ORGANIC TARGETS 4EU

TRANSFORMATION SCENARIOS FOR BOOSTING ORGANIC FARMING AND ORGANIC AQUACULTURE TOWARDS THE FARM-TO-FORK TARGETS

Deliverable D2.1
Scenarios for the development of the organic sector

REPORT/PUBLIC

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CALL	CL6-2021-FARM2FORK-01-01
PROJECT	OrganicTargets4EU
DURATION	42 M
START DATE	01/09/2022
PROJECT MANAGEMENT	IFOAM Organics Europe
PERSON IN CHARGE	Ambra De Simone
DELIVERABLE	D2.1. Scenarios for the development of the organic sector
TYPE	R
DISSEMINATION LEVEL	PU
DUE DATE OF DELIVERABLE	31/12/2025
ACTUAL SUBMISSION DATE	22/01/2026
WORK PACKAGE	WP2. Participatory foresight and scenario analysis
WORK PACKAGE LEADER	UNIVPM
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VERSION	Version 3 FINAL

History of Changes

VERSION 1	21/12/2025	Raffaele Zanoli, Danilo Gambelli, Daniela Vairo, Olivier Mora, Etienne Schultz	First draft
VERSION 2	30/12/2025	Raffaele Zanoli, Danilo Gambelli, Daniela Vairo, Olivier Mora, Etienne Schultz	Second draft integrating option planning and conclusions
VERSION 3	22/01/2026	Raffaele Zanoli, Danilo Gambelli, Daniela Vairo, Olivier Mora, Etienne Schultz	Final edited version

Executive Summary

This Deliverable provides a comprehensive foresight analysis of the pathways and policy options for achieving the European Union's Farm to Fork (F2F) target of 25% organic farmland and a significant increase in organic aquaculture by 2030. Drawing on scenario analysis, participatory workshops, and national backcasting studies, the report demonstrates that current business-as-usual trajectories are insufficient: projections indicate that, without structural transformation, the organic share of agricultural land in the EU will plateau between 12% and 19%, falling short of the F2F ambition.

To address this gap, the project developed four contrasting scenarios for the future of organic agriculture and aquaculture in Europe. These scenarios—ranging from policy-driven expansion and citizen-led mobilisation to market-driven growth and fragmented, regionally divergent pathways—were constructed through expert engagement and tested for their feasibility and desirability among key stakeholders. The analysis reveals that no single pathway is likely to deliver the F2F target in isolation; rather, coordinated, multi-level action is required, combining robust public policy, market incentives, and active civil society engagement

A distinctive feature of the study is its use of backcasting at the national level in five EU countries, which allowed for the tailoring of EU-level scenarios to specific national contexts. These national pathways highlight the importance of triggers such as decisive public policy action, research and societal recognition of organic's environmental and health benefits, and internal sector reorganisation to increase collective capacity and political influence. Across all countries, public policies—especially those that integrate

agricultural, environmental, health, and food system objectives—emerge as essential levers for change.

The report identifies several policy options that are robust across all scenarios. These include sustained investment in research and innovation, strengthening Agricultural Knowledge and Innovation Systems (AKIS), improving market intelligence and price transparency, and fostering stakeholder engagement and coordination through public–private partnerships and peer-to-peer initiatives. Notably, public procurement is highlighted not only as a market outlet for organic products but also as a strategic tool for food education and habit formation, amplifying the impact of organic policies across society.

For EU policymakers, the findings underscore the need to prioritise enabling capacities that can withstand uncertainty—such as research, innovation, and AKIS—while leveraging public procurement and market transparency to stabilise demand and support the organic transition. The study also calls for coordinated, multi-level governance, linking EU frameworks to national strategies and local implementation, to ensure that the transformation towards organic food systems is both resilient and inclusive. Ultimately, the report argues that achieving the 25% target is not merely a quantitative goal but a systemic transformation, requiring the alignment of political will, market structures, and citizen participation.

This evidence-based analysis provides actionable insights for EU policy audiences, demonstrating that the expansion of organic agriculture and aquaculture is most resilient when the EU and Member States prioritise system enablers and maintain policy coherence, regulatory integrity, and active engagement across the supply chain and civil society.

