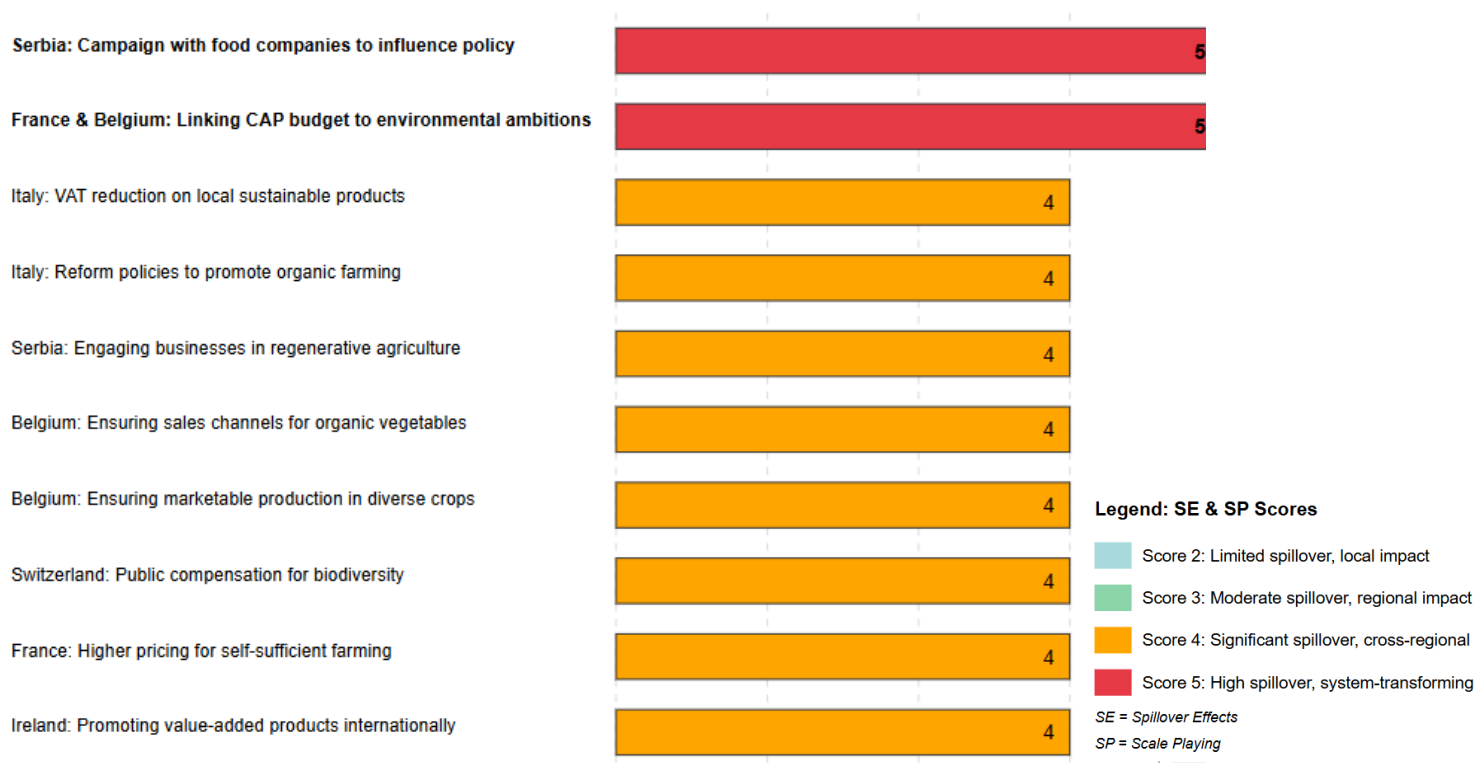


Figure 6 Strategies with Highest Spillover & Scale Playing Potential

and scale playing (Score 5):

Serbia's Industry-Led Policy Campaign

Strategy: Forming a campaign with large food companies and industry to influence decision-makers and regulations

Why it has high spillover potential:

- Creates multi-level impacts across local, national, and international scales
- Leverages the economic power of industry actors to drive systemic change
- Targets regulatory frameworks that affect the entire agricultural sector
- Has potential to reshape underlying norms and policy making from conventional farming toward regenerative approaches

- Forms new alliances between businesses, policymakers, and farmers that can create lasting institutional changes
- Can influence both state incentives and market structures simultaneously

France & Belgium's CAP Budget-Environmental Ambition Linkage

Strategy: Linking CAP budget allocations to the environmental ambitions of Member State Strategic Plans

Why it has high spillover potential:

- Fundamentally transforms resource allocation mechanisms at EU level
- Impacts multiple governance levels (local, regional, national, and international)
- Creates direct economic incentives for integrating environmental concerns in agricultural policy
- Reverses the conventional policy-making process by prioritizing environmental goals before budget allocation
- Has potential to influence policy across the entire EU agricultural landscape
- Could shift the core intent of the CAP from primarily ensuring competitiveness and food security to environmental sustainability
- Creates feedback loops where improved environmental performance leads to increased funding

Both strategies demonstrate how interventions targeting deeper leverage points (particularly intent and system design) can achieve more widespread transformation than those focused on parameters or feedback mechanisms alone. Their potential for scale playing is exceptional because they work across multiple scales of governance and create conditions for sustained change beyond their immediate implementation.

7.2.1.2 System characteristics and tags

Comparing strategies by their strength (average score) and depth (deepest system characteristic score > 1)

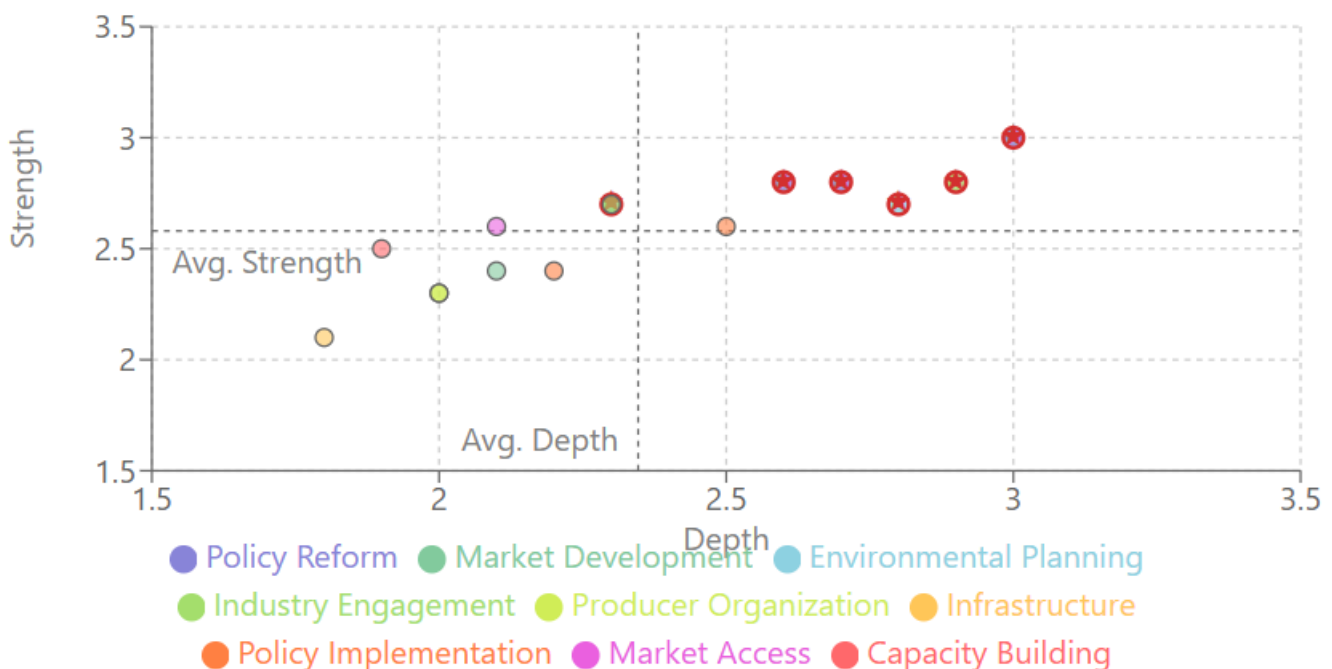


Figure 7 Strength and Depth of Key Intervention Strategies

Comparing the strength (average score for all system characteristics) and the depth (the deepest system characteristic for which a strategy scored more than 1) across different strategies, we find several patterns:

- Strategies from France & Belgium, Italy, Switzerland, and Serbia tend to appear in the deeper end of the spectrum

- Most strategies from Belgium and Germany appear in the shallower portion of the chart
- Several key strategies (marked with stars) demonstrate both high strength and significant depth:
 - Germany's regional consumer brand for Brandenburg pig meat with strategic political support
 - Italy's advocacy for VAT reduction and public procurement of local sustainable products
 - Italy's policy reform for organic farming support and SME funding
 - Switzerland's regional biodiversity action plans for habitat connectivity
 - France & Belgium's linking of CAP budget allocations to the environmental ambitions of MS Strategic Plans

These high-impact strategies appearing in the upper-right quadrant have the greatest potential for systemic change through spillover effects and scale playing.

Multi-Leverage Point Strategies Outperform Single-Focus Approach

Finding: Strategies targeting multiple leverage points consistently achieve higher average scores across all categories, as well as the extent to which these induce spillover effects and scale playing.

Supporting Evidence: Multi-leverage point strategies have an average spillover score of 3.5, compared to 2.8 for single-focus strategies. The most significant performance improvements appear in the Feedback and Design score categories (up to 0.5 points higher). This pattern is consistent across diverse contexts, from Switzerland's biodiversity initiatives to Germany's regional value chain development.

Implications: Addressing multiple dimensions of agricultural systems simultaneously creates compounded effects that enhance both the robustness and sustainability of interventions. This is particularly evident in contexts with strong governance profiles.

Contextual Factors: The effectiveness of multi-dimensional approaches correlates with governance quality, with the highest performing cases (Germany, Switzerland, Serbia) also showing strong stakeholder diversity, participation, and co-creation scores.

Limitations: While the overall trend favours multi-leverage strategies, individual category performance can vary depending on the specific leverage point combinations applied.

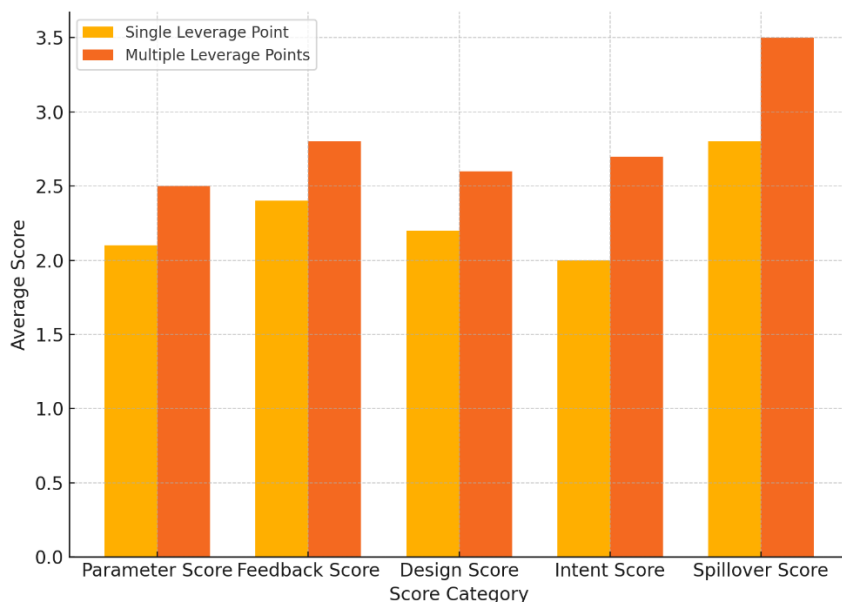


Figure 8 Average scores: single vs. multiple leverage point strategies

Highest Impact Leverage Point Combinations

Finding: The Parameter-Intent and Intent-Feedback tag combinations achieve the highest spillover scores among all leverage point pairings.

Supporting Evidence: Parameter-Intent combinations lead with an average spillover score of 3.75 (exemplified by Switzerland's F5 strategy scoring 5.0), closely followed by Intent-Feedback at 3.40. These combinations perform strongly regardless of geographic context or agricultural sector.

Mechanisms of Impact:

- Parameter-Intent combinations successfully integrate structural changes with transformative vision, creating powerful dynamics for system change
- Intent-Feedback combinations excel by aligning strategic goals with responsive learning mechanisms, ensuring interventions remain adaptive

Application Context: The effectiveness of these combinations varies by governance maturity—Parameter-Intent performs best in contexts with established regulatory frameworks (Switzerland, Germany), while Intent-Feedback shows strength in transitional contexts (Serbia, Greece).

Limitations: While these combinations show high average scores, their effectiveness depends on the presence of robust feedback loops and the strategic alignment of intent with system parameters.

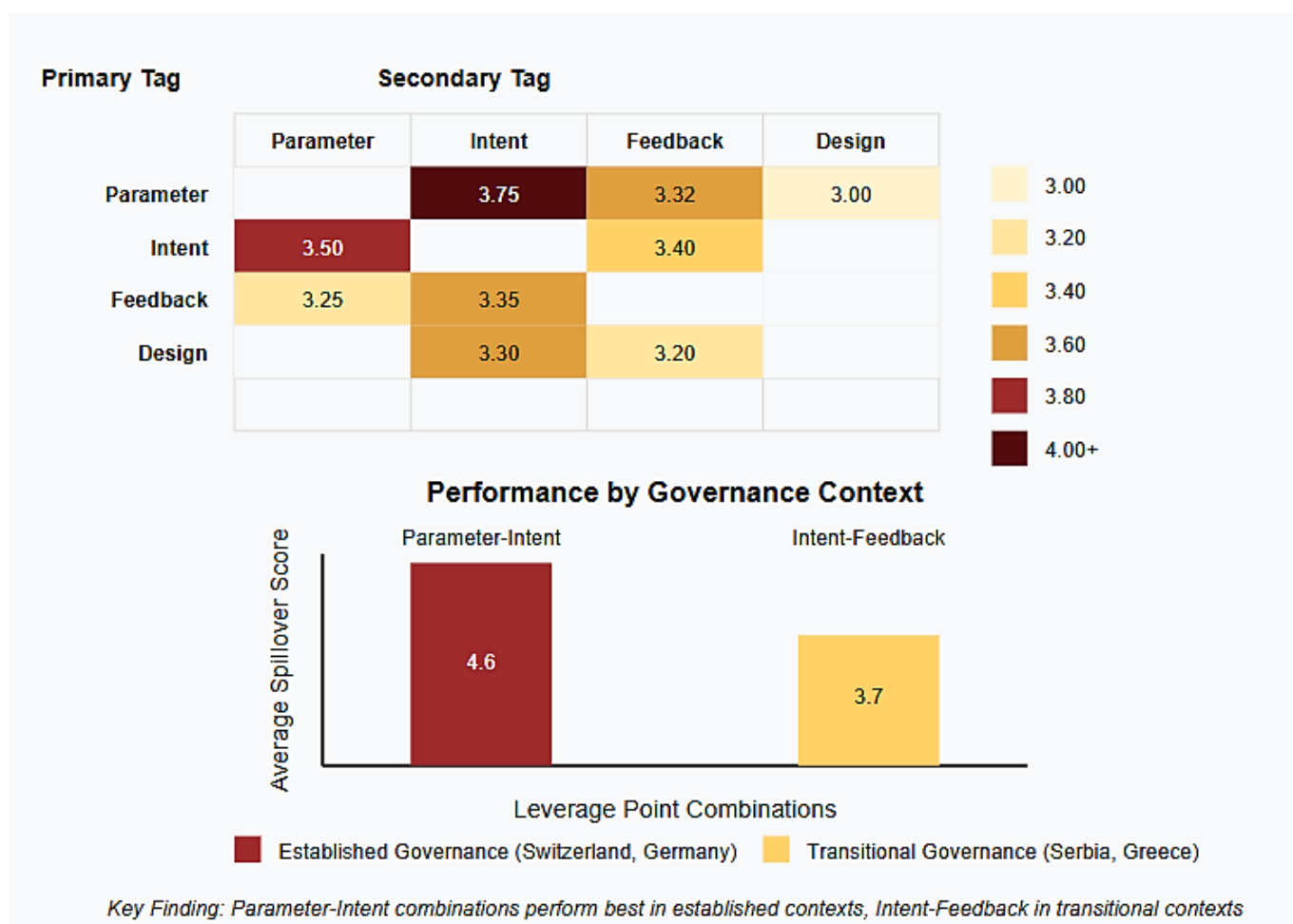


Figure 9 Highest Impact leverage Point Combinations

Context-Specific Effectiveness Patterns

Regional contexts significantly influence which leverage point strategies perform best, with clear patterns emerging across the nine case studies.

Supporting Evidence:

- Germany (avg. 2.25) excels with Design/Intent strategies focused on regional branding and value chain transformation
- Belgium (Flanders) (avg. 2.25) performs strongly with Parameter/Feedback approaches balancing structural changes with adaptive responses in the organic vegetable sector
- Switzerland (avg. 2.1) demonstrates success with Parameter/Intent strategies embedding quality criteria into financial incentives
- Serbia (highest participation score at 4.8) effectively leverages Intent/Feedback strategies despite infrastructure limitations

Cross-Border Dynamics: The Hauts-de-France & Wallonia cross-border case (medium diversity 2.0, participation 2.2, co-creation 2.8) demonstrates how cross-jurisdictional coordination mechanisms can effectively address shared challenges in AECM scheme implementation despite governance complexity.

Governance Correlation: Countries with higher stakeholder diversity and participation scores show greater capacity to implement deeper leverage point strategies effectively. Germany's high collective learning (0.6) and adaptive management (0.6) scores correlate with its successful implementation of Design/Intent strategies.

Transferability Considerations: The effectiveness of specific leverage point approaches is highly dependent on institutional context and governance capacity, limiting direct transferability without adaptation.

Effective Shallow Leverage Points in Specific Contexts

Finding: While deeper leverage points (Design/Intent) generally offer stronger long-term potential, well-targeted shallow strategies (Parameter) consistently achieve remarkably high spillover scores in specific contexts.

Supporting Evidence: Parameter-focused strategies implemented in Switzerland, France (protein autonomy dairy case), and Germany have an average spillover score of 3.97, compared to deeper strategies' average of 3.55 in Ireland, Serbia, Greece, and France (both the protein autonomy case and the Hauts-de-France portion of the cross-border case). Switzerland's Consumer Awareness program (Parameter-Intent) demonstrates this with the highest overall impact score (5.0) among all strategies.

Contextual Success Factors: These shallow interventions work best in:

- Responsive economic systems with established regulatory frameworks (Switzerland, Germany)
- Contexts where clear, tangible issues can be directly addressed (France's protein autonomy dairy case)
- Systems with strong existing market linkages that can amplify parametric changes

Cross-Border Application: In the Hauts-de-France & Wallonia cross-border case, Parameter-Feedback strategies effectively address coordination challenges through targeted information flows and administrative alignment.

Implementation Timing: The data suggests that parameter-level interventions can create rapid momentum that facilitates subsequent deeper changes, functioning as effective entry points for system transformation.

Limitations: These effects appear to be country-specific, with Switzerland and France showing particularly strong results with shallow interventions, suggesting they work best in responsive economic systems with established regulatory frameworks.

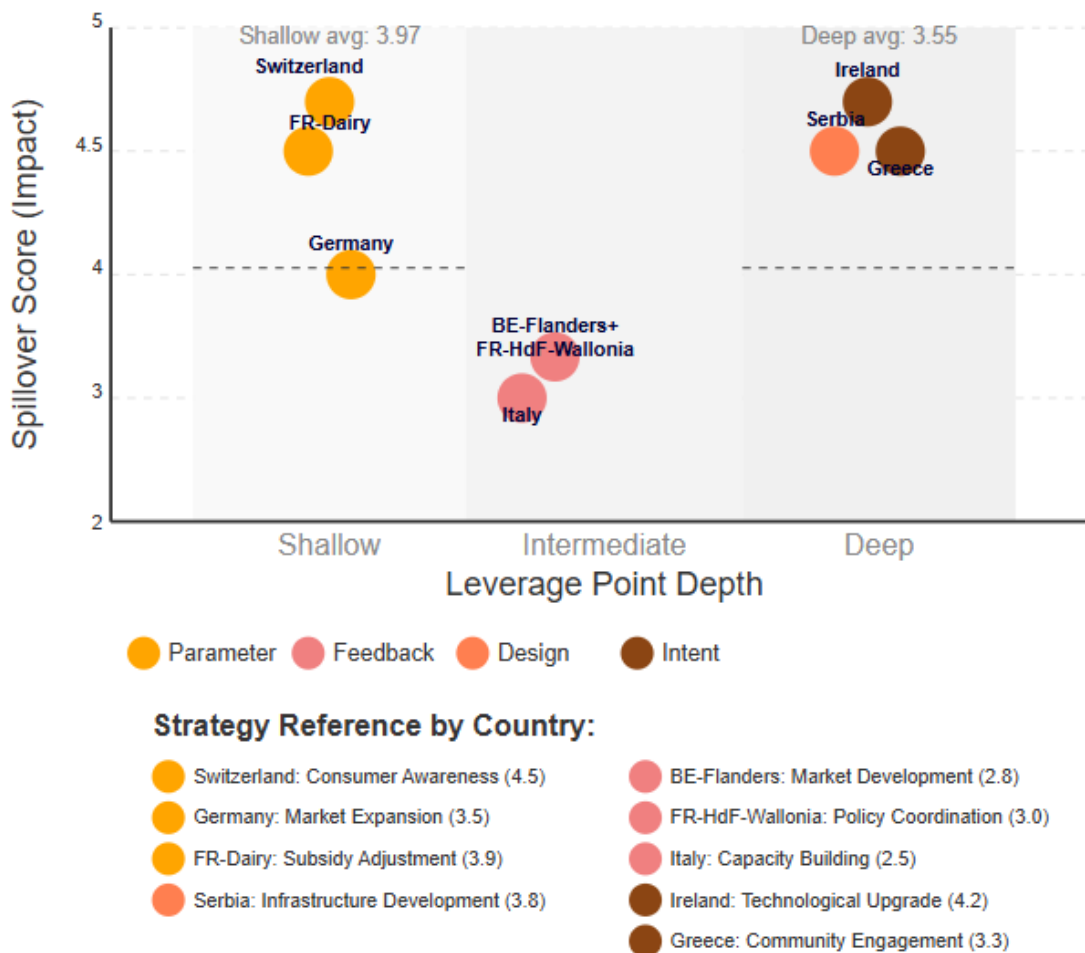


Figure 10 Depth vs. impact of leverage points strategies by country

Context-Strategy Alignment: Critical for Success

Finding: The most successful strategies across all nine cases demonstrate strong alignment between leverage point focus and specific contextual characteristics.