Key Takeaways & Policy Implications

- Business-as-usual is not enough: Current trends will not achieve the 25% organic farmland target by 2030; transformative change is essential.
- Eight scenarios for the future: The study outlines policy-driven, market-driven, citizen-driven, and fragmented pathways, each with distinct implications for stakeholders. Four scenarios are developed for the EU organic agricultural sector and four for organic aquaculture.
- Backcasting national pathways: In five EU countries downscaled the EU agricultural scenarios were backcasted, identifying tailored national transition pathways and critical triggers for change.
- Robust policy options: System enablers—such as research and innovation, AKIS strengthening, market intelligence, and stakeholder engagement—are effective across all scenarios.
- Public policy remains central: Even in demand-driven scenarios, public steering is necessary to align incentives, scale solutions, and stabilize demand.

- Prioritize enabling capacities: EU and Member States should invest in organic capacity building in research & innovation, AKIS, and market transparency to ensure resilience under conditions of uncertainty.
- Leverage public procurement: Organic procurement is not just creating direct public demand for organic food but is also a tool for food education and habit formation, amplifying the impact of organic policies.
- Foster multi-level governance: Coordinated action linking EU frameworks, national strategies, and local implementation is essential for systemic transformation.

1.Introduction

Achieving the EU's 2030 objective of reaching a 25% share of organically managed farmland and scaling up organic aquaculture is an ambitious goal that requires coordinated action across supply, policy, and demand dimensions (Dimitri & Oberholtzer, 2009). While these targets were prominently communicated under the Farm to Fork initiative, they now sit within a broader and evolving EU policy mix for sustainable food systems.

One critical aspect is the strengthening of the organic supply chain. This entails enhancing storage, transportation, and processing facilities to ensure organic products reach consumers promptly while maintaining quality standards (Baron & Dimitri, 2019). Improving these logistical components is essential for fostering consumer trust and satisfaction in organic goods.

On the supply side, establishing a supportive policy environment is paramount (Nguyen et al., 2021). The EU and national governments must enact and enforce policies that expedite the conversion to organic farming. Since transitioning from conventional to organic methods often incurs higher initial costs and entails a period of reduced yields, financial support, subsidies, and incentives are indispensable to stimulate farmers' conversion (Nguyen et al., 2021).

Addressing the demand side is equally crucial. Expanding the market for organic products and ensuring sustained demand are imperative goals (Dimitri & Oberholtzer, 2009). Educating consumers about the benefits of organic produce and raising awareness about its positive impacts on health and the environment can cultivate a stable market for organic farmers. In this context, the availability of resources, innovation processes aimed at enhancing climate change adaptability for organic farming, dedicated research efforts, and robust networking initiatives play pivotal roles (Dimitri & Oberholtzer, 2009).

By leveraging these resources and fostering collaboration within the organic farming community, the efficiency and productivity of organic agriculture can be enhanced, rendering it more appealing to farmers and consumers alike (Dimitri & Oberholtzer, 2009). Through a multifaceted approach encompassing policy support, consumer education, and technological innovation, the EU can strive towards realising its Farm to Fork targets and promoting sustainable agriculture across the continent.

In addition, organic aquaculture represents a paradigm shift in aquatic farming, emphasising sustainability, ecological harmony, and ethical food production.

Europe has emerged as a leader in developing and implementing organic aquaculture. The applicable EU framework for organic production and labelling is now Regulation (EU) 2018/848, which applies from 1 January 2022 and replaced the previous core regulation (EC) No 834/2007. This framework is complemented by delegated and implementing acts that further operationalise production and control requirements.

Many of the enabling conditions for organic aquaculture mirror those for organic farming, but with sector-specific constraints (e.g., aquatic environments, feed inputs, biosecurity, and site management). One crucial aspect under consideration is enhancing the organic supply chain, which involves bolstering storage, transportation, and

processing capacities to ensure the timely delivery of organic products to consumers while upholding quality standards (Baron & Dimitri, 2019). Improving these logistical components is essential for building consumer confidence and satisfaction in organic goods. Establishing a supportive policy framework is crucial (Nguyen et al., 2021). The EU and national governments must implement and enforce policies facilitating the transition to organic aquaculture. Given that shifting from conventional to organic methods often entails higher initial costs and a period of reduced yields, financial assistance, subsidies, and incentives are essential to encourage farmers' adoption (Nguyen et al., 2021). Addressing the demand side is equally critical. Expanding the market for organic products and ensuring sustained demand are crucial objectives (Dimitri & Oberholtzer, 2009). Educating consumers about the advantages of organic produce and raising awareness about its positive impacts on health and the environment can cultivate a stable market for organic farmers. In this context, resource availability, innovation processes to enhance climate change adaptability in organic farming, dedicated research efforts, and robust networking initiatives play pivotal roles. By leveraging these resources and fostering collaboration within the organic farming community, the efficiency and productivity of organic aquaculture can be improved, making it more attractive to farmers and consumers alike (Dimitri & Oberholtzer, 2009).

Given the scale of the transformation implied by these 2030 objectives, it is essential to project trajectories forward rather than rely solely on static targets. Foresight approaches can help anticipate whether, how, and when these targets might be achieved by testing alternative pathways, constraints, and policy–market interactions under plausible future scenarios. The main objective of this report is therefore to develop consistent scenarios for reaching the organic F2F targets.

Based on FIBL's available data about organic UAA by country and crop, we first developed a preliminary trend analysis to explore if the F2F target is feasible under current conditions. We used restricted cubic splines (RCS) (Gauthier et al., 2020; Heinzl & Kaider, 1997) to allow for non-linear modelling and increasing levels of complexity to fit observed data points. The results of the extrapolation using RCS indicate that, with increasing levels of complexity (number of knots) and fit of past trends (R2), the level of uncertainty and volatility increases, as shown by the shaded area referring to the confidence interval of the trends.

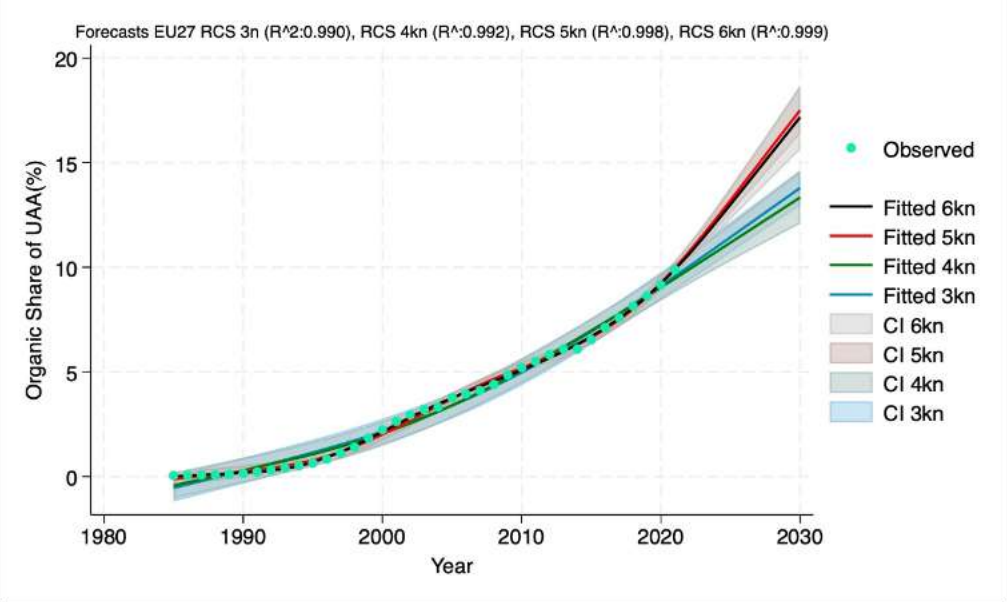


Figure 1. EU organic area trend forecasts

Results show that the expected growth of the organic share of UAA will stay between 12% and 19% (Figure 1). Details concerning specific crop types and countries confirm such a conclusion (see Appendix A). The conclusion that can be drawn from Figure 1 is that no extrapolation of current trends could lead to a sufficient development of the organic sector to reach the 25% target. The foresight exercise reported in this deliverable was inspired by Figure 1, given that the business-as-usual political and economic environment would unlikely allow reaching the F2F. We adopted a scenario analysis approach to focus on crucial relevant drivers that could introduce the necessary changes to reach the F2F target for the organic and aquaculture sector.