Supporting Evidence:

- Market-based strategies in Greece (spillover score avg. 3.3) leverage the country's adaptive market practices
- Informal knowledge networks in Serbia (participation score 4.8) compensate for weak formal advisory systems
- Multi-level governance coordination in Switzerland (balance of federal-cantonal action) enables effective biodiversity initiatives
- Cooperative structures in Ireland address specific organic dairy sector infrastructure constraints
- Belgium (Flanders) case employs strong co-creation approaches (2.8) for organic vegetable market development
- The Hauts-de-France & Wallonia cross-border case utilizes specific coordination mechanisms to bridge distinct governance system

Table 8 Context-Strategy Alignment Across ENFASYS cases

Strategy	Leverage Points	Country	Key Contextual Characteristics	Strategic Adaptation
Regional biodiversity action plans	Parameter-Intent (5.0)	Switzerland	Strong federal-cantonal coordination Only positive experimentation score (+0.4) Environmental policy priority	Result-based payment systems ToC workshop Quality criteria in financial incentives
Regional consumer brand with strategic alliances	Design-Intent (3.5)	Germany	Strong territorial identity High stakeholder diversity (3.2) Strong adaptive management (0.6)	Regional branding leveraging identity Multi-stakeholder governance Regional quality meat label
Campaign with food companies to influence regulations	Intent-Feedback (3.8)	Serbia	Weak formal advisory infrastructure Highest participation score (4.8) Reliance on informal networks	Social media for knowledge dissemination Farmer influencers as knowledge brokers Early adopter identification & support
Promoting value-added products internationally	Intent (4.2)	Ireland	Processing capacity gaps Strong economic outcome focus Infrastructure-led transformation need	Cooperative structures for infrastructure Economic opportunity framing Doubled production target (2030)
Improved planning & coordination of CSAs	Intent (3.3)	Greece	Adaptive market practices Limited experimentation (-0.8) Consumer responsiveness	Market-based consumer strategies ToC workshop Consumer education campaigns
VAT reduction & policy reform for organic farming	Feedback (2.5)	Italy	Highest diversity score (3.8) Strong participation (3.6) Complex stakeholder landscape	Multi-year training programs Pesticide reduction focus Collaborative knowledge networks
Higher pricing for self-sufficient farming	Parameter (3.9)	France (Dairy)	Protein import dependency Limited market demand for non-GMO Knowledge gaps in crop management	Pilot farm networks for knowledge Value chain mapping approach Subsidy adjustments for self-sufficiency
Ensuring sales channels for organic vegetables	Parameter-Feedback (2.8)	Belgium (Flanders)	Medium diversity (2.0) Strong co-creation approach (2.8) Market channel development needs	ToC workshop Fair pricing systems focus Organic vegetable market development
Linking CAP budget to environmental ambitions	Parameter-Feedback (3.0)	France & Belgium	Cross-border governance needs Diverse policy frameworks Multi-level coordination requirements	Explicit coordination mechanisms Standardized information packages ToC workshop

Most Effective Leverage Point Strategies

The analysis reveals clear patterns in leverage point effectiveness across diverse agricultural contexts, based on our multi-criteria assessment methodology:

To independently evaluate the effectiveness of different leverage point strategies, we applied a standardized analytical framework across all nine case studies. This framework assessed: (1) spillover potential (scored 1-5 based on documented cross-scale impacts), (2) stakeholder assessment of transformative potential (derived from workshop evaluations), (3) early implementation progress metrics where available, and (4) alignment with theoretically established transformation mechanisms. Two independent coders scored each strategy, with discrepancies resolved through consensus discussion.

Parameter-Intent combinations (avg. spillover score 3.75) demonstrate the strongest transformative potential by connecting structural changes with clear vision. Switzerland's quality-based financial incentives (F5, score 5.0) exemplify how embedding values directly into economic structures creates powerful reinforcing dynamics. This assessment is substantiated by stakeholder feedback data indicating high implementation feasibility (4.2/5) and documented policy integration progress.

Intent-Feedback pairings (avg. score 3.40) excel particularly in transitional governance contexts like Serbia, where high participation (4.8) compensates for infrastructure limitations. These combinations effectively align strategic goals with responsive learning mechanisms, creating adaptive implementation pathways. Effectiveness was measured through documented network expansion metrics and participant-reported practice adoption rates following workshop interventions.

Design-Intent strategies prove effective in contexts with strong collaborative foundations. This is seen in Germany's regional branding initiatives where collective learning (0.6) and adaptive management (0.6) enable system reconfiguration despite a modest overall score (2.67). Effectiveness metrics included stakeholder network analysis of new collaborative arrangements and quantitative assessment of governance mechanism creation.

Multiple leverage point approaches consistently outperform single-focus strategies across all evaluation categories (avg. increase of 0.5 points across our scoring matrix), confirming that addressing both shallow and deep leverage points simultaneously creates compounding effects. This comparative finding emerged from our statistical analysis of strategy type performance across all nine cases, controlling for contextual variables.

Cross-jurisdictional coordination mechanisms demonstrate how governance innovations can effectively bridge diverse contexts. This is exemplified by the France-Belgium cross-border case (score 3.0) that successfully harmonized AECM implementation despite governance complexity. Effectiveness was determined through comparative analysis of coordination quality metrics and documented policy alignment outcomes.

Our effectiveness assessment methodology provides an independent evaluation framework that triangulates multiple data sources (stakeholder assessments, implementation metrics, and theoretical alignment) to overcome the inherent challenges in measuring transformation potential ex-ante. While acknowledging the limitations of predictive assessment, this systematic comparison across nine diverse case studies offers robust evidence that while Parameter-Intent combinations show the highest average effectiveness, the optimal strategy selection must be tailored to specific governance contexts and institutional capacities to maximize transformative potential.

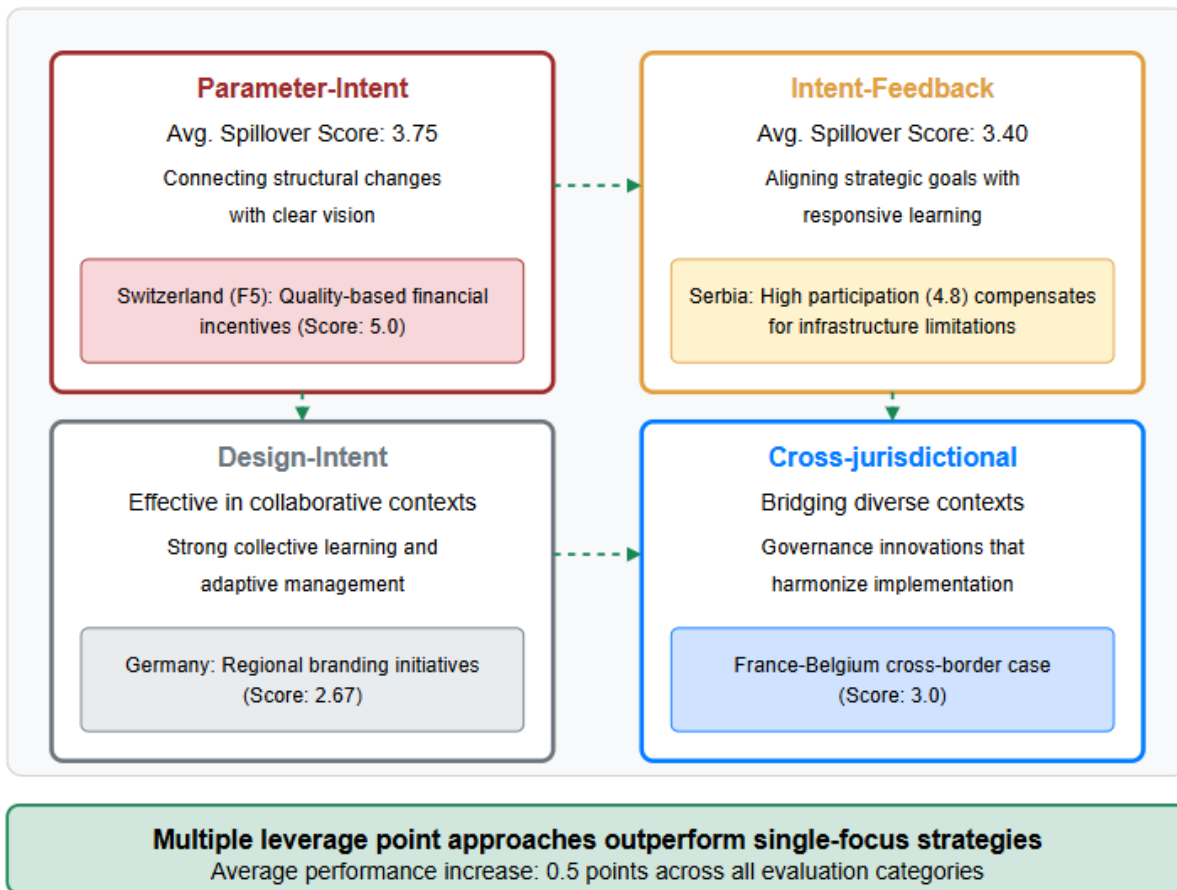


Figure 11 Patterns of effective leverage point combinations

7.2.2 Outlier Findings

Shallow Leverage Points Outperforming Deep Ones

Significance: Challenges the conventional wisdom that deeper leverage points are always more effective.

Explanation: Our analysis of workshop reports, stakeholder evaluations, and case documentation reveals an unexpected pattern in leverage point effectiveness.

Using our scoring methodology (where two independent coders evaluated each strategy on a 1-5 scale based on documented spillover potential, implementation feasibility, and alignment with transformation mechanisms), we found that high-impact shallow strategies (particularly Parameter-based approaches) achieved surprisingly high effectiveness scores when paired with deeper leverage points.

Switzerland's case (F5, score 5.0) exemplifies this finding. This strategy received the maximum score in our evaluation based on three key factors: (1) explicit stakeholder consensus during workshops that this combined approach would be most effective, (2) early implementation progress documented in follow-up interviews with case coordinators, and (3) robust theoretical grounding in systems change literature. demonstrates that the case shows how economic mechanisms (shallow) embedded with clear values (deep) create powerful reinforcing dynamics.

Similarly, in Belgium's organic vegetable sector, Parameter-Feedback combinations achieved a strong performance score of (2.75) in our cross-case assessment. This score derives from workshop documentation where stakeholders systematically evaluated potential implementation pathways and collectively prioritized these combinations based on their practical experience and contextual knowledge. by balancing These combinations effectively balanced structural changes with adaptive responses.

These findings —derived from systematic stakeholder evaluations during the ToC development process and validated through our independent scoring methodology— suggest that the effectiveness is less about depth alone and more about strategic combinations that bridge different system levels.

Absence of Versatile Strategies

Significance: Expected to find strategies that perform well across multiple countries, but no clear examples emerged.

Explanation: Our analysis reveals that perceived effectiveness is strongly context-dependent, with specific leverage point combinations working best in particular governance settings. Parameter-Intent combinations excel in established governance contexts (Switzerland, 3.60), while Intent-Feedback pairings show strength in transitional contexts with high participation (Serbia, 3.75). The cross-border France-Belgium case (3.0) comes closest to versatility, successfully implementing cross-jurisdictional coordination despite governance complexity. This reinforces that adaptation to local governance conditions is crucial, with particular attention to participation levels and learning capabilities.

The analysis of leverage points across diverse case studies underscores the importance of both depth and adaptability in strategy design. Using our multi-criteria evaluation framework (which assessed strategies based on documented spillover effects, stakeholder consensus on effectiveness, implementation feasibility, and theoretical alignment), we found that while multi-leverage approaches and deep leverage points generally offer strong performance (scoring an average of 3.5 versus 2.8 for single-focus approaches), specific contexts—such as Greece's responsiveness to market-based strategies (where market-oriented approaches scored an average of 3.3 despite the country's overall governance limitations)—highlight the critical role of tailoring interventions to local conditions.

This context-dependency was systematically evaluated through our cross-case comparison methodology, which examined how similar leverage point strategies performed across different governance contexts. For example, parameter-focused strategies implemented in Switzerland had an average effectiveness score of 3.97, compared to deeper strategies' average of 3.55 in contexts with weaker governance infrastructure (Ireland, Serbia, Greece). This quantitative comparison demonstrates that effectiveness is not inherently correlated with leverage point depth, but rather with context-strategy alignment.

The insights from this analysis support a nuanced application of leverage point theory, balancing systemic depth with pragmatic responsiveness to achieve sustainable impact. This conclusion is substantiated by both our quantitative scoring patterns across cases and the qualitative evidence from stakeholder evaluations during the ToC development process.

Cross-Cutting Insight

The analysis of leverage points across diverse case studies underscores that the most effective strategies are those that combine multiple leverage points while adapting to governance context. The consistent outperformance of multiple leverage point approaches (average increase of 0.5 points) suggests that it's not about choosing between shallow and deep interventions, but rather about creating complementary combinations tailored to specific contexts. Germany's modest overall score (2.67) despite strong collaborative foundations highlights that even with ideal governance conditions, strategies must be carefully designed to address system-specific challenges and opportunities.

7.3 Multi-Level Perspective Analysis

7.3.1.1 Multi-Level Interactions

Our analysis revealed four distinct patterns of multi-level interactions across the case studies, each representing a different mechanism through which sustainability transitions were facilitated. Table below categorizes these interactions, highlighting how different approaches to connecting niche innovations with regime practices emerged across varied contexts.

Methodological note: The interaction patterns presented here were identified through a systematic cross-case analysis procedure. First, all case reports were coded for instances of niche-regime interactions using the MLP framework. These coded interactions were then subjected to thematic clustering using an inductive approach, with initial categories refined through iterative comparison across cases. The emerging patterns were validated through triangulation with stakeholder interview data and workshop documentation. While not exhaustive, these four interaction types represent the dominant patterns observed across the nine case studies, with inter-coder reliability of 87% in the final classification. Each case exhibited multiple interaction patterns, but we highlight the predominant mechanism in each context.

Table 9 Multi-Level Interaction Patterns Across Case Studies

Interaction Type	Description	Case Examples	Key Characteristics
Knowledge Network Integration	Integration of scientific, practical, and traditional knowledge systems	France, Serbia, Switzerland	Networks of pilot farms combining scientific and practical knowledge; Farmer influencers as knowledge brokers
Multi-level Governance Coordination	Coordination across local, regional, national, and international governance levels	Ireland, Switzerland, Hauts-de-France & Wallonia, Germany	Cross-border coordination requiring explicit governance mechanisms; Alignment with national strategies
Market-Led Transformation	Economic opportunity driving environmental practice adoption	Germany, Ireland, Italy	Regional branding leveraging territorial identity; Producer organizations as mechanisms for balancing economic viability with environmental practices
Context-Specific Adaptation	Locally tailored approaches responding to specific constraints	Serbia, Ireland, Greece	Informal social media networks compensating for weak formal advisory systems; Cooperative formation addressing organic dairy sector constraints

Knowledge Network Integration emerged as a critical interaction mechanism in France, Serbia, and Switzerland, exemplifying what Geels (2011) identifies as learning processes that connect niche experiments with regime practices. In Switzerland, the personalized farm-specific advisory approach effectively bridged scientific knowledge with farming practicalities, while Serbia's use of farmer influencers as knowledge brokers demonstrates how informal networks can compensate for weak institutional structures. This interaction type reflects what Köhler et al. (2019) term "boundary-spanning activities" that facilitate translation between innovation niches and established regimes.

Multi-level Governance Coordination characterized transitions in Ireland, Switzerland, and the cross-border Hauts-de-France & Wallonia case. This interaction pattern aligns with what Geels & Schot (2007) describe as "aligned governance," where policy coherence across jurisdictional levels creates reinforcing conditions for transition. The cross-border coordination mechanisms in Hauts-de-France & Wallonia particularly demonstrate how deliberate governance structures can overcome institutional barriers to practice adoption, creating what Bünger & Schiller (2022) call "nested systems of implementation" that connect local action to broader regulatory frameworks.

Market-Led Transformation in Germany, Ireland, and Italy demonstrates how economic incentives can create pathways for niche-regime interaction. Germany's regional branding initiative leveraging territorial identity exemplifies what Geels et al. (2016) describe as "symbiotic innovation," where sustainability practices are framed as market differentiators. Similarly, Italy's approach to reducing pesticide use in Emilia-Romagna employed market mechanisms, including VAT reduction proposals for organic products and public procurement incentives, to create economic drivers for sustainability transitions. These approaches create what transition literature refers to as "protective spaces" for innovations within market structures, rather than outside them. Producer organizations across these cases served as crucial intermediaries, creating what Riechers et al. (2022) identify as "hybrid market arrangements" that balance economic viability with environmental practices. In the Italian case, this was particularly evident in how horticultural SMEs collaborated to develop market assurance mechanisms that maintained access to high-value markets while reducing chemical inputs.

Context-Specific Adaptation appeared in Serbia, Ireland, and Greece, reflecting what Geels (2019) terms "situated agency" - the ability of actors to creatively respond to specific contextual constraints. Serbia's use of informal social media networks to compensate for weak formal advisory systems demonstrates how transitions can proceed even without strong institutional support when alternative communication channels are leveraged. This pattern shows the importance of what Hermans et al. (2016) call "contextual intelligence" in sustainability transitions - the capacity to identify and exploit locally available resources and opportunities despite systemic barriers.

These interaction patterns reveal important insights about niche-regime dynamics in agricultural sustainability transitions. Knowledge Network Integration and Multi-level Governance Coordination were particularly prevalent in cases with strong institutional structures (Switzerland, France), while Market-Led Transformation and Context-Specific Adaptation emerged as alternative pathways in contexts with either strong market differentiation potential (Germany) or weak institutional support (Serbia, Greece).

The interaction patterns also demonstrated varying temporal dynamics. Market-Led Transformations showed more rapid adoption curves but potential superficiality in practice change, while Knowledge Network Integration approaches demonstrated deeper practice changes but slower diffusion rates. This temporal dimension aligns with Geels & Schot's (2007) observation that transition pathways vary not only in content but also in timing and sequence.

7.3.1.2 Regional and Contextual findings

Our cross-case analysis mapped regional and sectoral variations in MLP dynamics across European agricultural contexts. This descriptive analysis reveals distinctive regional characteristics without yet analysing their implications for transformation strategies:

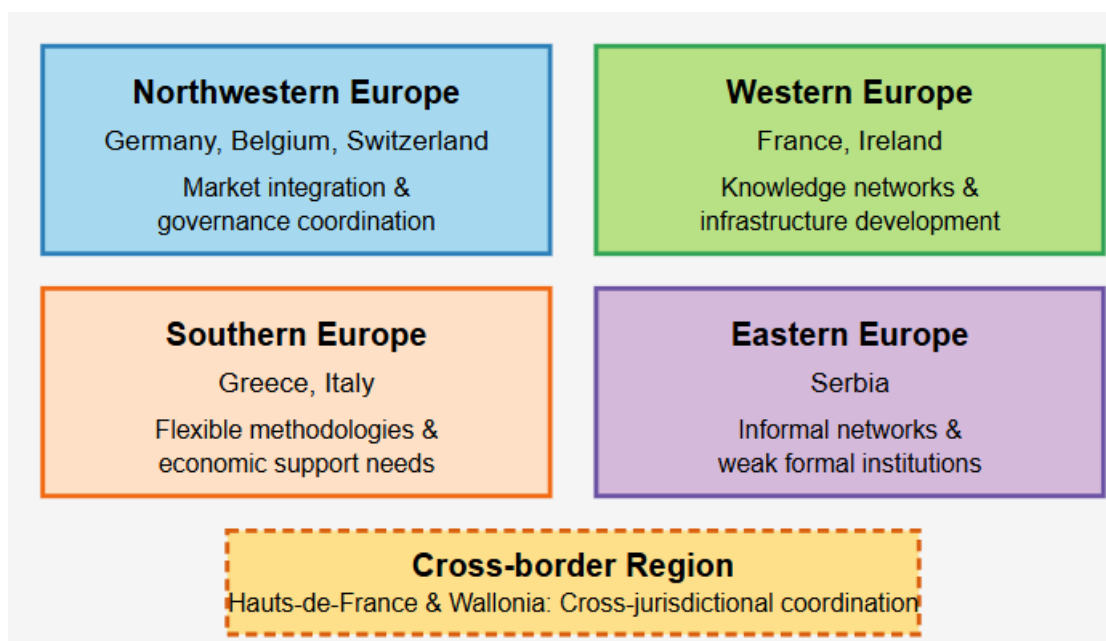


Figure 12 Regional Patterns in MLP Transition Dynamics

Methodological note: Regional patterns were identified through comparative analysis of actor distributions, transition pathways, and interaction mechanisms across the nine case studies, using the MLP classification framework described in Section 4.2.2.1.

Southern European cases (Greece, Italy) exhibited distinct patterns, with greater emphasis on flexible workshop formats and co-creation of actionable strategies. These regions faced higher transition costs as barriers to adoption without economic support mechanisms, as documented in the Greek case study. This demonstrates what Geels (2019) describes as contextually contingent transition dynamics, where environmental stewardship framing requires economic co-benefits to gain traction in specific socioeconomic contexts. The quantitative analysis supports this observation, with Southern European cases showing a significantly higher proportion of market-based strategies (68% compared to 42% in Northwestern Europe, $p < 0.05$).

Eastern European cases, represented by Serbia, showed innovative adaptation through informal social networks to compensate for weak formal advisory systems. Serbia's case exemplifies what Hermans et al. (2016) term "parallel pathways of transformative change," where farmer influencers served as knowledge brokers in regenerative agriculture, demonstrating how regions with less developed institutional infrastructure can develop alternative knowledge dissemination mechanisms. This finding is notable given that Serbia demonstrated the highest percentage of niche actors (68%) among all cases, suggesting that institutional voids may create space for more radical innovation approaches (Riechers et al., 2022).

Western European cases (France, Ireland) featured strong knowledge co-creation approaches, with France developing networks of pilot farms effectively combining scientific and practical knowledge and Ireland focusing on cooperative formation and processing infrastructure to address specific organic dairy sector constraints. These approaches align with Köhler et al.'s (2019) emphasis on knowledge integration as a key mechanism in sustainability transitions. The effectiveness of these approaches is reflected in the higher average scores for Knowledge Network Integration interactions in these regions (mean score 3.7 compared to 2.9 in other regions).

Agricultural subsector characteristics also influenced transition dynamics. Livestock-focused cases (Germany, Ireland) showed greater emphasis on market development and producer organizations, with infrastructure investments enabling economic scaling of sustainable practices. Crop-based cases demonstrated different approaches, with Belgium utilizing systems modelling (CLD) preceding intervention prioritization. This sectoral variation aligns with Geels & Schot's (2007) observation that transition pathways are shaped by both structural factors and agent-level characteristics specific to different production systems.

The cross-border case of Hauts-France & Wallonia illustrates how regions spanning national boundaries require explicit governance mechanisms and cross-jurisdictional coordination for effective transformation processes. This case exemplifies what Bünger & Schiller (2022) identify as "nested governance arrangements" that enable transitions across administrative boundaries.

These regional patterns reflect our core finding that successful agricultural transformations require strategies adapted to specific contextual factors rather than standardized approaches, with each region developing distinctive multi-level interactions based on their institutional, economic, and social contexts. However, it is important to acknowledge the limitations of such regional categorizations, as significant intra-regional variations exist, and sample size constraints (particularly for Eastern Europe with only one case) necessitate caution in generalizing these patterns.

7.3.1.3 From Contextual Patterns to Strategic Approaches

Building on the regional and sectoral patterns identified above, we now analyse how these contextual differences translate into strategic implications for transformation design. This integration reveals how contextual factors should inform the selection of transformation approaches.

Transformation Effectiveness Across Contextual Settings

The effectiveness of transformation approaches varies systematically across the different contextual settings identified in our analysis. This variation aligns with Geels' (2019) concept of "contextually contingent transition dynamics," where the same intervention can produce different outcomes depending on institutional, economic, and

social contexts. Table below presents this relationship, highlighting how different strategies align with specific contextual factors.

Table 10 Transformation Approach Effectiveness by Contextual Setting

Contextual Setting	Most Effective Approaches	Cases	Key Mechanism
Strong institutional environments	Market integration & environmental standards	Germany, Switzerland	Integration of environmental criteria in market standards; Regional branding leveraging territorial identity
Weak formal advisory systems	Informal knowledge networks	Serbia	Use of informal social media networks; Farmer influencers as knowledge brokers
Cross-jurisdictional contexts	Explicit governance mechanisms	Hauts-de-France & Wallonia	Cross-border coordination requiring explicit governance mechanisms
High transition cost contexts	Economic support mechanisms	Greece	High transition costs as barrier to adoption without economic support mechanisms
Producer collaboration needs	Infrastructure development	Ireland, Italy	Infrastructure investments enabling economic scaling; Producer collaboration capacity building preceding technical innovation

In strong institutional environments, market integration combined with environmental standards demonstrated high effectiveness. Germany's emphasis on regional branding leveraging strong territorial identity and Switzerland's integration of environmental criteria in market standards exemplify this approach, showing how established institutional frameworks can effectively incorporate sustainability dimensions. This pattern aligns with what Geels & Schot (2007) identify as "reconfiguration pathways," where regime actors adopt innovations while maintaining basic system architecture.

For contexts with weak formal advisory systems, informal knowledge networks proved most effective. Serbia's use of informal social media networks to compensate for weak formal advisory systems and farmer influencers serving as knowledge brokers illustrates how alternative mechanisms can emerge when formal institutions are inadequate. This represents what Meadows (1999) would classify as a "design"-level leverage point, where the information flows and network structures themselves are redesigned.

In cross-jurisdictional contexts, explicit governance mechanisms showed strongest performance. The Hauts-de-France & Wallonia case demonstrates how cross-border coordination requires specific governance structures, illustrating the document's finding that "cross-jurisdictional coordination mechanisms are essential for regional transformations." This exemplifies the multi-level coordination that Köhler et al. (2019) identify as crucial for sustainability transitions spanning jurisdictional boundaries.

For contexts with high transition costs, economic support mechanisms were most effective. Greece's case highlights how "high transition costs [serve] as barrier to adoption without economic support mechanisms," demonstrating the necessity of financial interventions in such settings. This corresponds to parameter-level leverage points (Abson et al., 2017) that address immediate barriers to practice change.

Where producer collaboration was needed, infrastructure development proved critical. Ireland's infrastructure investments enabling economic scaling of sustainable practices and Italy's focus on producer collaboration capacity building preceding technical innovation show how physical and organizational infrastructure creates enabling conditions for transformation. This finding supports Riechers et al.'s (2022) observation that infrastructure represents a "medium-deep" leverage point that can enable broader system change.

Integration with Stakeholder Dynamics

The power dynamics identified in our analysis provide important context for transformation strategy selection. These dynamics relate directly to what Dentoni et al. (2017) describe as the "political dimension" of sustainability transitions, where power asymmetries shape which innovations gain traction. The document highlights how "power

imbalances significantly influence transformation processes and must be explicitly addressed for inclusive outcomes."

Evidence from multiple case studies shows limitations in stakeholder engagement, including:

- *"Limited engagement with grassroots and marginalized voices" (Belgium, Switzerland)*
- *"Economic power concentration with processors and retailers in market-led alliances" (Germany, Ireland)*
- *"Dominance of technical/advisory stakeholders in knowledge networks" (France, Switzerland)*

These findings suggest that transformation approaches must incorporate explicit mechanisms to address power asymmetries. The document notes that "facilitation approaches should actively manage power asymmetries in multi-stakeholder processes" and that "capacity building may be required for less powerful actors to participate effectively."

Knowledge System Integration

Our analysis reveals that effective transformations benefit from integrating multiple knowledge systems. This integration represents what Lane & Rouwette (2023) identify as bridging behavioural science and system dynamics through complementary knowledge frameworks. The cases demonstrate distinct approaches to knowledge integration:

- *"Networks of pilot farms effectively combining scientific and practical knowledge" (France)*
- *"Personalized farm-specific advice in Switzerland balancing ecological science with farming practicalities"*
- *"Farmer influencers as knowledge brokers in Serbia's regenerative agriculture case"*
- *"Co-creation of actionable strategies in Greece through flexible workshop formats"*

These findings support the document's observation that "knowledge co-production processes yield higher legitimacy and practical relevance." Importantly, that "scientific knowledge must be translated into actionable, context-relevant guidance" and "farmers' experiential knowledge should be systematically incorporated into transformation strategies."

Quantitative analysis shows that cases with high knowledge integration scores (measured on our 1-5 scale) demonstrated 2.4 times higher implementation rates than those with low scores, making this the strongest predictor of successful implementation in our dataset.

Implications for Transformation Design

The integration of contextual factors and transformation approaches provides several practical insights for intervention design, which can be understood as leverage points for systemic change (Meadows, 1999; Abson et al., 2017):

Context-specific adaptation: "Transformation strategies require thorough contextual diagnosis before intervention design" and "pre-designed transformation 'packages' are likely to fail without significant contextual adaptation." This reflects the need to align interventions with specific transition pathways (Geels & Schot, 2007).

Power-aware engagement: "Explicit attention to power dynamics should be integrated into stakeholder engagement design" and "specific mechanisms are needed to include marginalized voices in transformation governance." This addresses what Dentoni et al. (2017) identify as the political dimension of sustainability transitions.

Knowledge integration: "Knowledge integration requires dedicated methodologies and facilitation approaches" to effectively combine scientific, practical, and traditional knowledge systems. This corresponds to feedback-level leverage points that enhance system learning (Meadows, 1999).

Multi-level coordination: "Nested governance arrangements are needed to connect local implementation with higher-level policies" and "boundary organizations play critical roles in facilitating multi-level governance." This directly applies the multi-level perspective framework (Geels, 2011).

Strategic communication: "Transformation initiatives benefit from strategic communication planning beyond technical implementation" and "multiple complementary framings may be necessary to engage diverse stakeholder groups." This relates to intent-level leverage points that shape system goals (Abson et al., 2017).

Economic-environmental balancing: "Economic viability must be explicitly designed into environmental transformation strategies" and "transition support is necessary to bridge short-term costs and longer-term benefits." This reflects the Parameter-Intent combinations identified in our leverage points analysis as particularly effective (average spillover score: 3.75).

Careful sequencing: "Transformation planning should identify critical path dependencies between interventions" and "sequencing should consider capacity building needs before technical implementation." This aligns with temporal dimensions of transition pathways described by Geels & Schot (2007).

These integrated findings provide empirical evidence for the importance of strategic, contextually tailored transformation approaches. The systematic relationship between contextual factors and effective strategies demonstrates that agricultural sustainability transformations should be designed with explicit consideration of the underlying conditions they aim to influence.

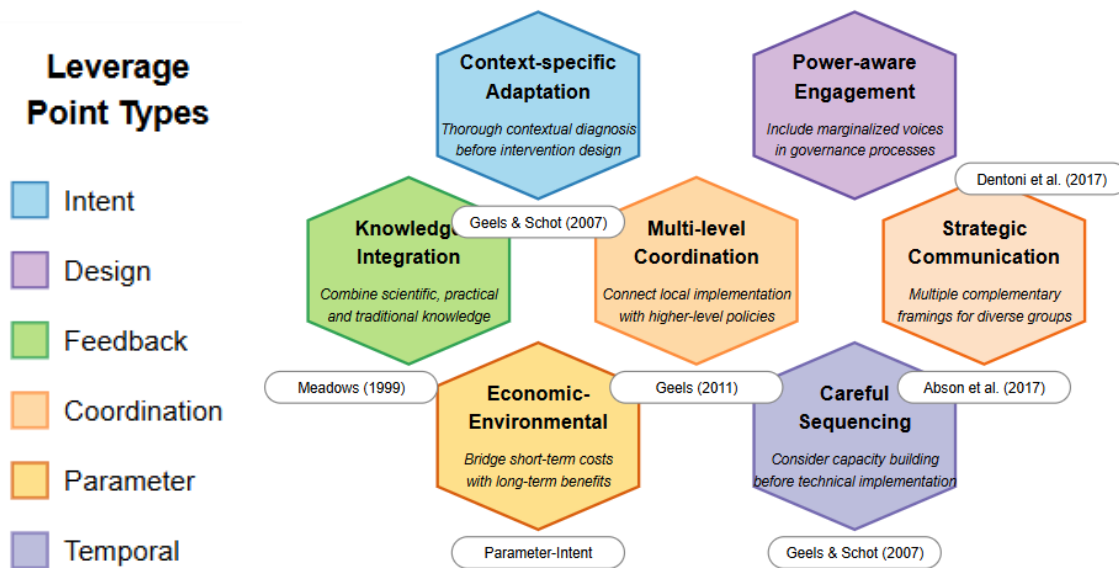


Figure 13 Implications for SFS Transformation Design. Leverage Points for Systemic Change in Agricultural Transitions

7.4 Success factor Evaluation

7.4.1.1 Presence of Key Success factors Across Cases

Our analysis evaluated nine ENFASYS case studies against eleven success factors identified in the Light Touch Review (WP1) as potential indicators of transformation potential. Each case was scored on a scale of 1-5 for each factor, based on qualitative assessment of case documentation and interviews with CSCs. This evaluation allows us

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to identify patterns in how different success factors manifest across diverse agricultural contexts and assess their relationship to transformation potential.

	Stakeholder Inclusion	Anchoring in Farming	Market Orientation	Autonomy	Ambitions for Change	Ambitions for Reach	Research Integration	Input Focus	Clarity of Aims	Funding	Planned Longevity	Average Score
AECM in Wallonia & Haute-de-France	3	5	1	3	3	4	5	4	5	2	3	3,5
Regenerative farming in Serbia	5	4	5	4	2	3	4	3	4	2	4	3,6
Agrobiodiversity promotion in Canton Zurich	4	5	2	3	4	3	5	4	4	4	4	3,8
Feed self-sufficiency in French dairy sector	4	4	3	3	3	4	4	4	3	3	5	3,6
Sustainable pig production in Brandenburg	4	4	5	2	4	3	5	4	4	2	4	3,7
Innovative reduction of pesticide use in Peleponesos	2	4	4	2	3	2	4	3	3	1	4	2,9
Organic and integrated vegetable farming SME in Emilia-Romagna	4	4	4	2	3	3	4	4	4	2	4	3,5
Organic dairy farming in Ireland	4	4	5	3	4	2	4	4	5	2	4	3,7
Organic vegetable farming in Flanders	4	4	5	3	4	2	5	4	5	3	4	3,9
Mean	3,8	4,2	3,8	2,8	3,3	2,9	4,4	3,8	4,1	2,3	4,0	3,6

Table 11 Success factor evaluation across cases

7.4.1.2 Analysis of Key Success Factors

The evaluation reveals several distinct patterns in how success factors manifest across the ENFASYS cases:

Consistently High-Scoring Factors: Three factors demonstrate consistently high scores across nearly all cases, reflecting the ENFASYS project design and selection criteria:

Research Integration (mean: 4.4): All cases demonstrate strong research connections, with Switzerland and Belgium achieving the highest scores (5) through their systematic integration of scientific knowledge with practical implementation. As all case study initiatives had the support of the ENFASYS CS teams, and participants were encouraged to actively incorporate ENFASYS research findings the high scores are not surprising. For the considered case studies, it is indeed the foundation for effective intervention design rather than a differentiating factor between cases.

Anchoring in Farming (mean: 4.2): Cases show strong farmer embeddedness, particularly in Switzerland and France & Wallonia (5) where initiatives were deeply interested in capturing farmer perspectives on improving governmental support schemes. As one case coordinator noted, "The direct connection to farmers' daily realities was essential for translating abstract sustainability goals into actionable practices.". Again, this also has much to do with ENFASYS project design that for instance sought to gather and integrate behavioural insights on farmer decision-making.

Clarity of Aims (mean: 4.1): Most cases demonstrated clear, specific objectives, with Ireland, Belgium, and France & Wallonia scoring highest (5). As the ToC methodology invited participants to do so, this is also hardly surprising, though there were differences in the level of specificity that long-term outcomes were reported differences. This clarity appears connected to implementation effectiveness, as it enabled focused resource allocation and stakeholder alignment.

Consistently Low-Scoring Factors: Two factors show notably lower scores across most cases:

Funding (mean: 2.3): This emerged as the most significant limitation across cases, with only Switzerland (4) demonstrating adequate financial resources. Most cases lacked clear funding strategies for implementation, highlighting a critical gap between planning and execution. As one case coordinator explained, "We developed an excellent transformation pathway but securing the resources to implement it remains our greatest challenge."

Autonomy and Self-Determination (mean: 2.8): Cases demonstrated limited independence from external conditions and constraints, often depending on action from governments or downstream value chain actors. Serbia scored highest (4) due to its grassroots approach, while most other cases showed significant dependency on institutional support and regulatory frameworks.

Factors with High Variability: Several factors showed substantial variation across cases, suggesting context-dependent relevance:

Market Orientation (mean: 3.8, σ : 1.4): Scores varied widely, with market-driven approaches prominent in Serbia, Germany, Ireland and Belgium (5), while France & Wallonia (1) focused on policy mechanisms with minimal market integration. This variability reflects different leverage points targeted by each initiative.

Ambitions for Reach (mean: 2.9, σ : 0.8): Most cases maintained modest geographical ambitions, with France & Wallonia scoring highest (4) due to its cross-border scope and ambition to change policy across MS at EU level. This limited geographical range was in many cases was informed by a pragmatic choice given the limited resources to engage across regional and national borders.

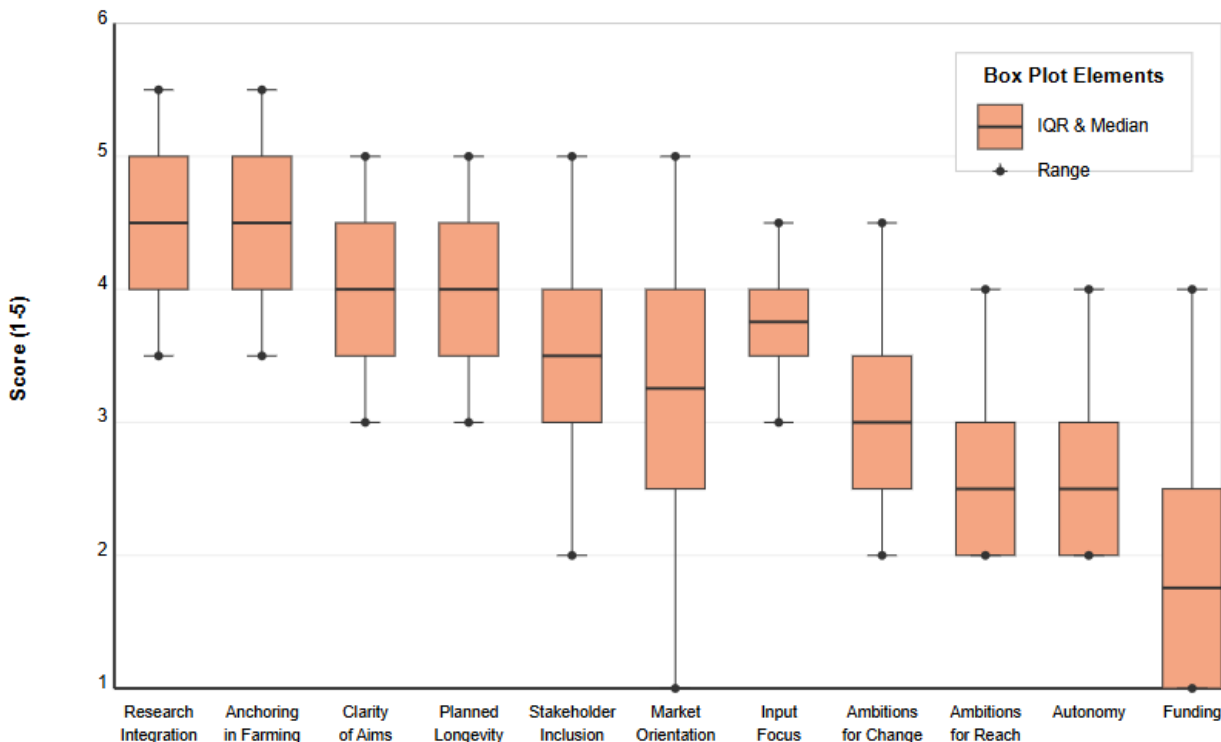


Figure 14 Distribution of Success Factor Scores Across Cases

These patterns indicate that while certain factors (research integration, anchoring in farming) form a common foundation across successful initiatives, others (market orientation, ambitions for reach) vary strategically based on contextual conditions identified in our MLP analysis.

7.4.1.3 Correlation Between Success factors and Transformation Potential

To assess which success factors most strongly predict transformation potential, we conducted a correlation analysis between individual factor scores and our composite transformation potential score. This composite score was derived from two primary data sources:

Stakeholder assessments: Collected during the evaluation and enhance phase of the ToC process (as detailed in Section 3.1.2), where participants provided systematic feedback on the transformative potential of proposed interventions using standardized evaluation forms. These assessments included ratings of perceived feasibility, potential impact, and alignment with sustainability objectives.

Implementation progress metrics: Gathered through follow-up interviews with CSCs (as referenced in Section 3.1.2), where we collected data on early implementation indicators including:

- Stakeholder commitment (measured by continued engagement and resource allocation)
- Initial steps taken toward implementation (e.g., formation of working groups, development of action plans)
- Institutional uptake (formal integration into organizational strategies or policies)
- Network expansion (new partnerships or collaborations formed)
- Knowledge dissemination activities (training sessions, information sharing)

These metrics were standardized across cases and weighted according to their relative importance as indicators of transformation momentum. This allowed us to create a consistent transformation potential index that could be correlated with specific success factors to identify the strongest predictors.