Specifically, we present the results of a (normative) scenario analysis focusing on different paths that could lead to achieving the 25% F2F target by 2030 and the results of a (explorative) scenario analysis focusing on different plausible pathways that look to how the organic aquaculture sector will be in 2040. The overall EU foresight exercise was developed after extensive desk analysis and stakeholder surveys and was drafted in two EU-level workshops, one held in Bruxelles in June 2023 and one gheld in Lecce in September 2023.

A multi-actor participatory backcasting analysis has been subsequently conducted to assess the relative feasibility of the future agriculture scenarios. The backcasting has been performed through a combination of surveys and focus country level workshops. Those workshops helped to develop possible pathways for reaching the scenarios and increase strategic thinking of actors (empower stakeholders in strategic thinking and align the necessary future actions.)

Finally, the scenarios have been tested against various policy and business strategic options: through a EU- level workshop, experts have been asked to evaluate each option for all scenarios, to identify potential opportunities and risk in relation to the achievement of the F2F targets for organic. A specific foresight option panning workshop was held in

Brussels in November 2025, to test the scenarios against various policy and business strategy options as reported in detail in another document (Deliverable 7.1).

The report is trsctured as follows. Firs, the methodology is introduced. Then the results of the overall scenario analyses are reported. The country-lvele backasting analyses are the reported in detail. The

2. Scenario analysis

2.1. Definition and aims of scenario analysis

Scenario analysis was originally developed for military strategy purposes (Kahn & Wiener, 1967). Since the early 70s, some multinational companies have used it as a forecasting tool, mainly for investment strategies and long-term planning. A brief review of scenario analysis of the agricultural sector can be found in Zanoli et al. (2012), while a short description of scenarios for agricultural policy is described in Ehlers et al. (2022) with a focus on technology and policy in a farming context.)

A scenario describes (textually and/or graphically) a set of events that might reasonably occur (Jarke, 1999; Schnaars, 1987). Scenarios can be considered hypothetical images of the future, which describe the functioning of a system under different conditions with a certain degree of uncertainty. Kahn & Wiener (1967) originally defined scenarios as "hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points". Fundamentally, scenario analysis enables several possible alternative futures to be imagined, described, and evaluated. There is not a single and unique approach to foresight. Scenario analysis refers to a spectrum of techniques ranging from highly qualitative 'intuitive logic' exploration styles to more formal mathematical modelling procedures that allow for minor judgmental adjustments (for reviews, see Amer et al., 2013; Bunn, D.W. Salo, 1993; Zanoli et al., 2012).

Scenario models depend more on intuitive judgment than rigorous models since "no hard data about the future exists" (Athey, 1987; Huss, 1988). Scenarios are not forecasts (predictions or projections) and focus more on possibilities than probabilities. They help to deal with uncertainty even when data is scarce and are based on a causal model of how different driving forces or drivers are linked to influence future developments in a specified system (Figure 2).

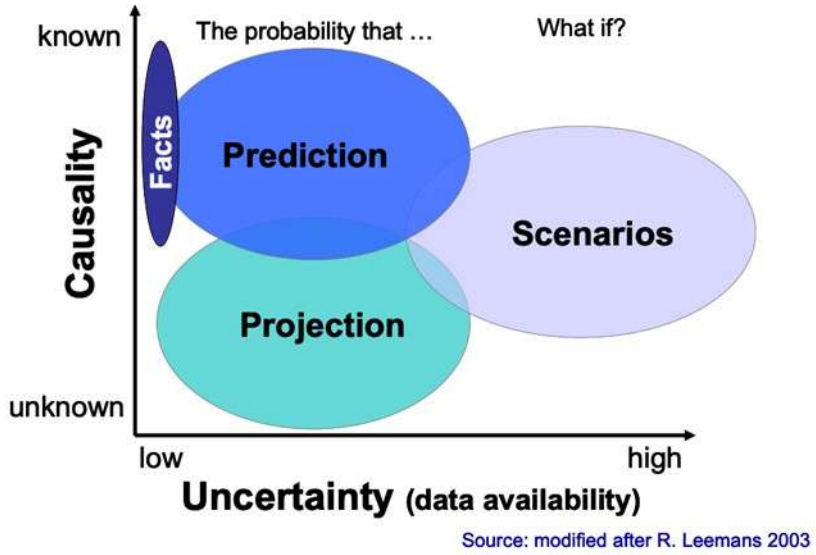


Figure 2. Scenario vs Forecasts

Scenarios can be classified based on various characteristics, including their aim, the type of data used, and the approach to develop the analysis (Börjeson et al., 2006; Ducot & Lubben, 1980; Heugens & van Oosterhout, 2001; van Notten et al., 2003). Börjeson et al. (2006) provide a classification of scenario typologies, distinguishing between predictive, normative, and explorative scenarios. The first type concerns scenarios aimed at defining what will happen in the near future, while the second type analyses how a future target may be reached. Finally, explorative scenarios consider a broader spectrum of what could happen to a complex system, spanning possible future developments.

Besides, the literature distinguishes between qualitative and quantitative approaches to scenario analysis (Huss, W.R. Honton, 1987; Tapinos, 2013). While quantitative scenarios are often model-based, qualitative ones describe possible futures through written narratives and either graphical or textual "storylines".

Finally, scenario methods can be classified according to the nature of the tool used. Participatory scenarios involve active contributions from experts and stakeholders, while desk-analysis scenarios rely on existing literature and statistical data without collaboration (IPBES, 2016; Kok et al., 2011). Expert input enhances structured analysis, especially when data is limited or unsuitable for foresight. For the application of scenario analysis in the agrifood sector, see Beckmann (2021); Billen et al. (2018); FAO (2018, 2022); IPBES (2016); Mora et al. (2020); Zanoli et al. (2012).

In all cases, scenarios help to deal with uncertainty, even with limited data, by using a causal model that links various driving forces, or drivers, which shape future developments within a defined system. Therefore, all scenario analyses must identify these drivers and their trends and establish a framework to explore the system's development over the specified time horizon.

In what follows we present the results of two EU-level foresight scenario workshops[1] for the organic agricultural and aquaculture sector and the preparatory work needed. A normative and qualitative approach, drawing on experts' knowledge gathered through a series of participatory workshops has been employed for the organic agricultural sector, while an explorative and qualitative method that exploits experts' knowledge again through a participatory approach has been applied for the organic aquaculture sector.

2.2. The scenario generation process

2.2.1. Scenario knowledge generation for the organic agricultural sector

The scenario analysis was designed and managed by an experienced facilitation team that provided the necessary preparatory work and toolkits for the two-days' workshop (28-29 June 2023) conducted in Brussels (BE).

The full scenario generation process is shown in Figure 3.

Step 1. We first conducted desk research to identify the principal megatrends and driving forces shaping the evolution of the EU organic sector. We then validated and refined these factors through strategic interviews with sector stakeholders.

Step 2. We established the final set of drivers through two rounds of a Delphi survey (see, among others, Beiderbeck, 2021; Chang et al., 2011; Tori et al., 2023 for an application in a scenario analysis context), aimed at selecting those assessed as both highly impactful and highly uncertain for the future development of organic farming in the EU. These drivers were subsequently used as inputs to build the sector's future scenarios together with project partners and relevant external experts.

Step 3. The trend analysis suggested that achieving the Farm to Fork (F2F) target would likely require structural shifts in key drivers of the organic sector. We therefore concentrated on drivers that combine high relevance with significant uncertainty, as these are most likely to condition transformative change. We set 2040 as the time horizon and the European Union as the spatial scope of the analysis. All scenarios were developed to address the following guiding question: "How can the F2F target be reached by 2030, given that a business-as-usual trajectory is unlikely to deliver it?"