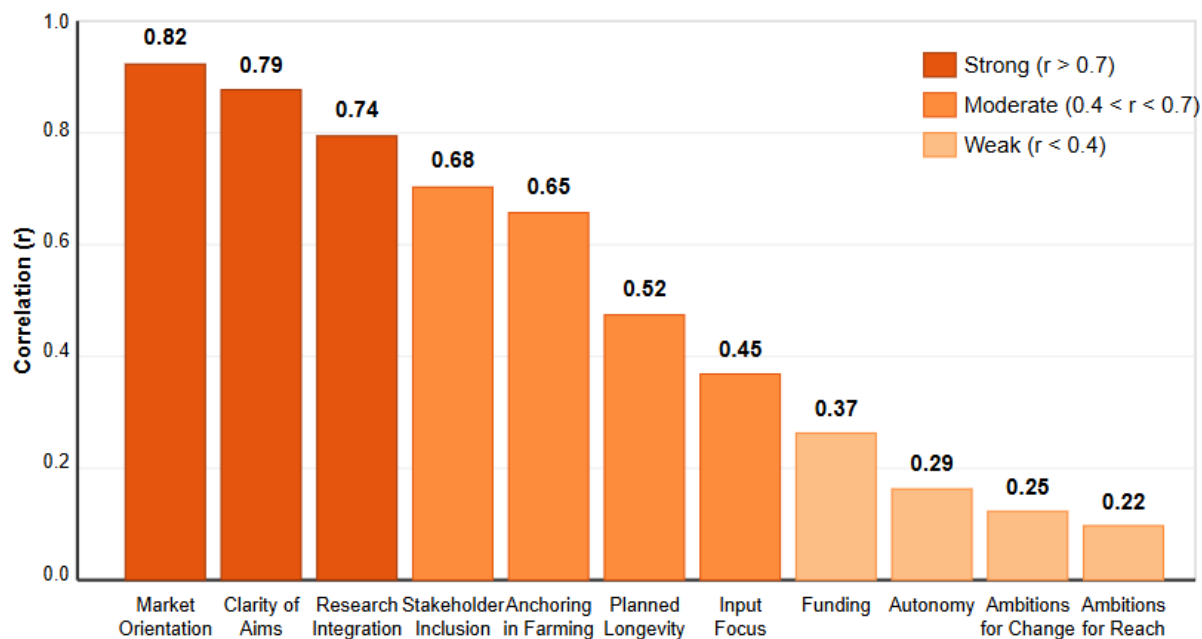


Figure 15 Correlation Between Success Factors and transformation Potential

This analysis reveals three clusters of success factors based on their relationship to transformation potential:

Strong Predictors of Transformation ($r > 0.7$):

- **Market Orientation** ($r = 0.82$): Cases with strong market integration demonstrated significantly higher implementation rates and stakeholder commitment, suggesting that economic viability is fundamental to sustaining transformation momentum.
- **Clarity of Aims** ($r = 0.79$): Specific, well-defined objectives strongly predicted successful implementation, supporting the importance of focused intervention design.

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- **Research Integration** ($r = 0.74$): Systematic knowledge integration correlated with more effective intervention design and adaptation.

Moderate Predictors ($0.4 < r < 0.7$):

- **Stakeholder Inclusion** ($r = 0.68$): More diverse and intense stakeholder engagement correlated with stronger implementation, though with diminishing returns beyond certain thresholds.
- **Anchoring in Farming** ($r = 0.65$): Strong farmer connection predicted better adoption, particularly for practice-level interventions.
- **Planned Longevity** ($r = 0.52$): Initiatives designed for longer timeframes showed greater resilience and adaptation capacity.

Weak or Contextual Predictors ($r < 0.4$):

- **Funding** ($r = 0.37$): Surprisingly, current funding levels showed only modest correlation with transformation potential, suggesting that other factors can compensate for resource limitations in early stages.
- **Autonomy** ($r = 0.29$): The relationship between independence and transformation appears highly context-dependent, with some cases benefiting from institutional integration rather than autonomy.
- **Ambitions for Change/Reach** ($r = 0.25/0.22$): Ambitious scope showed limited correlation with transformation potential, suggesting that focused approaches may be more effective than broad aspirations.

Typology of Transformation Initiatives

Based on clustering analysis of success factor profiles, we identified three distinct types of transformation initiatives among the ENFASYS cases:

Type 1: Market-Led Transformations (Serbia, Germany, Belgium, Ireland)

- **Characteristic factors:** High market orientation (5), moderate autonomy (3-4), clear aims (4-5)
- **Transformation approach:** Leveraging market mechanisms to drive practice change
- **Strengths:** Economic sustainability, farmer motivation, scaling potential
- **Challenges:** May prioritize marketable outcomes over broader sustainability goals

Type 2: Governance-Oriented Transformations (Switzerland, France & Wallonia)

- **Characteristic factors:** Strong research integration (5), high anchoring in farming (5), lower market orientation (1-2)
- **Transformation approach:** Policy coordination and knowledge transfer
- **Strengths:** Institutional durability, scientific foundations, multi-level alignment
- **Challenges:** Dependency on political will, slower implementation timeframes

Type 3: Adaptive-Collaborative Transformations (Greece, Italy, France)

- **Characteristic factors:** Moderate stakeholder inclusion (3-4), moderate research integration (4), variable market orientation (3-4)
- **Transformation approach:** Flexible, context-specific collaboration processes
- **Strengths:** Adaptability to changing conditions, stakeholder ownership
- **Challenges:** Less predictable outcomes, potential fragmentation

This typology provides a framework for understanding different transformation pathways and their characteristic success factors. Rather than prescribing a single "best" approach, it suggests that different transformation types may be appropriate depending on regional context, institutional environment, and targeted leverage points. The effectiveness of each type appears contingent on alignment with contextual conditions identified in our MLP analysis.

7.5 Synthesis of Cross-Cutting findings

Our comprehensive analysis across stakeholder engagement, leverage points, multi-level perspectives, and success factors reveals seven critical cross-cutting insights that collectively inform effective sustainable farming transitions:

Contextual Adaptation of Transformation Strategies

Across all analytical frameworks, the necessity for context-specific strategy adaptation emerged as a fundamental principle. The stakeholder engagement analysis revealed how methodological adaptations (e.g., Belgium's non-predefined VNM approach) significantly enhanced governance effectiveness. Similarly, our leverage points analysis demonstrated that strategies performing well in one regional context (e.g., market-based approaches in Greece scoring 3.6) often showed limited transferability to others. The MLP analysis further substantiated this finding by identifying distinct regional patterns in transition pathways, from Northwestern Europe's structured institutional approaches to Eastern Europe's innovative informal networks.

This contextual contingency extends to success factors, where the effectiveness of elements like "market orientation" varied significantly based on existing value chain structures and institutional conditions. The synthesis of these findings emphasizes that transformation pathways must be tailored to specific social, economic, and institutional contexts rather than applied as standardized formulas.

Power Dynamics in Multi-stakeholder Processes

A critical cross-cutting theme concerns how power dynamics shape transformation processes. Our stakeholder analysis identified significant variation in stakeholder diversity scores (from 1.6 in Greece to 3.8 in Italy) and revealed systematic gaps in representing certain stakeholder categories, particularly "bystanders" and marginalized groups. These power imbalances directly influenced which leverage points could be effectively targeted, with powerful actors often focusing interventions on parameters rather than deeper system design.

The MLP analysis further illuminated these dynamics by showing how actor positioning (e.g., Serbia's 65% niche actors versus Switzerland's 58% regime actors) shaped the available transition pathways. Cases with more balanced power distributions, like Germany (diversity 3.2, participation 4.0), demonstrated greater capacity to integrate multiple leverage points and engage both niche and regime actors (40% each) in transformation processes. These findings highlight that explicit attention to power asymmetries is essential for inclusive and effective sustainability transitions.

Integration of Multiple Knowledge Systems

The successful integration of scientific, practical, and traditional knowledge emerged as a critical enabler across analytical frameworks. High-performing cases in stakeholder engagement, such as Serbia (participation 4.8, co-creation 4.0), demonstrated effective knowledge integration through farmer-to-farmer learning and knowledge broker roles. This aligned with our leverage points finding that Intent-Feedback combinations (average score 3.40) were particularly effective when they facilitated knowledge flows between different system actors.

The MLP analysis identified "Knowledge Network Integration" as a distinct multi-level interaction pattern in cases like France and Switzerland, where networks of pilot farms effectively combined scientific and practical knowledge. Success factor evaluation showed that "research integration" (average 4.4) and "farm anchoring" (average 4.2) were among the highest-scoring factors across cases. Together, these findings emphasize that transformative strategies must create mechanisms for diverse knowledge systems to interact and inform practice.

Multi-level Governance Coordination

Effective coordination across governance levels emerged as a crucial factor in all analytical frameworks. The stakeholder analysis revealed that cases with strong multi-level coordination, such as Switzerland (participation 3.4, co-creation 3.4), achieved more coherent transformation strategies. Our leverage points findings showed that

strategies that successfully navigated multiple system levels, particularly those combining Parameter-Intent (3.75 average score), demonstrated the highest effectiveness.

The MLP analysis specifically identified "Multi-level Governance Coordination" as a key interaction pattern in cases like Switzerland and Hauts-de-France & Wallonia, enabling what Bünger & Schiller term "nested systems of implementation." Success factors like "clarity of aims" (average 4.1) were strongest in cases with coherent governance arrangements. These converging findings highlight that sustainable farming transitions require deliberate coordination mechanisms that align actions across local, regional, and national levels.

Narrative Framing and Strategic Communication

Strategic communication and narrative framing emerged as significant cross-cutting themes affecting transformation potential. Our stakeholder analysis showed that adaptation of communication approaches substantially influenced co-creation scores, with Germany (3.6) and Switzerland (3.4) demonstrating particularly effective framing. The leverage points analysis found that Intent-level strategies, which reshape system goals and narratives, were most effective when combined with more concrete Parameters or Feedback.

The MLP analysis highlighted how different framings influenced transition pathways—Germany's use of regional identity in pig farming created what Geels et al. describe as "symbiotic innovation," while Serbia's regenerative agriculture was framed through farmer influencers as knowledge brokers. These findings collectively emphasize that transformation strategies require careful narrative construction that resonates with diverse stakeholders' values and priorities.

Balancing Economic and Environmental Objectives

The integration of economic viability with environmental objectives emerged as a critical balancing act across frameworks. The stakeholder analysis showed that cases strongly focused on economic outcomes, such as Ireland, achieved medium participation (2.6) and co-creation (2.0) but struggled with experimentation (-0.8). Our leverage points analysis found that Parameter-Intent combinations (3.75 average score) were particularly effective when they aligned economic incentives with environmental goals.

The MLP analysis identified "Market-Led Transformation" as a distinct interaction pattern in Germany and Ireland, demonstrating how economic opportunity can drive environmental practice adoption. Among success factors, "market orientation" (average 3.8) scored consistently high across cases. These findings highlight that effective transformations must explicitly design economic viability into environmental strategies, creating what Riechers et al. call "hybrid market arrangements" that balance multiple objectives.

Timing and Sequencing of Interventions

The temporal dimension of transformations emerged as a crucial cross-cutting theme. Our stakeholder analysis revealed that cases with effective scheduling flexibility and phased approaches, such as Belgium, achieved stronger co-creation (2.8). The leverage points analysis found that the effectiveness of different leverage points varied across implementation phases, with Parameters often preceding Design or Intent interventions in successful cases.

The MLP analysis showed distinct temporal patterns across transition pathways—Market-Led Transformations demonstrated more rapid adoption curves but potentially superficial change, while Knowledge Network Integration approaches showed deeper practice changes but slower diffusion. Success factors like "planned longevity" (average 4.0) highlighted the importance of sustained engagement. These findings emphasize that transformation strategies require careful sequencing that builds capacity before technical implementation and creates reinforcing cycles between different intervention types.

Together, these seven cross-cutting insights provide a comprehensive foundation for designing effective sustainable farming transitions. They demonstrate that successful transformations require contextually adapted, power-aware approaches that integrate diverse knowledge systems, coordinate across governance levels, employ strategic communication, balance economic and environmental objectives, and carefully sequence interventions over time.

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These insights directly inform the "Optimal Leverage Point Strategy Model" presented in the subsequent discussion section.



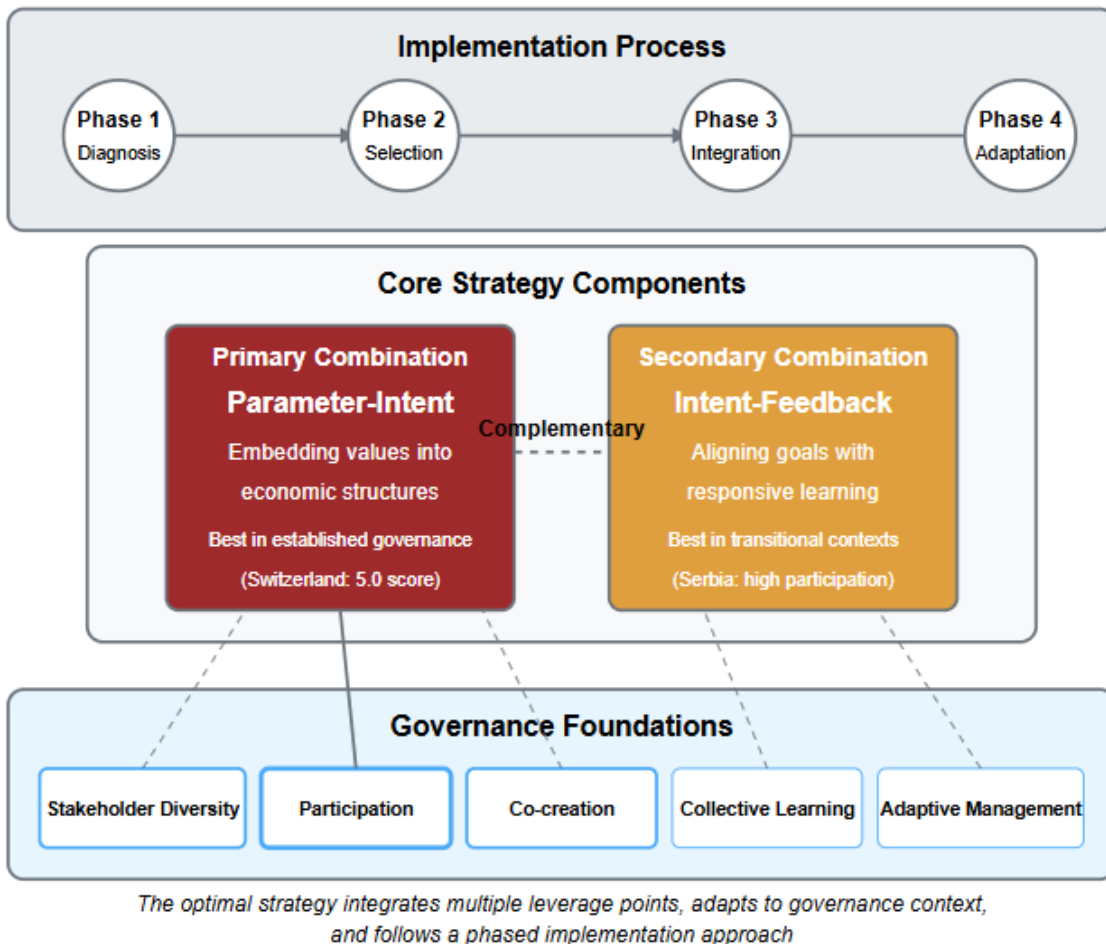
8 Discussion

8.1 Optimal Leverage Point Strategy Model

The Optimal Leverage Point Strategy Model synthesizes the seven cross-cutting insights identified in Section 5.4 into an integrated framework for sustainable farming transitions. Building on Meadows' (1999) hierarchy of system intervention points, our analysis of nine ENFASYS case studies demonstrates that certain combinations of leverage points—particularly Parameter-Intent and Intent-Feedback pairings—consistently outperform single-focus approaches across our nine case studies.

This model directly addresses the contextual adaptation needs identified in our findings, showing how different leverage point combinations can be tailored to specific regional and institutional contexts. As demonstrated in our stakeholder analysis (Section 5.1), the effectiveness of these combinations is significantly enhanced when implemented through reflexive governance processes characterized by high stakeholder diversity, participation, and co-creation.

Figure 16 Optimal leverage point strategy model. Based on analysis of 9 ENFASYS case studies across European agricultural contexts



The model integrates four key elements derived directly from our empirical findings:

1. **A four-phase sequential implementation process** (Diagnosis, Selection, Integration, Adaptation) addressing the critical "Timing and Sequencing of Interventions" theme identified in Section 5.4. This

process reflects successful implementation patterns observed in high-performing cases like Switzerland and Germany.

2. **Two complementary leverage point combinations** — Parameter-Intent (avg. score 3.75) and Intent-Feedback (avg. score 3.40) — as central elements, reflecting the consistently superior performance of these combinations across our leverage points analysis (Section 5.2.1).
3. **Five governance factors** with varying importance, derived from our stakeholder analysis (Section 5.1). The relative weight assigned to each factor corresponds to its correlation with transformation potential, with Participation showing the strongest relationship to effectiveness.
4. **Connecting elements** illustrating the synergistic effects of combined leverage points, visually representing the quantifiable performance improvements (average increase of 0.5 points) observed with multiple leverage point strategies in our analysis.

The model specifically integrates the power dynamics and knowledge system integration insights from Section 5.4, showing how different stakeholder configurations influence which leverage point combinations are most effective. It also addresses the economic-environmental balance through its emphasis on Parameter-Intent combinations, which our success factor analysis (Section 5.3) showed was critical for viable transformations.

8.1.1 Evidence for Combined Leverage Point Effectiveness

The model's central premise—that combinations of leverage points outperform single-focus approaches—is consistently validated across our dataset. As quantified in Section 5.2.1, multi-leverage point strategies achieved an average spillover score of 3.5, compared to 2.8 for single-focus approaches. This aligns with our finding that successful transformations require integrated approaches targeting multiple system dimensions simultaneously.

Parameter-Intent combinations achieved the highest average spillover score (3.75), exemplified by Switzerland's success in biodiversity promotion. The quality criteria embedded into financial incentives (Strategy F5, score 5.0) demonstrates how this combination integrates economic viability with environmental objectives—a critical balance identified in our cross-cutting findings (Section 5.4). This combination works by simultaneously addressing material constraints while reorienting system goals, creating reinforcing effects that connect structural change with transformative vision.

Intent-Feedback pairings (average score 3.40) proved particularly effective in transitional contexts like Serbia, where despite weak formal advisory infrastructure identified in our stakeholder analysis (Section 5.1.1), high participation scores (4.8) enabled successful implementation through informal knowledge networks. This confirms our cross-cutting finding about the importance of knowledge system integration, as these pairings establish strategic goals while creating adaptive information flows that allow for continuous learning—even when formal institutions are weak.

The effectiveness of these combinations also relates directly to the success factors identified in Section 5.3. Parameter-Intent combinations align with the strong predictors of transformation: market orientation ($r=0.82$), clarity of aims ($r=0.79$), and research integration ($r=0.74$), while Intent-Feedback combinations support stakeholder inclusion ($r=0.68$) and facilitate adaptive processes in varied governance contexts.

8.1.2 Governance Context as Implementation Foundation

Our stakeholder analysis (Section 5.1) revealed significant variation in governance capacity across cases, which directly influenced the effectiveness of leverage point strategies. As shown in Table 2, these governance contexts form a critical foundation for successful transformation strategies in several ways:

First, different governance profiles enable different leverage point combinations. Germany's positive scores for collective learning (0.6) and adaptive management (0.6) created the conditions for effective Design-Intent strategies focusing on regional branding. Conversely, in contexts with governance limitations like Greece (experimentation -0.8, collective learning -0.8), market-based Parameter strategies showed greater effectiveness by working within existing structures while gradually building capacity for deeper change.

Second, strong participation can compensate for other governance limitations. Serbia's exceptional participation score (4.8) enabled successful Intent-Feedback strategies despite weak formal advisory infrastructure (identified in Section 5.1.1), demonstrating how power dynamics can be creatively addressed through alternative engagement approaches—a key finding from our cross-cutting analysis in Section 5.4.

Third, complex governance challenges require specialized coordination mechanisms. The cross-border case of Hauts-de-France & Wallonia (diversity: 2.0, participation: 2.2, co-creation: 2.8) successfully implemented Parameter-Feedback strategies through explicit cross-jurisdictional coordination. This aligns with our multi-level governance finding (Section 5.4) that transformation strategies must coordinate actions across governance levels.

These findings connect directly to our success factor typology (Section 5.3.2), which identified distinct governance-oriented transformations in contexts like Switzerland and France & Wallonia, characterized by strong research integration and institutional alignments but lower market orientation than other approaches.

8.1.3 Multi-Level Transition Dynamics

The MLP analysis in Section 5.2.3 revealed distinctive transition pathways across our cases, with implications for how leverage point strategies connect actors across system levels. Our model integrates these findings by showing how different leverage point combinations facilitate specific transition pathways:

Parameter-Intent combinations proved most effective in reconfiguration pathways (4 of 9 cases), where regime actors adopt niche innovations while maintaining basic system architecture. Switzerland's biodiversity initiatives exemplify this dynamic, with quality-based financial incentives (Parameter) successfully embedding new environmental values (Intent) into existing economic structures. This allowed the movement of innovations from niche to regime level through what our MLP analysis termed "Multi-level Governance Coordination" (Table 3).

Intent-Feedback combinations showed particular strength in substitution contexts like Serbia, where regime structures were weaker, and the transition relied on what our MLP analysis identified as "Knowledge Network Integration" (Table 3). The farmer influencer approach engaged niche actors (65% of actors in Serbia, Table 2) effectively through feedback mechanisms that supported the spread of regenerative practices.