[1] Within our normative scenario analysis for the organic sector, we conducted a comprehensive two-days' workshop (28–29 June 2023) in Brussels (BE). In the context of the explorative scenario analysis for the aquaculture sector, a one-day workshop (11 September 2023) was conducted in Lecce (IT).

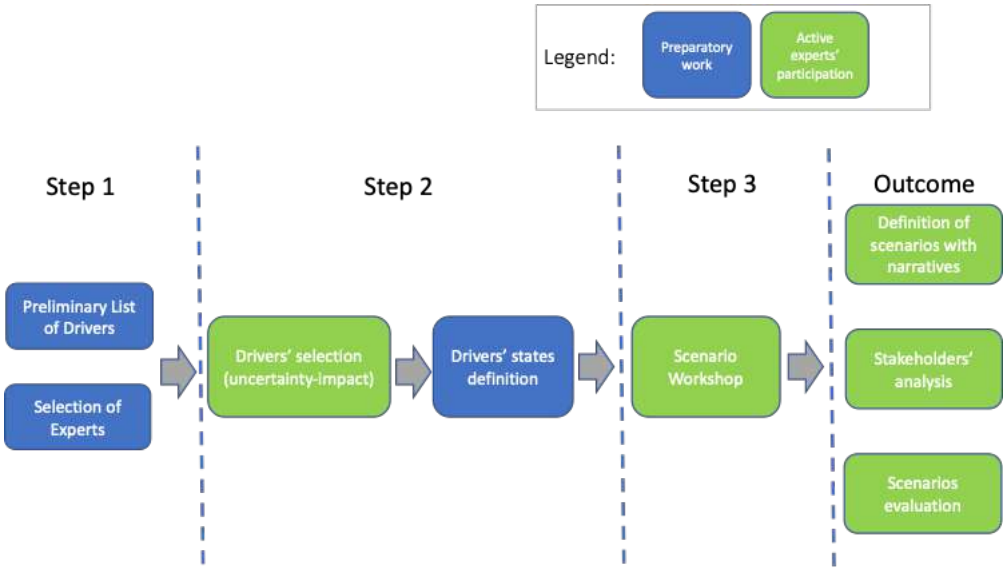


Figure 3. Drivers' selection and the scenario generation process for the organic farming sector

Step 1 - Definition of the list of preliminary relevant drivers and experts' selection

A preliminary list of relevant drivers was defined based on an extensive literature review analysis of global megatrends and scenarios of the agro-food sector, including organic farming. The preliminary list of relevant drivers covered the following macro-categories: Megatrends, Consumers' perspective, Supply chain, Policy, Farmers' perspective, and AKIS. The complete list of preliminary relevant drivers is shown in Appendix B.

Twenty experts were involved in the scenario-generation process. Experts were selected from the research project participants and stakeholders of the organic sector who were external to the research project. The selection criteria were:

- Geographical coverage – experts from:
  - North/Continental European countries
  - Mediterranean European countries
- The structural situation of the organic sector – experts from:
  - countries where the organic sector is well-developed in terms of agricultural production,
  - countries where the consumption of organic products is well-developed,
  - countries where the organic sector is still in an initial phase of development/Eastern European countries
- Type of expertise – experts from the following fields:
  - academic and research
  - organic producers
  - organic processors and distributors

- umbrella organisations, associations and consultants for the organic sector.

Step 2 - Driver selection

A final selection of crucial drivers was performed to keep the scenario generation process feasible and manageable. The final selection of drivers to be modelled in the scenario analysis was obtained after two rounds of Delphi surveying on the Qualtrics™ online survey platform.