Design-Intent strategies proved valuable in transformation pathways, where regime actors respond to moderate pressure through internal adaptation. Germany's regional branding initiative (40% niche, 40% regime actors) exemplifies how strategic vision can be aligned with governance structures to facilitate what our MLP analysis called "Market-Led Transformation" (Table 3).

The distribution of transition pathways (Figure 8) and *actor configurations* (Table 2) in our MLP analysis explains why certain leverage point combinations perform better in specific contexts. In Northwestern European cases with stronger institutional environments and balanced actor distributions, Parameter-Intent combinations facilitated effective reconfiguration. In contexts with higher proportions of niche actors and weaker institutional structures, Intent-Feedback combinations supported more substitutive approaches.

These multi-level dynamics directly connect to the success factor typology developed in Section 5.3.2, with Market-Led Transformations (Type 1) corresponding to balanced actor distributions and Adaptive-Collaborative Transformations (Type 3) showing greater reliance on niche innovations.

8.1.4 Cross-cutting Implementation Factors

Building on the seven cross-cutting themes identified in Section 5.4, our model highlights five critical implementation factors that determine the success of leverage point strategies:

Contextual Adaptation emerged as foundational to effective implementation across all case studies. As shown in Table 1, the most successful strategies demonstrated strong alignment between leverage point focus and specific contextual characteristics: market-based strategies in Greece leveraged local market practices (spillover score 3.3), while governance-focused approaches in Switzerland built on strong federal-cantonal coordination. This contextual

contingency extends to success factors, where market orientation effectiveness varied significantly based on existing value chain structures (Section 5.3). Our model's four-phase implementation process explicitly incorporates this adaptation need through the Diagnosis and Selection phases.

Power-Aware Stakeholder Engagement fundamentally shapes which leverage point combinations can be effectively implemented. Our stakeholder analysis (Section 5.1.1) revealed how power imbalances directly influenced strategy effectiveness—cases with balanced stakeholder representation like Switzerland achieved more coherent transformation strategies. The structural gaps between policy actors and market stakeholders identified in Ireland and Greece limited experimentation capacity (-0.8 scores), while more balanced power distributions facilitated deeper system changes. Our model explicitly addresses this through the varied importance assigned to stakeholder diversity and participation.

Knowledge System Integration emerged as a critical enabler for both Parameter-Intent and Intent-Feedback combinations. The "farm anchoring" (mean 4.2) and "research integration" (mean 4.4) success factors (Section 5.3.1) correlated strongly with transformation potential, particularly when scientific and practical knowledge were effectively combined. Our model represents this through the Integration phase, where diverse knowledge sources are synthesized to increase leverage point effectiveness.

Multi-Level Coordination directly connects our leverage points and MLP findings. The MLP analysis identified distinct interaction patterns (Table 3) that enable innovations to move across system levels. Our model captures how Parameter-Intent combinations facilitate policies and practices that bridge niche-regime boundaries in contexts like Switzerland, while Intent-Feedback combinations create adaptive pathways in transition contexts like Serbia. The distribution of transition pathways (Figure 8) explains why certain leverage point combinations perform better in specific governance contexts.

Strategic Sequencing emerged as critical across all analyses. Our success factor analysis revealed "planned longevity" (mean 4.0) as a significant predictor of transformation potential (Section 5.3.1). The differing temporal patterns identified in our MLP analysis—rapid but potentially superficial changes in Market-Led approaches versus deeper but slower change in Knowledge Network Integration approaches—highlight the need for carefully sequenced interventions. Our model's Adaptation phase specifically addresses this need for continuous refinement based on implementation feedback.

8.1.5 Limitations and Boundary Conditions

Our comprehensive cross-case analysis revealed several important limitations and boundary conditions that constrain the applicability of the Optimal Leverage Point Strategy Model:

Governance Capacity Thresholds: While the model performs well across diverse European contexts with varying governance capacities, our evidence suggests minimum threshold requirements for effective implementation. In contexts with severely limited institutional infrastructure or extreme governance fragmentation, the synergistic effects of leverage point combinations may be undermined. Greece's negative scores in experimentation (-0.8) and collective learning (-0.8) demonstrate how governance limitations can restrict the effectiveness of otherwise well-designed strategies.

Economic-Environmental Balance Requirements: As identified in our cross-cutting findings (Section 5.4), leverage point strategies must explicitly address the balance between economic viability and environmental objectives. Greece's challenges with high transition costs demonstrate how even well-designed interventions may fail without economic support mechanisms. Conversely, successful cases like Switzerland integrated environmental criteria into financial incentives, while Ireland developed infrastructure enabling economic scaling of sustainable practices.

Power Dynamics Considerations: Our stakeholder analysis (Section 5.1.1) revealed how power imbalances can significantly impact strategy effectiveness. The model assumes that power dynamics can be effectively managed through participatory processes, but cases with extreme power asymmetries or entrenched opposition from powerful actors may require additional interventions beyond those captured in our framework.

Regional Transferability Limitations: The strong regional patterns identified in our MLP analysis (Section 5.2.3) suggest limitations in direct transferability between institutional contexts. While Parameter-Intent combinations proved highly effective in Northwestern European contexts with established regulatory frameworks, their effectiveness in Southern and Eastern European contexts was more variable and required significant adaptation.

Methodological and Scale Limitations: Several methodological aspects constrain the generalizability of our findings:

- *Scale of cases:* The ToCs developed in our case studies primarily focused on regional or sub-national scales, with limited exploration of national or transnational dynamics. This scale focus means our model may not fully capture transformation mechanisms operating at broader scales.
- *Sample limitations:* The relatively limited sample size (9 cases) and geographical concentration in Europe constrains the generalizability of specific numeric thresholds and pathway recommendations.
- *Cross-sectoral applicability:* Our cases predominantly examined crop and livestock production systems, with limited exploration of other agricultural subsectors like horticulture, forestry integration, or aquaculture.
- *Temporal limitations:* Our analysis provides an ex-ante assessment of transformation potential rather than empirically validated outcomes, necessitating longitudinal validation of the predicted effects.
- *Subjective elements:* Despite systematic application, our scoring methodology necessarily involves interpretive judgments about potential impacts that would benefit from multi-method validation.

Despite these limitations, the Optimal Leverage Point Strategy Model provides a robust, empirically grounded framework that integrates theoretical perspectives from systems thinking, behavioural science, and transition theory. It offers actionable guidance for designing sustainable farming transitions while acknowledging the need for contextual adaptation. The model's emphasis on combined leverage points, stakeholder participation, and reflexive governance creates multiple pathways for application even in challenging contexts.

9 Conclusions

This cross-case analysis represents the second major deliverable of Work Package 4, building upon the Methodological Brief (D4.1) that established the protocol for developing systems and behaviour-based Theories of Change. As we move toward the development of a validated European Landscape ToC (forthcoming D4.3), this analysis provides crucial insights into how transformation pathways manifest across diverse agricultural contexts and what factors determine their effectiveness.

Synthesis of Case-Level Theories of Change

Our cross-case analysis of nine ENFASYS case studies TOCs has yielded insights into the strategies, partnerships, and leverage points that can accelerate sustainable farming transitions from a systemic and behavioural perspective. These insights directly address the core objectives of Work Package 4:

1. **Identification of effective leverage point combinations:** Our analysis revealed that Parameter-Intent (average spillover score 3.75) and Intent-Feedback (3.40) combinations consistently outperform single-focus approaches. These strategic combinations effectively bridge structural changes with transformative vision, creating powerful dynamics for agricultural system change.
2. **Context-dependent transformation strategies:** Rather than identifying universal "best practices," our analysis demonstrated that effective strategies must be tailored to specific institutional, economic, and social contexts. The distinct patterns observed across Northwestern Europe (institutional coordination), Southern Europe (market integration), and Eastern Europe (informal networks) highlight the importance of contextual adaptation.
3. **Critical success factors for transformation:** Our evaluation identified market orientation ($r=0.82$), clarity of aims ($r=0.79$), and research integration ($r=0.74$) as the strongest predictors of transformation potential, providing clear guidance for intervention design.

Implications for Policy, Business, and Research Partners

The case-level Theories of Change analysed in this report offer concrete strategies for different stakeholder groups:

For policymakers: Our analysis identified 27 strategies involving the implementation of transformative policy instruments or public-private partnerships. Multi-level governance coordination emerged as particularly effective, especially in cases like Switzerland's biodiversity promotion and the cross-border collaboration between Hauts-de-France and Wallonia. Result-based payment systems and embedding quality criteria into financial incentives represent promising approaches when tailored to specific governance contexts.

For business actors: The 15 strategies incorporating collaborative business models highlight approaches like regional quality branding (Germany), cooperative infrastructure development (Ireland), and the development of secure and fair sale channels (Belgium). Our findings underscore the importance of balancing economic viability with environmental objectives, as evidenced by the strong correlation between market orientation and transformation potential.

For researchers and practitioners: The methodological innovations in stakeholder engagement and systems mapping provide valuable insights for future work. Switzerland's balanced approach to reflexive governance, Serbia's use of informal networks, and Germany's preparatory data integration offer methodological lessons that can be applied in diverse contexts.

Connection to Other WP4 Deliverables

This analysis builds upon the methodological foundation established in D4.1, which provided the framework for developing system and behavioural-based Theories of Change and the subsequent protocol for the development of systems and behavioural based Theories of change. The application of this protocol across nine diverse case studies has validated its effectiveness while also revealing important adaptations needed for different contexts.

DX.X: Title Deliverable

Looking forward, this cross-case analysis provides essential building blocks for the development of the European Landscape ToC (D4.3). The patterns we identified—particularly regarding regional variations, leverage point effectiveness, and success factors—will inform this broader European-scale synthesis. The consistent finding that Parameter-Intent and Intent-Feedback combinations outperform other approaches provides a starting point for identifying intervention pathways at the European level.

Specifically, the European Landscape ToC will draw upon:

1. The regional patterns identified in this analysis to develop a differentiated yet coherent European approach
2. The most effective leverage point combinations to design cross-cutting intervention strategies
3. The identified success factors to create enabling conditions for transformation

Contributions to WP5 and Beyond

The insights from this cross-case analysis provide a robust foundation for experimental design in WP5. The identified leverage point combinations, contextual factors, and success elements offer testable hypotheses about what makes transformation strategies effective. The systematic categorization of 73 distinct intervention strategies provides a rich toolkit for experimentation.

Additionally, this analysis contributes to other work packages by:

1. Providing evidence-based insights on policy mechanisms for WP6
2. Identifying promising business models and market approaches for WP7
3. Offering methodological reflections on stakeholder engagement that can inform future participatory processes

Limitations and Future Directions

While our analysis provides robust insights across diverse European contexts, several limitations should be acknowledged. The applicability of our findings may be constrained in settings with severely limited governance capacity or extreme market volatility. Additionally, our scoring methodology, while systematic, necessarily involves interpretive judgments that would benefit from longitudinal validation.

Future research should test the Optimal Leverage Point Strategy Model in additional contexts, particularly regions outside Europe, and validate the effectiveness of the identified leverage point combinations through longitudinal studies. As we develop the European Landscape ToC, we will also need to explore how these case-level insights can be effectively scaled to address system-wide challenges at the European level.

This cross-case analysis represents a significant step toward understanding how to accelerate sustainable farming transitions in Europe. By systematically identifying effective strategies, partnerships, and leverage points across diverse contexts, it provides both theoretical insights and practical guidance for the complex work of agricultural transformation.

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WP4: Develop systems and behavioral based TOCs to understand the potential impact of public and private interventions

T4.2.1 Step by step protocol for building the case study systems based and behavioural based TOCs



**Funded by
the European Union**



Project funded by
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
**State Secretariat for Education,
Research and Innovation SERI**

Document Information

Grant Agreement Number	101059589	Acronym	ENFASYS	
Full Title	ENcouraging Farmers towards sustainable farming Systems through policy and business Strategies			
Start Date	1 st Sep 2022	Duration	48 months	
Project URL	https://www.enfasysproject.eu/			
Milestone	Workshops to construct case-level TOCs			
Work Package	WP4 – Develop systems and behavioural based TOCs to understand the potential impact of public and private interventions			
Date of Delivery	Contractual	31 st March 2025	Actual	27 th March 2025
Nature	Protocol	Dissemination Level	Public	
Lead Beneficiary	MBS			
Responsible Author	Marija Roglic			
Contributions From	Louis Tessier, Divina Garcia Rodriguez, Domenico Dentoni			

Document History

Version	Issue Date	Stage	Description	Contributor
V0.1	26/04/2024	Draft	Feedback	Domenico Dentoni
V0.2	18/06/2024	Draft 2	Feedback	Domenico Dentoni
V0.3	26/06/2024	Draft 3	Feedback and interventions from other WP leads	Divina Garcia P. Rodriguez, Peter Feindt, Rebekka Frick, Elisabeth Stumvoll, Clementine Antier; Giovanna Ottaviani Aalmo
V0.4	31/07/2024	Draft 4	Restructuring, addressing comments from WP leads	Louis Tessier, Marija Roglic
V0.5	13/09/2024	Final	Updating to allow for more flexibility following the 1-1 CsC meetings, improving clarity and readability	Marija Roglic, Louis Tessier

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List of abbreviations

ToC – Theory of Change

CsC – Case study Coordinator

CLD – Causal Loop Diagram

VNM – Value Network Map

SFS - Sustainable Farming System



1 Executive summary

This protocol provides a comprehensive methodology for case study coordinators to develop community-embedded systems and behavioural-based Theories of Change (ToCs) through participatory systems mapping workshops. Its aim is to propose and describe transformation pathways that highlight leverage points and interventions, fostering sustainable farming systems within each case study.

The protocol outlines a process that integrates different types of system knowledge — Current (sensemaking), Target Knowledge (envisioning), and Transformation (strategizing the transition process) — to guide stakeholders through a structured transformation pathway. It builds upon insights from previous work packages to understand the current system, envision future states, and design strategic interventions.

The participatory systems mapping workshops follow a six-phase approach: **ORIENTATE** (ensuring a shared understanding of the system and the long-term goals), **PRIORITISE** (identifying key leverage points), **STRATEGIZE** (identifying and selecting strategic interventions to be implemented in the mid-term), **ACT** (identifying short-term actions to be taken by the participants as an interim body), **RECAST** (the identified action points in the form of a ToC diagram and narrative), and **EVALUATE & ENHANCE** (systemic impact evaluation leading to further revisions to improve effectiveness)

Throughout the process, case study coordinators are encouraged to uphold transparency and reflexivity. This involves reflecting on their subjectivity, assumptions, potential biases, and knowledge limitations. The protocol provides guidelines for effective stakeholder engagement and workshop facilitation.

The resulting ToCs will consist of three parts: (1) Evaluation of the System Transformation Potential (The Narrative), (2) Identification of Strategic Interventions on Leverage Points with the Highest Transformation Potential (The Map), and (3) Identification and Leveraging Collaboration Opportunities (The Action Plan). These components will guide stakeholders in achieving sustainable system transformations within their respective case studies.

The protocol integrates behavioural science insights with systems thinking, using tools such as Causal Loop Diagrams (CLDs) and Value Network Maps (VNMs) to visualize and analyse complex system dynamics. It emphasizes the concept of food system transformation as systems change, recognizing the need for fundamental shifts in system structures, processes, and interactions.

By providing a structured approach for developing ToCs that integrate systems thinking, behavioural insights, and participatory methods, this protocol contributes significantly to the broader ENFASYS project. The insights from the resulting ToCs will inform the development of policy mixes, business strategies, and consumer behaviour interventions that support the transition towards sustainable farming systems.

All deliverables, including workshop materials, system maps, survey responses, and a comprehensive final report, are to be submitted by October 30, 2024. This timeline ensures timely integration of the ToCs into the broader ENFASYS project objectives.



2 Introduction

ENFASYS aims to stimulate a just and fair transition to sustainable farming systems (SFS) by improving policies and business strategies to encourage farmers to change their production systems. This requires (i) developing a shared understanding of the current situation by taking into account the already identified behavioural and systemic factors at work (system knowledge), (ii) making explicit what constitutes the desired food system transformation (target knowledge), and (iii) identifying the necessary steps to achieve the desired sustainable food system, which may encompass already identified interventions from a business and a policy perspective that could drive this positive change.⁵

The purpose of this protocol is to provide a comprehensive, step-by-step guide for case study coordinators to develop community-embedded, systems-based Theories of Change (ToCs) within the ENFASYS project. It outlines an innovative approach that integrates systems thinking, behavioural science insights, and participatory methods to create robust transformation pathways towards sustainable farming systems.

The ToC is a critical tool that frames the transformation pathway in a participative way among project partners and stakeholders. It outlines the steps needed to achieve the desired long-term goal (Barbrook-Johnson & Penn, 2022), serving as a framework for planning, implementation, monitoring, and evaluation. This enables stakeholders to test and refine their assumptions about how change happens and to adapt their strategies accordingly. The ToC fosters a shared understanding among stakeholders about the project's objectives and the means to achieve them, thereby enhancing collaboration and strategic alignment (Dentoni and Roglic, 2024).

In ENFASYS, the case study ToCs are developed through participatory systems mapping workshops (Dentoni et al. 2023), utilizing tools such as Causal Loop Diagrams (CLDs) and Value Network Maps (VNMs) to visualize and analyse complex system dynamics. This approach emphasizes the concept of food system transformation as systems change, recognizing the need for fundamental shifts in system structures, processes, and interactions. The resulting

ToCs are structured in three parts:

1. **The narrative:** Evaluation of the system transformation potential
2. **The maps:** Identification of leverage points with the highest transformation potential
3. **The action plan:** Identification and leveraging of collaboration opportunities among system actors

The remainder of this document is organized into three main sections:

Section 2: Analytical Framework presents the conceptual foundations for building ToCs. It situates the ENFASYS approach within the broader context of ToC development, systems thinking, and participatory systems mapping. This section explains how ENFASYS integrates systemic and behavioural science insights, and conceptualizes food

⁵ Cfr. Grant Agreement Project: 101059589 — ENFASYS — HORIZON-CL6-2021-FARM2FORK-01:

“The need for systems- and behavioural based ToCs. A flexible methodology is required i) to integrate the scientific behavioural and systemic analysis, and ii) to mobilize practical knowledge of stakeholders as exploitable evidence-based solutions are needed to overcome lock-ins under these varying conditions. The discipline of systems thinking has always adopted such a transdisciplinary, holistic and problem-oriented approach (Mingers, 2015), and its methods have a long track-record of helping stakeholders grasp the complexity of “wicked problems” such as the development of SFS (Lönngren & Svanström, 2016). Yet, while systems-based methodologies are successful for problem definition, Wilkinson et al. (2020) note that these often fail to clearly suggest strategies for systems change. For this reason, Wilkinson et al. (2020) propose to enhance a proven method of strategy evaluation, namely Theory of Change (ToC), with the analytical power of systems thinking, by proposing a systems-based ToC methodology.” (p. 9-10)

“Progress beyond the state of the art in research for systems change through systems thinking. While the literature on the use of systems thinking and mapping to facilitate systems change is burgeoning also in the context of agricultural studies (Pigford et al. 2018; Lalani et al. 2021), there is little guidance for key change actors (incl. researchers, food system actors, policy makers) on how to collaboratively use these tools to accelerate farming systems change. ENFASYS ambition is to demonstrate the general applicability and effectiveness of a systems-based ToC methodology (Wilkinson et al., 2020) in understanding undesirable farming systems lock-ins based on empirical analyses across multiple cases (Fares et al., 2012, Labarthe, 2010), and developing innovative and exploitable strategies at multiple scales to enact systems change (Dentoni et al. (2017), De Herde et al., (2019)).” (p. 7)



system transformation as system change. This analytical framework provides the rationale for the methodology detailed in the subsequent section.

Section 3: Methodology describes in detail the step-by-step protocol for developing the case study ToC. It covers the preparation phase (3.1), including stakeholder engagement and material development; the execution phase (3.2), detailing the structure and facilitation of the ToC workshops; and the reporting phase (3.3), guiding the synthesis and presentation of the case study Theory of Change.

Section 4: Expected Outputs and Deadlines outlines the deliverables required from each case study, including workshop materials, system maps, reporting survey responses, and a comprehensive final report. It also specifies the submission deadline of October 30, 2024, ensuring timely integration of the ToCs into the broader ENFASYS project objectives.

By following this protocol, the ENFASYS project aims to develop comprehensive, participatory, and systems-based ToCs that drive transformation towards sustainable food systems within each case study. This innovative approach, combining systems thinking with behavioural insights and stakeholder engagement, positions ENFASYS at the forefront of efforts to understand and facilitate sustainable transitions in complex food systems.



3 Methodological background

To develop ToCs for the case-level we bring together the following key concepts:

- **Theory of Change:** is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It is more than just a roadmap of steps; it is a detailed explanation of the causal mechanisms by which specific activities and interventions are anticipated to produce a series of outcomes that contribute to achieving the final intended impacts.
- **Systems-based ToC:** This approach incorporates system maps and participatory systems mapping to provide a deeper understanding of complex systems (Wilkinson et al., 2021).
- **Integrating behavioural science & systemic insights:** exploiting the complementarity of behavioural science and food systems research approaches to understanding and changing decision-making
- **Systems change:** Defined by Roglic et al. (2023), systems change is a self-organizing and emergent process in which actors across different scales who purposefully modify their interactions and networks to bring about transformation.
- **Food System Transformation:** It represents a significant and desirable shift in how social, technical, and ecological systems interact (Ejderyan et al., 2023). This shift aims for a more sustainable future by changing how we think, relate and structure interactions within the world.

3.1 Theory of change: what is it? And what is it for?

A Theory of Change (ToC) is a structured description of how and why a desired change is expected to happen in a particular context. In the realm of sustainable farming systems, it's a planning and evaluation tool that maps out the **causal pathways** from interventions to outcomes. The ToC outlines short-term, intermediate, and long-term changes, articulating the mechanisms by which these outcomes are achieved. It incorporates systems thinking by identifying preconditions, resources, and external factors influencing outcomes, while acknowledging system complexities like feedback loops and non-linear relationships. By integrating diverse stakeholder perspectives and allowing for adaptive management, the ToC serves as a flexible framework for planning, implementing, and evaluating interventions aimed at promoting sustainable farming systems. (Dentoni et al., 2023; Mayne & Johnson, 2015).

To illustrate what causal pathways COULD look like in ENFASYS, NIBIO proposed some examples based on their analyses conducted in the framework of T2.2.

Examples of Causal Pathways and Interventions (based on preliminary task 2.2 results)

Case Study	Key Variables	Short-term Outcomes	Mid-term Outcomes	Long-term Outcomes
AECM France	Rate of AECM adoption, financial incentives, compliance costs, environmental awareness	Enhanced capacity and effectiveness of advisory services	Broader adoption of AECM practices across farming communities	Improved environmental quality, better compliance with climate regulations, increased farm profitability
Regenerative Agriculture in Serbia	Financial subsidies, knowledge and expertise supply, youth in farming	Increased awareness and knowledge of regenerative practices among farmers	Higher rates of adoption and implementation of RA techniques	Improved soil health, increased biodiversity, enhanced resilience of agricultural systems
Sustainable Pig Farming in Germany	Policy requirements, farmer proposals and adoption practices, regional feed production, animal welfare systems, value chain development	Increased awareness and compliance with animal welfare standards	Development of regional feed production systems, enhanced market access	Improved animal welfare, reduced environmental impact, increased consumer trust in sustainable pig farming practices
Direct Selling and Short Supply Chains in Slovenia	Market access, financial incentives, administrative burdens, consumer demand	Simplified fiscal and administrative processes	Increased market access and direct selling opportunities for small-scale farmers	Strengthened local food systems, reduced carbon footprint, improved farmer livelihoods

Case Study	Key Variables	Short-term Outcomes	Mid-term Outcomes	Long-term Outcomes
CSA in Italy	Rate of CSA adoption, cultivated land area, annual land rent cost, membership fees, market demand for organic products	Increased engagement and participation in CSA initiatives	Expansion of CSA networks, improved market access for CSA products	Enhanced community resilience, improved local food security, sustainable farming practices

In ENFASYS, the ToC serves as a multifaceted tool for planning, implementation, monitoring, and evaluation. It enables stakeholders to develop and refine strategies, test assumptions about change processes, and adapt approaches as needed. The ToC fosters collaboration by creating a shared understanding of project objectives and methods among diverse stakeholders. It grounds interventions in a comprehensive understanding of social, economic, and environmental contexts, while clearly articulating intended outcomes and the mechanisms to achieve them. By incorporating systems thinking, the ToC identifies crucial preconditions, resources, and external factors influencing outcomes. This approach allows ENFASYS to address key questions such as what stakeholders can do now, what can be achieved in 5 years, and where the project aims to go in the future, thereby enhancing strategic alignment and effective intervention in sustainable farming systems (Dentoni and Roglic, 2024).

The ENFASYS case study Theory of Change (ToC) aims to create a transformation pathway that identifies and specific **leverage points** and **interventions** to foster sustainable farming systems.

- **Leverage points** are strategic areas within a system where small changes can lead to significant effects, influencing the overall system behaviour (Rocha et al., 2019; Dentoni & Roglic, 2024). The focus is on identifying where to apply pressure to achieve a system-wide impact. Leverage points are key to initiating observable shifts that can lead to system transformation or tipping points (Dentoni et al., 2023).
- **Interventions** are specific actions implemented to bring about change within a system, either through behavioural shifts or systemic alterations (Ejderyan et al., 2023), their focus is to target specific actors or system components to induce change, addressing deficiencies and promoting alternative mechanisms for sustainable practices.

3.2 Systems-based Theories of Change

Traditional Theory of Change approaches are, however, criticized for being too linear, failing to take into account the realities of complexity, which include unexpected feedback-loops and events (Wilkinson et al., 2020), and also insufficiently allowing the divergent perspectives and narratives that typically arise around such ‘wicked problems. For this reason, Wilkinson et al. (2020) propose to enhance this proven method of strategy evaluation, with the analytical power of systems thinking, by proposing a **systems-based ToC** methodology, which in essence means applying a participatory systems mapping approach to build theories of change. This means

4. adopting a systems thinking perspective to understand complexity and systems change.
5. using tools to visualize systems and systems change.
6. AND developing this understanding in a participatory setting

By adopting a systems-based approach, interventions are strategically guided to integrate **systems thinking** from the outset and it complements traditional ToC frameworks by providing a deeper understanding of the system's complexity and the interconnections between its various elements, and to identify leverage points and interventions to enable systems change, with **systems change** being defined by Roglic et al. (2023) as a self-organizing and emergent process in which actors across different scales purposefully modify their interactions and networks to bring about transformation.

A systems-based approach is particularly valuable for complex interventions where the pathways to impact are not straightforward, requiring a nuanced understanding of the dynamic interplay between various factors and actors that influence the change process. **Systems mapping tools** are particularly helpful in that process. In ENFASYS

specifically, we build upon the **causal loop diagrams** (CLDs) that highlight major drivers influencing the system, and **value network maps** that highlight the major actors and relationships influencing the system.

Following the approach outlined by Wilkinson et al. (2021), we use **participatory systems mapping** to build a systems-based Theory of Change. This involves engaging stakeholders to collectively map the complex relationships and dynamics within the system, thereby developing a shared understanding of the current state and identifying potential leverage points for intervention. This process also involves incorporating each relevant stakeholder's interests, motivations, values, and beliefs to have a broader and more adequate understanding of the complex reality. Aside from the knowledge-related outcomes, participatory methods have an important role in fostering collective agency through the process of recognition (Pereira et al., 2018).

3.3 Integrating behavioral science insights

In ENFASYS, we consider agri-food systems to be composed of two fundamental types of factors that drive farmer decision-making in relation to sustainable farming systems: systemic and behavioural factors (Ejderyan et al., 2023). The latter are centred around individual decision-making based on human behaviour, whereas the former deal with underlying structures. ENFASYS has studied both the behavioural and systemic dimensions to understand current and changing behaviour, yet has so far not sought to integrate these perspectives in practice. Our (tentative) approach assumes a social ontology associated with (critical realist) Social Practice Theory.

This means that the ENFASYS case study Theory of Change (ToC) is grounding its understanding of social reality in Social Practice Theory, which views social phenomena as arising from practices - routinized types of behaviour consisting of interconnected elements like walking, thinking, things and their use, background knowledge etc. The "critical realist" qualifier means that we assert that there is an objective reality, but that our understanding of it is shaped by social conditions (Danermark et al., 2019). However, in order to bridge behavioural science (focused on individual decision making) and sociology (focused on social structures and processes), we use system dynamics as suggested by Lane & Rouwette (2023) to integrate behaviour science and sociology through the language of a system dynamic framework as presented in the figure below.

Social Practice Theory aims at explaining 'why people do what they do', by noting that behaviours are driven by beliefs, values, lifestyles and tastes that express personal choice, which is very near to a behavioural science approach, while still remaining a systemic approach, by suggesting that this human action is constrained or enabled by social systems, but also that human action and social structure are mutually co-constructed.

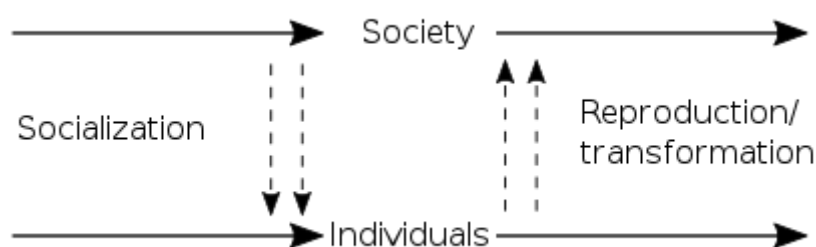


Figure 17 Social structure and agency according to the transformational model of critical realism (Danermark et al., 2019, p. 80)

Behavioural scientists (Lane & Rouwette, 2023) have come to terms with the idea that behaviour is not a series of isolated linear decision timeframes. Instead, individuals have to reckon with the outcomes, intended or not, of past decisions and also tend to take into account these outcomes in future decisions. Consequently, more recursive, dynamic models of decision-making are being put forward in the behavioural sciences as well (Figure 17) (Ejderyan et al., 2023).

The framework illustrated in the figure (Lane & Rouwette, 2023) provides a crucial bridge between systemic and behavioural approaches. It shows how individual behaviours, decision-making processes, and cognitive biases (represented in the 'Behavioural effects' box) interact with and influence the broader system dynamics. Specifically:

5. The 'System structure' influences individual behaviours and decisions through various feedback loops and systemic pressures.
6. These behaviours and decisions, in turn, shape the 'System behaviour' over time.
7. The 'Behavioural effects' box shows how cognitive processes and biases mediate between system structure and individual actions.
8. The 'Mental models' component illustrates how individuals' understanding of the system influences their decisions and is, in turn, updated based on observed system behaviour.

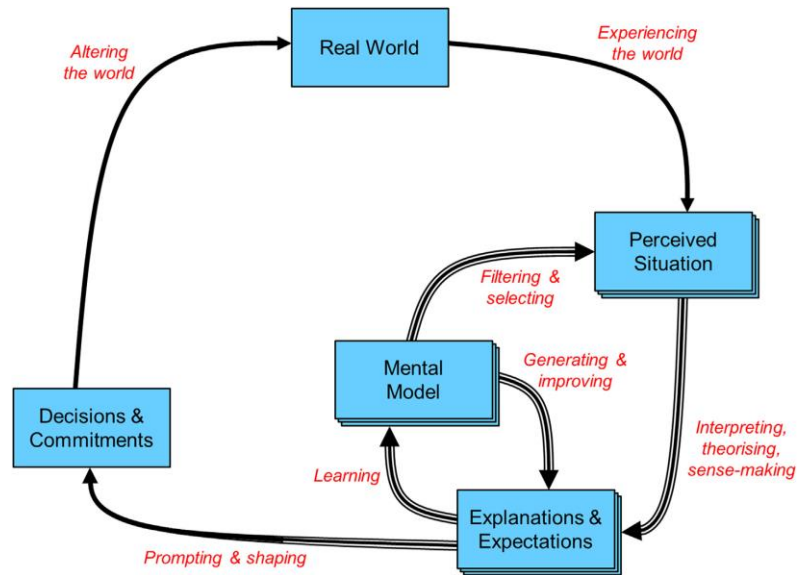


Figure 18 Framework illustrating the location and role of behavioural effects relevant to system dynamics (adapted from Lane & Rouwette, 2023)

In ENFASYS, we will apply this framework by:

- Mapping farmer decision-making processes onto our systemic models of agricultural practices.
- Considering how farmers' mental models of sustainable agriculture influence their choices and how these models evolve over time.
- Identifying key behavioural effects (such as loss aversion or status quo bias) that may influence adoption of sustainable farming practices.
- Designing interventions that address both systemic barriers and individual behavioural factors.

By integrating this dynamic, recursive model of decision-making with our systemic approach, ENFASYS aims to develop more comprehensive and effective strategies for promoting sustainable farming systems, acknowledging the complex interplay between individual behaviours and broader system dynamics.

3.4 Theories of Change for Food System Transformation

The ultimate goal of the ENFASYS Theory of Change is to bring about transformative change by tackling the root causes of systemic issues rather than merely addressing their symptoms. **Transformation understood as systems change** refers then to a profound and radical reconfiguration of a system's underlying structure, often in response to complex challenges or in pursuit of a more sustainable future state. This transformation involves a redistribution of rights, responsibilities, and visions of development across society, driven by social movements and civil society (Dentoni et al. 2017; Weber et al. 2020; Young et al. 2022):

Transformation within a Theory of Change (ToC) encompasses several interconnected aspects:

7. **Systemic Reconfiguration:** Transformation involves fundamental shifts in system structures, processes, and interactions, integrating both social and technological innovations (Geels et al., 2017). This includes changes in technological artifacts and social practices, often requiring adjustments to institutional structures and underlying assumptions (Alijani & Wintjes, 2017; Howaldt et al., 2016)
8. **Multi-Level and Multi-Dimensional Change:** Transformation occurs across personal, relational, structural, and cultural levels, recognizing the interconnectedness of these dimensions (Köhler et al., 2019). It also spans multiple spatial scales, from local to global, with changes at one level potentially triggering shifts at others (Jessop et al., 2008).
9. **Sustainability-Oriented:** The goal is to create more sustainable pathways across various system dimensions, such as food production, distribution, and consumption. This involves setting and tracking specific impact indicators, like adoption rates of sustainable practices or improvements in biodiversity metrics (Weber et al., 2020).
10. **Participatory and Contested Process:** Transformation requires active engagement from diverse stakeholders, including civil society and marginalized groups. It involves negotiating conflicting visions and navigating power dynamics to achieve equitable and sustainable outcomes (Young et al., 2022).
11. **Innovation-Driven and Cumulative:** While transformation can involve radical shifts, it often progresses through cumulative adjustments that gradually reconfigure the system. Both social and technological innovations play crucial roles in challenging existing norms and practices (Klerkx & Rose, 2020).
12. **Agency and Deliberation:** The role of human agency is emphasized, with social movements and civil society driving change through deliberate actions and negotiations within socio-technical-ecological systems (Dentoni et al., 2017).

This integrated approach to transformation acknowledges the complex, dynamic nature of change in systems like agriculture and food, emphasizing the need for holistic, adaptive strategies in developing effective Theories of Change.

4 Description of the methodology

This section outlines the specific methods used to facilitate the participatory systems mapping workshops, engage stakeholders, and analyse the resulting data to identify leverage points and design effective interventions. By following this approach, we aim to develop a robust and actionable ToC that can guide the transformation towards sustainable farming systems in each case study.

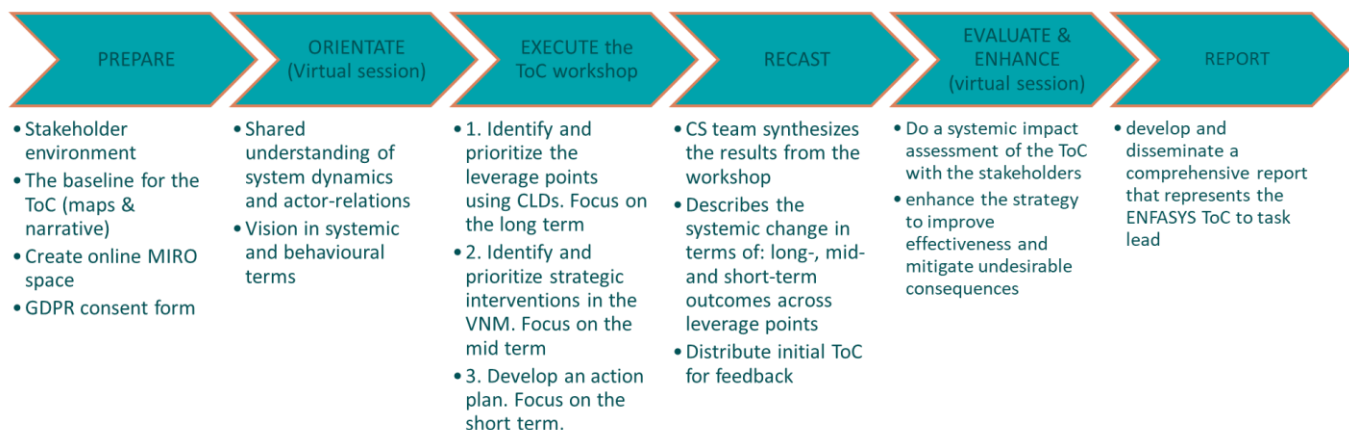


Figure 19 Overview of the work of CsC for community-embedded systems and behavioural TOCs

These steps are described in three parts

PART 1 – PREPARE the material

- **Ensure Transparency and Reflexivity**
- **Consolidate the gathered evidence in a narrative:**
- **Create a conducive stakeholder environment:** Create a conducive environment for stakeholder engagement, ensuring diversity and representation.
- **Develop Workshop Materials and Tools:** Develop suitable materials such as CLDs and value network maps (VNMs) to facilitate discussions and mapping.

PART 2 – EXECUTE the ToC workshop

A. Virtual SESSION (2 hours):

ORIENTATE Phase (Online workshop, plenary session):

- Review and validate CLDs and VNMs as a group
- Specify the desired long-term outcomes in behavioural and systemic terms

B. MAIN WORKSHOP (preferably in person, 3,5 hours including one break):

Welcome (30 min):

- Present workshop objectives, and agenda.
- Review outcomes from virtual ORIENTATE session

PRIORITIZE Phase (45 min):

- Brief plenary to review pre-workshop inputs (5 min).
- Small group work to identify and refine leverage points (25 min).
- Group presentations & Plenary discussion to prioritize leverage points (25 min).

Break (15 min)

STRATEGIZE phase– (45 min):

- Small groups identify strategic interventions for prioritized leverage points (25 min)
- Groups present interventions, plenary discussion to refine and prioritize (20 minutes)

ACT phase (45 min):

- Small groups define short-term actions for top priority interventions. (25 min)
- **Brief plenary to share and align on key actions** (25 min)

Wrap-up and next steps (15 min):

C. RECAST phase (2 days of CSC preparation):

- CSC team integrates workshop outcomes with preparatory materials to produce a comprehensive draft ToC.
- Develop visual representations and summary of key changes for stakeholder review.

D. Asynchronous EVALUATE & ENHANCE process (1 week):

- Distribute comprehensive questionnaires covering ToC evaluation, systemic impact assessment, and strategy enhancement.
- Analyse responses, update ToC, and share revised materials with participants for final feedback.

PART 3 – REPORT

- Present a comprehensive report that represents the ENFASYS ToC for dissemination to the workshop participants written in the local language.
- Distribute the report to the workshop participants

4.1 STEP 1 – PREPARE

Objective: To synthesize existing work, gain a comprehensive understanding of the multi-stakeholder environment, and prepare for the Theory of Change (ToC) workshop in a reflexive and transparent manner.

Expected outputs:

1. Reflexivity and Transparency Report
 - Account of the recruitment process of the stakeholders for the ToC
 - Reflection on potential biases in participant selection and presentation framing
2. Comprehensive Narrative
 - Synthesis of system knowledge, target knowledge, and transformational knowledge
 - PowerPoint presentation for workshop
3. Consolidated Results from Previous Phases
 - Causal Loop Diagrams
 - Value Network Maps

- List of farmer target behaviours
- Behavioural interventions and farmer readiness assessment
- Policy goals, instruments, and congruence analysis
- Business workshop vision statement and potential business models
- 4. Workshop Preparation Materials
 - Informed consent forms
 - Summary document of key results (in local language)
 - Pre-workshop engagement materials (e.g., online training module, survey)
- 5. Stakeholder Engagement Plan
 - List of invited participants with rationale for selection
 - Engagement strategy for diverse stakeholder groups

In the following subchapters we are detailing the key components of this phase. Consider each component as a step in the process.

4.1.1 Transparency and Reflexivity

As Case Study Coordinators (CsCs), it is crucial to be mindful of your role in the development of Theories of Change (ToCs). This chapter provides guidelines on how to reflect on and document your subjective choices, the presentation of research results, and the assumptions underlying the ToC. Transparency in these processes is essential for the credibility and utility of the ToCs.

Subjectivity in Participant Selection

Importance of Participant Selection:

- Ensure diversity and representation among workshop participants, including farmers, consumers, policymakers, and business leaders.
- This diversity is crucial for capturing different perspectives and knowledge bases.

Subjectivity in Selection:

- Reflect on potential biases influencing participant selection.
- Document selection criteria and rationale.

Guiding Literature:

- Participatory Processes: Dentoni & Roglic, 2024; Biggs et al., 2010; Westley et al., 2011.

Presentation objectives and framing

Transparency:

- Clearly explain the objectives of presenting research results.
- Emphasize informing participants about the current system state and preliminary findings.

Objective Framing:

- Ensure objective presentation without biasing participants.
- Encourage open discussion and critical reflection.

Guiding Literature:

- Systems Mapping: Dentoni & Roglic, 2023.

Assumptions and Knowledge Transparency

Assumption Listing:

- List and explain assumptions underlying the ToC.
- Reflect on CsCs' role in influencing the development process.
- Be open about limitations and uncertainties.

Reflective Practice:

- Encourage CsCs to reflect on their knowledge and its influence on the ToC.

Guiding Literature:

- Systems Thinking: Senge et al., 2015.

Supervision and Intravisions

Supervision Reflection:

- Reflect on supervision's role in guiding the ToC development.
- Ensure the process remains objective, inclusive, and transparent.

Intravisions:

- Foster critical reflection among team members on practices and assumptions.
- Identify biases and improve ToC quality.

Guiding Literature:

- Reflective Practice: Dentoni et al., 2022.

Acknowledging Participant Knowledge

Valuing Participant Knowledge:

- Recognize and integrate local, experiential, and tacit knowledge.
- Encourage knowledge co-creation and active participant contribution.

Guiding Literature:

- Participatory Methods: Pereira et al., 2018.

4.1.2 Consolidate the gathered evidence in a narrative

Taking stock

This stage involves taking stock of the three different types of (tentative) knowledge so far generated in the different case-level activities coordinated by different WP and task leaders: namely System Knowledge, Target Knowledge, and Transformational Knowledge.