The selection was performed according to two aspects: the potential future impact of drivers on the organic sector in the EU and the degree of uncertainty in the period spanned by the scenario analysis. When considering the drivers' uncertainty, experts were not asked to evaluate the likelihood of the drivers' future state. On the contrary, a driver was considered uncertain if it could not be predicted whether the driver would be positive or negative for the organic sector and did not even know how likely it was to occur. The evaluation of both impact and uncertainty for each driver was elicited during two Delphi rounds using online questionnaires. Experts were provided with the complete preliminary list of relevant drivers (Appendix B); for each driver, experts evaluated impact and uncertainty using a five-point Likert scale. After the first elicitation of experts' evaluations, a second round was used to consolidate and deepen insights derived from the previous round. Experts had the opportunity to reconsider their opinion on the level of impact and uncertainty that they previously provided in the first round. In particular, the second-round experts could compare their assessments with the consensus response of the group. This information could be used to reflect on the reasons for the original responses and alter them if appropriate

Collected data were used for an Impact-Uncertainty Analysis (IUA), which is proposed here as an adaptation of the Importance-Performance analysis (IPA) initially proposed by Martilla & James, (1977). IUA compares measures of impact and uncertainty for a set of drivers in a two-dimensional space based on the Likert scores. The Impact and Uncertainty scores were summed to get an overall relevance score for each driver. The final selection was performed following these criteria: at least two drivers for each macro-category should be included, and the total number of drivers should be taken in a manageable size to allow a feasible approach in the following steps of the scenario analysis.

A graphical representation of the classifications of the selected drivers is shown in Figure 4.

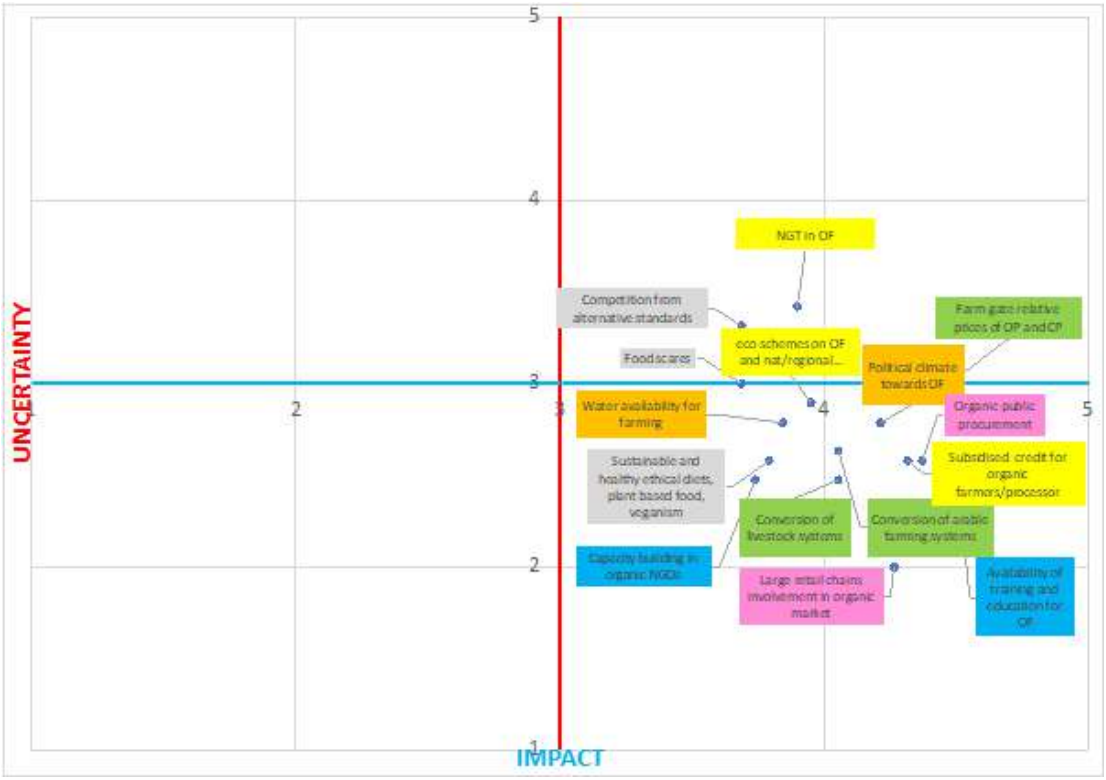


Figure 4. Impact and Uncertainty drivers: organic farming drivers selection results

The final selection accounted for 15 drivers. Three possible states were qualitatively defined to span the potential evolution of each of the 15 selected drivers by 2040. The drivers' states were defined by trying to encompass, for each driving force, all possible mutually exclusive outcomes between the two extremes. A concise definition, together with a short state description, was provided for each driver state. The final list of selected drivers with the respective states is shown in Appendix C.