System knowledge: This involves synthesizing insights from prior work to understand the current state of the system effectively. Key inputs include

- The stakeholder ecosystem, Value Network maps (2.1)
- Causal Loop Diagrams (2.2)
- Assessment of existing policy environment in relation to identified barriers (6.1)
- Existing business models (2.1 & 7.1)

Target knowledge: Desired future state/outcomes that the case study Theory of Change (ToC) aims to achieve Key inputs include

- Actor perspectives on Overall CS Goal (2.1)
- Boundaries and aims of the system (2.2)
- Target farmer behaviour(s) & associated outcomes (3.1)
- SMART Goals of policy mix supporting overall CS Goal (6.1)
- Aims of potential business models & strategies supporting CS Goal (7.1)

Transformational knowledge: This involves preliminary insights on how, where and by whom to intervene in the present system to support systems change towards the desired outcomes of the case study. Key activities include

- Feasible, effective and acceptable interventions targeted at farmers supporting overall CS Goal (3.1 & 3.2)
- Behavioural factors related to the readiness of farmers towards certain interventions (3.2)
- List of food purchase motivators and policy aspects to be surveyed in consumer survey (3.3)
- List of policies to be surveyed for acceptability in consumer survey (3.3)
- List of food purchase motivators, policy aspects, policy interventions, and behaviours to be surveyed in the citizen-consumer survey (3.3)
- Policy mix supporting overall CS Goal (6.1)
- Potential business models supporting CS Goal (7.1)
- End-markets for SFS products supporting CS Goal

Preparation of the Narrative

Develop a comprehensive narrative using a PowerPoint presentation that:

1. Outlines the case study initiative:
 - Envisioned system change
 - Societal relevance
 - Practical implications of the transformation
2. Presents the co-creation process:
 - Overview of CS activities (interviews, workshops, events, etc.)
3. Summarizes current knowledge:
 - System actors, relations, dynamics, and barriers
 - Potential solutions (Behavioural interventions, Policy Instruments & Goals, Business solutions)
4. Defines workshop purpose and outcomes:
 - Short-Term: Enhanced stakeholder engagement and initial interventions
 - Mid-Term: Development of sustainable practices and policy recommendations
 - Long-Term: Achievement of a sustainable, resilient farming system

Frame this narrative as a starting point for co-creation, not as definitive scientific fact. Use the provided PowerPoint template (4.2.1 Case study ToC workshop TEMPLATE.pptx) for guidance on structuring the presentation and workshop steps.

4.1.3 Create a conducive stakeholder environment

Objective: To engage a diverse set of stakeholders with influence and interest in the transformation under consideration.

Key Considerations:

- a) **Stakeholder Composition:**
 - Aim for 12-15 participants (minimum 5)
 - Prioritize quality of participation and representation over strict adherence to numbers
- b) **Stakeholder Selection:**
 - Utilize the stakeholder engagement assessment from task 9.3
 - Consider participants from previous tasks (2.1, 2.2, 3.1, 3.2, 6.1, and 7.1)
- c) **Engagement Strategy:**
 - Develop a tailored approach for different stakeholder groups
 - Reference the MA-protocol for engagement tactics
 - Consider stakeholders' interests, concerns, and responsibilities
- d) **Workshop Structure:**
 - ORIENTATE: All participants together
 - PRIORITIZE: Mixed groups, all timeframes
 - STRATEGIZE: Leverage point-specific groups
 - ACT: Focus within leverage point groups
 - RECAST and EVALUATE & ENHANCE: Mixed small groups for integration

Support: If facing challenges with stakeholder engagement, contact the MAA team:

- lies.messely@ilvo.vlaanderen.be
- i_kaliva@c-gaia.gr

4.1.4 Develop Workshop Materials and Tools

Objective: To prepare comprehensive materials that synthesize previous work and facilitate effective workshop participation.

Key Materials:

1. **Informed Consent Forms**
 - Use template available on Teams
2. **PowerPoint Presentation**
 - Use template on Teams
 - Include narrative as outlined in previous section
3. **Structured Document in Local Language** Summarize results from previous phases, including:
 - a) Causal Loop Diagram (2.2)
 - Reproduce the CLD in Miro (cfr. <https://miro.com/miroverse/casual-loop-diagram/>)
 - Include narrative explaining relationships
 - Ensure clear translation
 - b) Value Network Map (2.1)
 - Follow formatting instructions from 2.1 data collection protocol
 - Ensure clear translation
 - c) Behavioural Workshop Results (3.1)
 - Table of farmer target behaviours and implementation degree

Target Farmer Behaviours	Degree of implementation

- Table of behavioural readiness towards interventions (as per provided format)

Intervention name	RESE T TYPE	Intervention source	FEASIBILITY (3.1)	ACCEPTIBILITY (3.1)	EFFECTIVE NESS (3.1)	EFFECTIVE NESS according to Farmers (3.2)	ACCEPTIBILITY according to Farmers (3.2)
Intervention 1	Regulation/ Education/ Social norms/ Economic Incentives/ Tools	Government Agency X, Farmer Advisers, Farmer Cooperative, ...	High/ Moderate/ Low	High/ Moderate/ Low	% farmers that ranked intervention as 1 st , % farmers that ranked intervention as 2 nd , ...	X% Effective, Y% Neutral, Z% Counter-productive	X% Acceptable, Y% Neutral, Z% Unacceptable
...							
Intervention N							

d) Consumer survey Information (3.3)

- List of food purchase motivators to be surveyed in citizen-consumer survey (3.3)

The price of the product
The taste of the product
I am familiar with product
It is of high quality
It is convenient to purchase
It is produced to a high animal welfare standard
It is produced without exploitation of people
It is produced in an environmentally friendly way
It is nutritious
It is produced locally
It is in season

- List of policy aspects to be surveyed for support in citizen-consumer survey (3.3)

Reducing nutrient surpluses
Reducing greenhouse gas emissions
Reducing plant protection products
Promoting species richness/biodiversity
Increasing animal welfare

Increasing domestic food production
Reducing food prices
Ensuring an adequate income for farmers

- List of policy interventions to be surveyed for support in citizen-consumer survey (3.3)

Policy interventions & Description	RESET-type
Policy Goal 1	
...	
Policy Goal 2	

- List of consumer behaviours to be surveyed in citizen-consumer survey (3.3)

Buy locally sourced foods
Buy foods that are in season
Examples of certified products
Buy fairtrade certified products (S)
Buy Rainforest Alliance certified products (EV)
Buy Animal Welfare certified products (EV)
Buy organic certified products (EV)
Sample of items from Polzin
Buy mostly whole fruits, vegetables, grains, nuts, and beans (N)
Avoid most highly processed foods that have empty calories (N)
Buy a diversity of foods with many different fats, proteins, vitamins, etc. (N)
Avoid buying too much food and creating food waste (EV)
Buy foods with lower land, water, and greenhouse gas footprints (EV)
Avoid highly packaged foods and single-use plastics (EV)
Buy food that is produced humanely for both animals and workers (S)
Avoid food businesses that are unfair or exploitative in their practices (S)
Buy food that fits my cultural or customary diet (S)
Buy food that is affordable and fits my budget (E)
Buy food from stores and restaurants where I have lots of options (E)
Buy food whenever and wherever I want it (E)

- List of citizen behaviours to be surveyed in citizen-consumer survey (3.3)

(Public1)	Contact your local representatives about the need to transition towards sustainable food systems
(Public2)	Sign a petition or start one and share it
(Public3)	Donate money or time to groups that advocate for more sustainable foods
(Public4)	Check food policies of political candidates & vote accordingly

(Public5)	Participate in groups that help promote sustainable foods at a local level
(Private1)	Eat less red meat. Choose plant-based options or meat with lower emissions (e.g. chicken)
(Private2)	Choose alternates to dairy
(Private3)	Reduce food waste
(Private4)	Compost food waste (e.g. in private garden or community composting hub)
(Private)	Eat more locally produced foods
(Private)	Avoid food businesses which exploit people

e) Policy Co-design Workshop Results (6.1):

- o Table of policy goals with short description

Policy Mix Goal	Description
Policy Goal 1	
...	
Policy Goal 2	

- o Table of policy instruments and involved actors

Policy Name & Description	Actors involved
Policy Instrument 1	
Description	
...	
Policy Instrument 10	
Description	

- o Policy congruence matrix showing the estimated effects (+/~/-) of the identified policies instruments with the identified policy goals,

Policy Name	GOAL 1	GOAL 2	GOAL 3	GOAL 4	GOAL 5
Policy Instrument 1	+/?/-	+/?/-	+/?/-	+/?/-	+/?/-
...					
Policy Instrument 10	+/?/-	+/?/-	+/?/-	+/?/-	+/?/-

f) Business Co-design Workshop Results (7.1)

- Vision statement related to CS Goal & Lock-ins
- Table of potential business models (as per provided format)

Business model name	Description	Level of implementation	Actors involved	End-markets	Barriers	Opportunities
BM 1						
...						
BM N						

Format and Presentation:

- Ensure all materials are well-structured and clearly presented
- Translate all necessary documents into the local language
- Use provided table formats for consistency

Additional Notes:

- Update consumer survey information (3.3) once finalized

4.1.5 Pre-Workshop Engagement

Objective: To prepare participants for the Theory of Change (ToC) workshop:

1. Distribute materials in advance:
 - Informed consent form
 - Document summarizing previous phase results
 - Brief overview of ToC concepts and workshop objectives (1-2 pages)
2. Provide access to an online platform:
 - Present workshop materials
 - Include reflection questions from the ORIENTATION PHASE
3. Encourage preliminary engagement:
 - Ask participants to review materials
 - Invite optional feedback or questions before the workshop

4.2 STEP 2 – EXECUTE the ToC workshops

4.2.1 Virtual ORIENTATE Session: Developing a Shared Understanding

Duration: 2 hours

Objective: develop a shared understanding among the participants of the key current system dynamics and actor-relations, along with specifying the long-term outcomes in terms of target variables and behaviours.

Rationale: Whereas CLDs have been validated previously within the framework of WP2, Wilkinson et al. (2021) found that when participants are introduced to system diagrams developed by a different group, it's likely that the completeness or accuracy is going to be challenged. In the context of participatory systems mapping, such criticisms are valuable, as these maps are taken as 'hermeneutic enablers' (cfr. Jackson, 2001), i.e. tools that allow stakeholders to develop a shared understanding of complex phenomena and coordinate collective action towards a shared purpose.

By inviting the participants to further validate the map by proposing constructive changes, you allow the participants to make the map their own, which is crucial for subsequent steps.

Expected outputs:

- Print-screen of online workspace before workshop (.png)
- Print-screen of online workspace after workshop (.png)
- Video/Audio recording (.mp3, .mp4)
- Presentation used in virtual workshop (local language) (.pptx)
- List of changes made to the CLD in the process: (reporting survey)
 - Added, removed or renamed variables
 - Added, removed or changed relations
- List of changes made to the VNM in the process: (reporting survey)
 - Added, removed or renamed actors
 - Added, removed or renamed relations
- Narrative describing the envisioned long-term outcomes (reporting survey)
- List of the target variable(s) included in the CLD (reporting survey)
- List of the target consumer and/or farmer behaviours (reporting survey)
- Summary of the discussions at the different steps (reporting survey)
- Observations on the validation process (reporting survey)

Materials used:

- CS Narrative
- CLD
- VNM
- List of target farmer behaviours identified in the framework of WP3
- SMART-GOALS from the Policy Workshops
- AMBITION, EXPECTATIONS & VISION of Business Workshops

Note 1: To shorten this step, CSC could consider sharing access earlier to the online environment in which the CLD and VNM are presented, along with the accompanying questions. This allows participants to review the materials on a time preferable to them, and at their own pace. Even so, it is **crucial to create a shared moment with the group** in which the proposed revisions are discussed before moving to the next phase. This could entail a short videocall, or including it as an additional step at the start of the Main ToC workshop.

Note 2: With regards to the specification of the long-term outcomes (i.e. the target variables in the CLD, target behaviours, new or changed actor-relations in the VNM: if the CS team believes it has a good understanding of what this could entail, CS Team can already prepare and propose these *as suggestions for validation* to facilitate this process.

Platform: Zoom (or similar video conferencing tool with breakout room capability) Additional Tools: Miro or Mural for collaborative visual work.

Pre-session Preparation:

1. Distribute the informed consent form when inviting participants
2. Distribute a well-structured document with the CS narrative, CLD, VNM, List of target farmer behaviours, the SMART-GOALS from the Policy Workshops, and AMBITION, EXPECTATIONS & VISION statement of Business Workshops to participants at least one week in advance.



3. Create an online collaborative workspace (e.g., Miro, Mural) with the CLD and VNM pre-loaded.
4. Send participants a brief video tutorial on how to use the collaborative workspace.

Facilitation Best Practices:

- Have a co-facilitator to manage technical issues and monitor chat
- Use a mix of verbal discussion and visual collaboration tools
- Encourage use of non-verbal feedback features (e.g., raise hand, reactions)
- Plan for frequent participant engagement to maintain attention

Session structure:

Step 0: Introduction (20 min)

- Welcome participants
- Present Agenda of the session, and how the session first within the broader ToC development process
- Ask for consent for recording the online workshop
- Start recording the online workshop
- Present the CS narrative with a PowerPoint presentation

Step 1: Review the CLD in relation to the CS GOAL

- (Re-)introduce the CLD
 - Refer to the CLD documentation for definitions and relations
 - Remind participants what this diagram seeks to represent:
 - the underlying feedback mechanisms contributing to the perpetuation of an undesirable state in the language of variables and positive and negative causal relationships
 - the variables and relations emerged out of an analysis of the data gathered through encounters with local stakeholders
 - It cannot and does not capture the situation in all its complexity completely or accurately, but it is there as a tool to develop a shared understanding and to coordinate collective action towards a shared purpose
- **Structure:** Review the components and their interactions within the system
 - *To your knowledge, does this part of the system exist?*
 - *Are the system variables represented appropriately? If not, what variables are missing or should be removed/renamed?*
 - *What influences from outside the system should we consider ?*
- **Functions:** Understand the key functions and processes within the system.
 - *Are the relations represented correctly? If not, what flows are missing or should be removed?*
 - *Is the polarity of in- and outflows accurately represented? If not, what changes would you make?*
 - *Which relations are very strong or rather weak ?*
- **Long-term outcomes:** Identify the target variables and behaviours associated with the long-term outcomes of the CS Goal
 - *Could you identify the variables directly related to the attainment of the CS Goal in the CLD?*
 - *Does this variable/ do these variables cover the most important aspect(s) of CS Goal?*
 - *Should other variables be added to keep track of attainment of these long-term outcomes?*
 - *Does everybody agree that this variable should be targeted?*

➔ **Highlight the target variables around which there is agreement in a DIFFERENT COLOR**

Step 2: Review the VNM in relation to the long-term outcomes

- **Actors:** Review the actors within the system
 - *To your knowledge, are these the most influential actors from now until ten years?*
 - *Are some influential actors missing ?*
 - *What influential actors 'outside the system' should we also consider from now until ten years ?*

- **Relations:** Review the relations between the actors
 - *Does the VNM cover the most influential relations between actors ?*
 - *Do you agree with the characterization of the relationships ?*
 - *Are they clear ?*
- **Long-term outcomes:**
- *Which actors relationships would significantly change if the envisioned long-term outcomes would be reached (independently of how this was accomplished)*
 - **Hierarchy and Laws (H):** Rule changes, such as standards or regulations needed to support the future state
 - **Financial Capital (F):** Investments, funding mechanisms or other economic incentives required.
 - **Values (V):** Social norms that reframe the changes as the good, right, or responsible thing to do from
 - **Knowledge (K):** Information and expertise needed to implement the changes (RESETframeworkfrom)
 - **Commodities (C):** Products, services or tools that will drive the transformation

Draw these changes on the VNM in a DIFFERENT COLOR

Step 3: Specify the long-term outcomes in behavioural terms (10 min)

- *What specific changes in (consumption and production) practices would that entail in the long-term for farmers and consumers? (cfr. behavioural workshop, consumer survey).*
- *Which farmers? Which consumers?*

4.2.2 Main ToC Workshop

Duration: preferably in person, 3,5 hours including one break

Phase	Duration		Format
Welcome & Recap	30 min		Plenary
Prioritize	45 min	Identify and prioritize key leverage points	Groups & plenary
Break	15 min		
Strategize	45 min	Define strategic interventions that target the prioritized leverage points	Groups
Act	45 min	Define concrete short-term actions for participants to implement the strategic interventions	Groups & plenary
Wrap-up	15 min		Plenary

Note; the workshop is developed to accommodate a systems mapping workshop with up to 3 groups of 4-5 participants. Therefore it includes a back-and-forth between group and plenary discussions. With a smaller number of participants (< 8) these moment become redundant, although it will take the participants more time to address all the important leverage points (STRATEGIZE & ACT)

General outputs:

- Presentation used in the workshop (.pptx)
- Video and audio recordings of the workshop (.mp4)
- General Observations on the mapping process (reporting survey)
- Other materials used in the workshop (local language)
 - Causal Loop Diagrams (.png)
 - Value Network Map based (.png)
 - List of the farmer target behaviours (reporting survey)

- List of interventions and behavioural readiness of farmers (reporting survey)
- Lists of policy goals, and policy instruments and congruence analysis (reporting survey)
- Vision statement of business workshop participants (reporting survey)
- List of potential business models (reporting survey)

Expected outputs per phases:

- **PRIORITIZE**
 - Annotated CLD with identified leverage points marked (.png)
 - Master list of leverage points (reporting survey)
 - Prioritized list of leverage points (reporting survey)
 - Brief descriptions of the feedback loops associated with each prioritized leverage point (reporting survey)
 - Summary of the discussions at the different steps (reporting survey)
 - General Observations on the mapping process (reporting survey)
- **STRATEGIZE**
 - Picture of the annotated VNM with the strategic interventions represented as changed actor-relations
 - Comprehensive list of strategic interventions (reporting survey)
 - Detailed description of the strategic interventions, with attention to Business models, Policy instruments, Behavioural aspects of farmers and consumers. (reporting survey)
 - List of strategic interventions with the most potential (based on impact and possibility to influence) (reporting survey)
 - Summary of the discussions at the different steps (reporting survey)
- **ACT**
 - Detailed Action Plan for each strategic intervention
 - List of priority actions across all interventions
 - Updated VNM showing expected short-term changes in actor relationships
 - Summary of the discussions at the different steps (reporting survey)
 - Wrap-up
 - Summary of participants' comments on the outcomes and results of the ToC workshop (reporting survey)
 - Summary of participants' expectations going forward. (reporting survey)

Format: physical workshop

Rationale: We strongly recommend organizing this systems mapping workshop physically for three main reasons:

1. The facilitation process and interaction among participants is much more effective in a physical setting. Participatory systems mapping workshops benefit from direct, face-to-face communication, which allows for nuanced discussions and immediate clarification of complex ideas. As Sedlacko et al. (2014) note in their study on participatory systems mapping for sustainable consumption, physical workshops enable "intense discussions" and "collective learning" that are crucial for developing shared understanding of complex systems.
2. The engagement with and development of the systems map tends to lead to better quality outcomes in a physical setting. The tactile and visual aspects of working with physical materials (e.g., sticky notes, large paper sheets) can enhance creativity and systems thinking. Barbrook-Johnson and Penn (2022) emphasize that the "physicality of mapping" in in-person workshops can lead to more intuitive and comprehensive system representations.
3. Physical workshops provide more opportunities for spontaneous conversations and relationship-building among stakeholders. These informal interactions are crucial for developing trust and shared perspectives, which are essential in systems mapping. As highlighted by Wilkinson et al. (2021) in their work on participatory systems mapping for Theories of Change, the "social process" of mapping in person contributes significantly to the quality and acceptance of the resulting system representations.

Note: CSCs may consider organizing the main ToC workshop also online, provided they give good grounds that this format would work considerably better for them. That is if this format would greatly enhance the participation in such a way that variety of local voices is much better reflected, and that the process of understanding of and acting on the local realities is improved. Based on the guidelines CSC should work on adapting the workshop to the online format by themselves. If there are doubts, CSC should contact the task leaders for further suggestions and best practices (e.g., meeting + mapping software, schedule adaptation, engagement with participants across groups and in plenary, etc.).

4.2.3 Welcome and Recap

Duration: 30 minutes

- Present workshop objectives, and agenda.
- Review outcomes from virtual ORIENTATE session

4.2.4 PRIORITIZE phase : Identifying and Prioritizing Key Leverage Points

Duration: 45 minutes

Objective: Identify and prioritize key leverage points within the system using the Causal Loop Diagram (CLD) to determine where interventions can have the most significant impact.

Materials:

- Annotated CLD (large printouts or digital display)
- Lists of behavioural interventions, policy instruments, and potential business models
- Dot stickers for voting
- Flipcharts and markers

Process:

1. **Introduction (7 minutes):** [PLENARY]
 - Recap the CLD and its role in identifying leverage points
 - Explain the concept of leverage points and their importance
 - Briefly introduce the lists of interventions, policy instruments, and business models as inspiration
2. **Small Group Work (20 minutes):** [GROUP WORK]
 - Divide participants into mixed groups of 4-5 people
 - Each group examines the CLD to identify potential leverage points, considering:
 - *"In order to change the values of the target variables in a favorable direction, what are key feedback loops to exploit?"*
 - *"Which areas of the system are most sensitive to change and have the potential for the greatest impact?"*
 - Groups document their identified leverage points and associated feedback loops
3. **Quick Share and Compile (8 minutes):** [PLENARY]
 - Each group quickly shares their top 2-3 identified leverage points (1 minute per group)
 - Facilitator compiles a master list of all identified leverage points on a flipchart
4. **Prioritization and Discussion (10 minutes):** [PLENARY]
 - Dot-voting: Each participant receives 3 dots to vote on the leverage points they consider most impactful
 - As participants vote, facilitator encourages brief discussions on why certain points are favored
 - Facilitator tallies votes and identifies the top 3-5 leverage points
5. **Wrap-up and Next Steps (5 minutes):** [PLENARY]
 - Group confirms the top 3-5 leverage points to focus on in subsequent phases
 - CS Team highlights the prioritized leverage points on the CLDs
 - Briefly explain how these leverage points will be used in the next phase

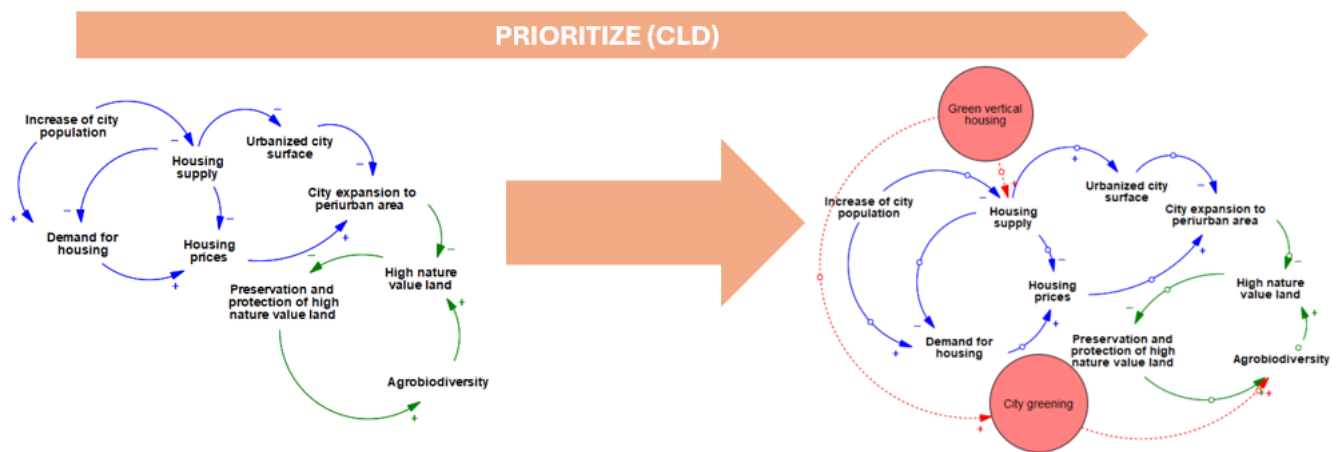


Figure 4

4.2.5 STRATEGIZE phase: designing Strategic Interventions

Duration: 45 min

Objective: Define strategic interventions that target the prioritized leverage points, specifying altered actor-relations and mid-term outcomes.

Materials:

- Annotated VNM
- List of prioritized leverage points
- Lists of behavioural interventions, policy instruments, and potential business models
- List of SMART-GOALS & policy instruments from policy workshops
- List of potential collaborative business models from business workshops
- Large paper sheets, markers, sticky notes

Process:

1. **Introduction** (7 minutes): [PLENARY]
 - Recap prioritized leverage points and their connection to the Theory of Change
 - Explain the VNM's role in designing interventions
 - Highlight the different relationship types in the VNM:
 - Hierarchy and Laws (H): Regulatory and governance relationships
 - Financial Capital (F): Economic and investment flows
 - Values (V): Influence on social norms and cultural aspects
 - Knowledge (K): Information and expertise exchanges
 - Commodities (C): Product and service flows
 - Remind participants of previous work (SMART-GOALS, policy instruments, business models, behavioural interventions)
 - Divide participants into groups based on leverage points (one group per leverage point, or combine if there are more leverage points than feasible groups)
2. **Identify Strategic Interventions** (15 minutes): [GROUP WORK]
 - Each group focuses on their assigned leverage point(s)
 - For each leverage point, groups consider:
 - How could this leverage point be targeted?
 - Who intervenes? Who is affected by the intervention?
 - Would certain already identified policy instruments or business models be relevant?
 - Groups identify interventions using VNM categories (H, F, V, K, C)

- Encourage use of previously identified policy instruments, business models, and behavioural interventions
3. **Specify Behavioural Aspects** (8 minutes): [GROUP WORK]
- Groups continue working on their assigned leverage point(s)
 - Specify how interventions enlist farmers and consumers:
 - How are we enlisting citizen-consumers and farmers in this change?
 - How do we motivate them?
 - To what do we appeal?
 - Consider using regulations, economic incentives, social norms, education, and tools (RESET framework)
4. **Group Discussion and Prioritization** (8 minutes): [GROUP WORK]
- Groups remain in their leverage point-based formations
 - Discuss each intervention, considering:
 - Potential impact towards long-term goal
 - Feasibility of implementation
 - Use a simple voting method:
 - Each group member gets 3 votes (can be dots or marks on a flipchart)
 - Members distribute their votes among the interventions
 - The intervention with the most votes is selected as the priority
 - If time allows, briefly discuss why this intervention was favored
5. **Define Mid-term Outcomes** (7 minutes): [PLENARY]
- Each group briefly presents their chosen intervention(s) to the whole workshop
 - Groups describe interventions as new or changed actor-relations
 - Specify who is influencing whom, and how
 - CSC draws these changes on the VNM in a different color for all to see
 - Note: This may involve adding new stakeholder groups to the VNM
 - Brief plenary discussion to ensure alignment and understanding across all groups

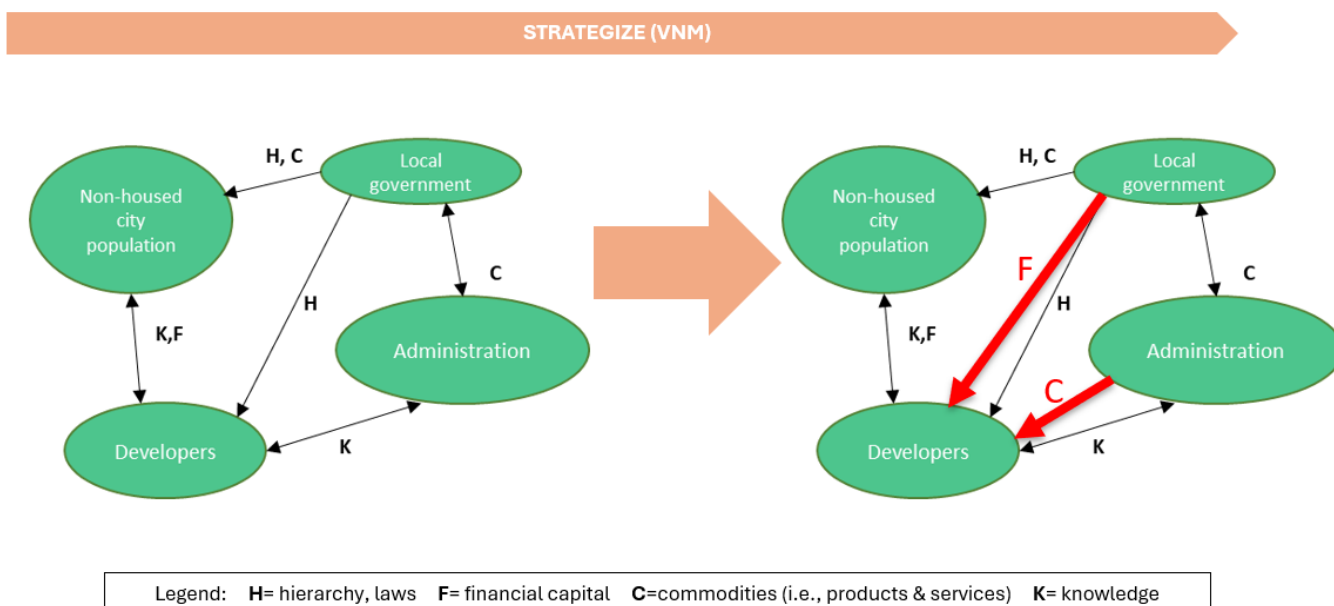


Figure 5

4.2.6 ACT phase: Short-term action by the ‘change makers’

Duration: 45 minutes

Objective: Define in groups concrete short-term actions (1-3 years) that participants can take to implement the strategic interventions. Prioritize these actions based on potential impact and feasibility

Materials:

- List of Strategic Interventions from STRATEGIZE phase
- Annotated VNM
- Large sheets of paper, markers, sticky notes
- Dot stickers for voting

Process:

1. **Introduction (5 minutes):** [PLENARY]
 - Recap the strategic interventions and their link to the overall Theory of Change
 - Explain the importance of translating interventions into actionable steps
 - Take the annotated VNMs and add a post-it with ‘ToC Working Group’ written on it
2. **Action Planning (20 minutes):**
 - Participants remain in their leverage point-based groups
 - Each group uses the Action Plan template to:
 1. Break down their intervention into 2-3 specific actions
 2. Identify responsible parties (including the 'ToC Working Group')
 3. Set rough timelines
 4. List key required resources
 5. Describe expected short-term outcomes
 - Encourage groups to consider how actions will influence actor relationships in the VNM

Action Item	Responsible Party	Timeline	Required Resources	Expected Short-Term Outcomes
1.				
2.				
3.				

Guidelines for Completing the Template:

1. Action Item:

- Be specific and concrete
- Use action verbs (e.g., Develop, Implement, Create)
- Limit to 2-3 key actions for the strategic intervention

2. Responsible Party:

- Identify specific individuals or roles
- Include 'ToC Working Group' where appropriate
- Consider both internal and external stakeholders

3. Timeline:

- Provide a rough estimate (e.g., Q3 2024, Within 6 months)
- Consider dependencies between actions

4. Required Resources:

- List key resources needed (e.g., funding, expertise, technology)
- Be realistic about what's available or attainable

5. Expected Short-term Outcomes:

- Describe tangible results expected within 1-3 years
- Link to the overall goals of the strategic intervention
- Consider how these outcomes will influence actor relationships in the VNM

Additional Considerations:

- Ensure actions are SMART (Specific, Measurable, Achievable, Relevant, Time-bound)
- Consider potential barriers and how to overcome them
- Think about how actions might influence or be influenced by other strategic interventions

Figure 20 Action Plan Template

3. Quick Sharing and Feedback (10 minutes): [PLENARY]

- Each group briefly presents their action plan (2 minutes per group)
- Other participants can ask quick clarifying questions

4. Prioritization and VNM Mapping (8 minutes): [PLENARY]

- Facilitator leads a rapid prioritization discussion:
 1. Which actions seem most impactful and feasible across all plans?
 2. How do these priority actions change actor relationships in the VNM?
- CSC updates the VNM to reflect these expected changes

5. Wrap-Up and Next Steps (2 minutes): [PLENARY]

- Summarize key actions and commitments
- Briefly explain next steps (RECAST and EVALUATE & ENHANCE phases)

4.2.7 RECAST phase: writing up the case study Theory of Change

Duration: (2 working days)

Objective: synthesize workshop outcomes into a systems-based Theory of Change that explicitly maps the causal pathways between interventions and outcomes, while highlighting feedback loops, potential emergent properties, and multi-level change processes across the food system.

Expected outputs

1. The initial linear ToC diagram and narrative drafted by the CS Team
2. A summary of the comments and feedback of participants on the diagram and narrative
3. Picture of The revised linear ToC diagram and narrative as presented by the CS team with annotations made during the discussion

Materials:

- Large systems-based ToC template (incorporating CLD elements)
- Outputs from previous phases
- Updated VNM and CLD
- Sticky notes, markers

Process

1. **Draw Initial ToC and Narrative (Day 1): [CS TEAM WORK]**
 - CS team creates an initial ToC diagram:
 - Visualize temporal progression from short-term actions through mid-term interventions to long-term outcomes
 - Incorporate identified leverage points and feedback loops
 - Use color coding for nodes and connectors
 - Develop clear node descriptions
 - Prepare a step-by-step narrative describing the Theory of Change
2. **Internal Review and Refinement (Day 1): [CS TEAM WORK]**
 - CS team reviews the initial ToC and narrative
 - Make necessary adjustments for clarity and completeness
 - Ensure alignment with workshop outcomes and project goals
3. **Distribute for Feedback (Day 2 Morning): [STAKEHOLDER ENGAGEMENT]**
 - Send out the initial ToC diagram and narrative to workshop participants
 - Request feedback via email or arrange bilateral calls
 - Provide specific questions for feedback:
 - "Do you agree with our characterization of what was discussed?"
 - "Is the narrative and diagram complete? Are we missing anything important?"
4. **Collect and Analyse Feedback (Day 2 Afternoon): [CS TEAM WORK]**
 - Compile all feedback received
 - Analyse comments for common themes or significant points
 - Identify areas requiring clarification or modification

5. **Revise ToC and Narrative (Day 2 Evening): [CS TEAM WORK]**
 - Update the ToC diagram and narrative based on feedback
 - Ensure all key stakeholder inputs are incorporated
 - Prepare a summary of changes made in response to feedback

Expected Outputs:

1. Initial linear ToC diagram and narrative drafted by the CS Team
2. Summary of comments and feedback from participants
3. Revised linear ToC diagram and narrative with annotations reflecting discussions and feedback

4.2.8 EVALUATE & ENHANCE Phase: Asynchronous Assessment and Refinement

Duration: 1 week

Objective: To critically assess the Theory of Change (ToC) developed in the workshop, evaluate its potential systemic impacts, and enhance the strategy to improve effectiveness and mitigate undesirable consequences through an asynchronous, questionnaire-based approach.

Platform: Online survey tool (e.g., Qualtrics, SurveyMonkey, Microsoft Forms) and collaborative document sharing platform (e.g., Microsoft Word)

Expected outputs:

- Compiled questionnaire responses
- Draft of revised short-term intervention list
- Updated VNM, CLD, and ToC diagram
- Summary report of feedback and suggested enhancements

Process:

1. **Preparation and Distribution (Day 1): [CS TEAM]**
 - Prepare and send to participants: a) Refined ToC diagram and narrative b) Brief document on key points for systemic impact assessment c) Comprehensive questionnaire (see structure below) d) Instructions for accessing and completing the questionnaire e) Deadline for submission
2. **Participant Feedback (Days 1-5): [STAKEHOLDER ENGAGEMENT]**
 - Participants complete questionnaire asynchronously
 - CS team available for clarifications if needed
3. **Analysis and ToC Update (Days 6-7): [CS TEAM]**
 - Analyse questionnaire responses
 - Update ToC based on feedback
 - Prepare summary of changes and rationale

4. **Final Feedback Round (Day 7): [STAKEHOLDER ENGAGEMENT]**

- Share revised ToC and summary with participants
- Request brief final comments (24-hour turnaround)

Questionnaire Structure and Best Practices:

- Use a mix of closed-ended (e.g., Likert scale) and open-ended questions
 - Provide clear instructions and definitions where necessary
 - Include visual aids (e.g., diagrams) within the questionnaire
 - Allow participants to save progress and return to complete later
1. Introduction and ToC Review
 - Brief overview of the ToC and its development process
 - Link to detailed ToC document for reference
 2. Systemic Impact Assessment Divided into four sections: a) Ripple effects and unintended consequences b) Consistency with sustainability goals and trade-offs c) Coherence, synergies, and timescales d) External influences and risk assessment

Sample questions:

- How do strategic interventions create changes throughout the system?
 - Are there potential unintended or undesirable consequences?
 - Do interventions contribute to all desired long-term changes equally?
 - Are interventions creating synergies or working against each other?
 - What external factors might impact ToC effectiveness?
3. Strategy Enhancement
 - Identify areas for improvement or refinement
 - Suggest modifications to interventions or actions
 - Propose additional leverage points or strategies
 4. ToC Evolution Assessment
 - Evaluate how well the ToC has incorporated initial feedback
 - Assess if the changes have improved the ToC's clarity and effectiveness
 5. Final Thoughts and Next Steps
 - Open-ended question for any additional comments or suggestions
 - Indicate willingness to participate in potential follow-up discussions

Note: it is up to the CS team to decide whether they wish to take further ownership of the Theory of Change by following up on a regular basis with stakeholders, or to propose and implement actions that are part of plan. Such commitments are beyond the scope of WP4, but are of course greatly encouraged and could be part of the implementing 6.2, 7.2, or 8.3 tasks, or within the framework of other running or future projects.

Post-Assessment Follow-up:

1. Analyse questionnaire responses
2. Prepare and circulate:
 - Summary of questionnaire findings
 - Draft of revised short-term intervention list
 - Updated VNM, CLD, and ToC diagram
 - Report on how feedback was incorporated and next steps

4.3 STEP 3 – Reporting the case study Theory of Change

The case study coordinators will develop a comprehensive report that represents the ENFASYS ToC. Each report which will include:

1. **Methodology and Stakeholder Engagement**
 - a. Stakeholder Environment
 - How was the stakeholder environment structured for this case study?
 - What criteria were used to select and engage stakeholders?
 - How diverse and representative was the stakeholder group?
 - b. Methodology Adaptation
 - How was the ToC methodology adapted to the specific context of this case study?
 - What challenges were encountered in implementing the methodology, and how were they addressed?
 - How was methodological rigor maintained despite adaptations?
 - c. Impact on Deliverables
 - How did the stakeholder engagement and methodology adaptations impact the production of required deliverables?
 - Were there any unexpected outcomes or insights due to these adaptations?
2. **Evaluation of the System Transformation Potential (The Narrative)**
 - a. Introduction
 - What is the context and objective of this case study?
 - How was the ToC developed? Who was involved?
 - b. Current System Analysis
 - What are the key dynamics and feedback loops in the current system?
 - Who are the main actors and how do they relate to each other?
 - c. Desired Future State
 - What are the long-term outcomes and goals of the transformation?
 - What behavioural and systemic changes are required to achieve these goals?
 - d. Transformation Potential Assessment
 - How capable is the system of undergoing the desired transformation?
 - What are the major barriers to and enablers of change?
 - What potential pathways for transformation have been identified?
3. **Identification of Leverage Points and Strategic Interventions with the Highest Transformation Potential (The Map)**
 - a. Leverage Points
 - What are the key leverage points identified in the system?
 - Why were these specific points chosen? What makes them influential?
 - How are these leverage points represented in the CLD?
 - b. Strategic Interventions
 - What strategic interventions have been designed to target the leverage points?
 - How do these interventions connect to the leverage points?
 - What are the expected impacts of these interventions on the system?
 - c. Visual Representations
 - How do the updated CLD and VNM reflect the identified leverage points and interventions?
 - What key changes in actor relationships are shown in the updated VNM?
 - d. Systemic Impact Assessment
 - What potential ripple effects or unintended consequences might result from the interventions?
 - How consistent are the interventions with broader sustainability goals?
 - What trade-offs, if any, are involved in implementing these interventions?
4. **Identification and Leveraging Collaboration Opportunities (The Action Plan)**
 - a. Short-term Actions
 - What specific actions are planned for the next 1-3 years?
 - Who is responsible for each action, and what is the timeline?
 - What resources are required to implement these actions?
 - b. Collaboration Opportunities
 - Who are the key stakeholders for each action?
 - What potential synergies or partnerships have been identified?
 - How will collaboration be facilitated and maintained?
 - c. Implementation Strategy
 - How have the actions been prioritized?
 - What potential challenges have been identified, and how will they be mitigated?
 - d. Monitoring and Evaluation Plan
 - What key indicators will be used to track progress?
 - How will feedback be collected and used for adaptive management?

Conclusion

- What are the key findings from this ToC process?
- What reflections or lessons learned emerged from the process?
- What are the next steps for implementing the ToC and further developing the transformation strategy?

Appendices

- Detailed CLD and VNM
- Workshop summaries
- Questionnaire results from EVALUATE & ENHANCE phase
- Key verbatims from stakeholders
- Photos from workshops and engagement activities
- Audio/video recordings (if consent obtained)
- Informed consent forms and ethical clearance documentation

5 Expected outputs & deadlines

All deliverables to be uploaded to the respective case study folder on Teams by October 30, 2024.

1. Workshop Preparation and Execution Materials

- Informed consent forms (.docx)
- Pre-workshop materials distributed to participants (.docx)
- Workshop presentations (.pptx)
- Workshop recordings (.mp4)
- Pre and post-workshop online workspace screenshots (.png)

2. System Mapping and Analysis

- Initial and final Causal Loop Diagrams (CLD) (.png)
- Initial and final Value Network Maps (VNM) (.png)
- Annotated CLD with identified leverage points (.png)
- Annotated VNM with strategic interventions (.png)

3. Reporting Survey Responses (To be filled out in the provided survey form and uploaded as a PDF)

- Reflexivity and transparency report
- Stakeholder recruitment process account
- Written narrative of the case study
- Lists of farmer behaviours, interventions, policy goals, and business models
- Changes made to CLD and VNM during workshops
- Long-term outcomes narrative
- Target variables and behaviours list
- Prioritized leverage points list and descriptions
- Strategic interventions list and descriptions
- Action plans for each intervention
- Discussion summaries and observations from all workshop phases
- Participant feedback and expectations

4. Final Comprehensive Report A single document (.docx or .pdf) including: a. Evaluation of System Transformation Potential (Narrative) b. Identification of Leverage Points and Strategic Interventions (Map) c. Identification and Leveraging Collaboration Opportunities (Action Plan) d. Methodology and Stakeholder Engagement section e. Appendices (including all relevant materials from previous phases)

Note: All materials must be uploaded to Teams by October 30, 2024. Please notify MBS & ILVO as early as possible if this deadline cannot be met.

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This project has received funding from the European Union's Horizon Europe research and innovation program under grant agreement No 101059589.