Step 3 - Scenario workshop

A two-day workshop was organised to develop the scenarios for the organic agriculture sector. The workshop was designed to actively involve experts in a practical foresight exercise that explored different scenarios that might affect the organic sector in reaching the F2F targets.

Experts were guided to explore relationships between variables/events that may potentially impact the future of the organic food and farming sector. During the workshop, experts co-created a shared foresight of the future. They sketched the potential role of the relevant stakeholders and the desirability of each scenario for them. The experts were involved in a qualitative modelling exercise based on morphological analysis (Ritchey & Arciszewski, 2018). By combining relevant drivers and their alternative states by 2040, experts were able to develop collective storylines leading to the F2F target. Specifically, experts were asked to develop four scenarios based on contrasting and alternative storylines, subsequently described by written narratives.

Unexpected and 'surprise' storylines were encouraged. Storylines represent the identified combinations of drives/states defined as internally consistent and possible (but not necessarily probable) following an influence diagram approach. In other words, events represented by drivers' states should naturally be related to each other by clearly explainable and plausible relationships. Storylines could be considered the "skeletons" of the scenarios, which were then fleshed out to add consistent narratives and obtain the whole scenario's representation.

The workshop included both plenary and breakout sessions. For breakouts, the experts were divided into two groups. One group was asked to develop storylines using a policy-driven perspective ("Push" group), and the other group was asked to follow a demand-driven perspective ("Pull" group). Each group was assigned a facilitator and an assistant facilitator for notetaking and worked separately to develop storylines according to their "Push" or "Pull" perspective.

Once drafts of storylines were completed, participants of the "Pull" group were invited to critically review the storylines of the "Push" group and vice versa. The aim was to consider comments, suggestions or amendments to the storylines.

Based on the graphical storylines, the complete scenarios were developed, adding narratives. The facilitator encouraged the experts in each group to agree on a short, vivid name for each scenario. The participants were then instructed to write a concise narrative summary of each scenario storyline. The task was to collectively "tell the story", fleshing each scenario storyline with natural language and adding relevant details and implications that may contribute to enforcing the internal consistency and credibility of the scenarios. All the scenarios were presented and discussed in a plenary session.

The final set of graphical storylines is shown in

Figure 5 in a visual representation inspired by Mora et al., (2020), where different colours identify the various storylines defined by the scenario team. Participants developed four scenarios: the two "Push" (supply-driven) scenarios were named *Green Public Policy* and *Divergent Pathways for the Organic Sector*. The two "Pull" (demand-driven) scenarios were *Organic on Every Table* and *Organic Power to the People*. The scenario narratives have been finalised after a validation process that involved various steps of revision among experts.

		PUSH - POLICY DRIVEN			PULL - DEMAND DRIVEN		
	DRIVER	STATE 1	STATE 2	STATE 3	STATE 1	STATE 2	STATE 3
MEGA TRENDS	Political climate towards OF	Green Deal cancelled	Green Deal stalled	Green Deal +	Green Deal cancelled	Green Deal stalled	Green Deal +
	Water availability for farming	Water conflicts	Mixed corporate-public governance of water	Circularity and regulated water	Water conflicts	Mixed corporate-public governance of water	Circularity and regulated water
CONSUMERS PERSPECTIVE	Competition from alternative standards	Mainstream agriculture revival	Entropy of standards	Organic primacy	Mainstream agriculture revival	Entropy of standards	Organic primacy
	Food scares	Organic scandals	No pain, no gain	Conventional food scandals	Organic scandals	No pain, no gain	Conventional food scandals
	Sustainable and healthy diets	Going junky	Healthy but Grey	Healthy & Green	Going junky	Healthy but Grey	Healthy & Green
SUPPLY CHAIN	Large retail chains involvement	Fragmented supply	Networking	Big is better	Fragmented supply	Networking	Big is better
	Organic public procurement	Organic demand stays private	Fragmented public procurement	Public procurement boost	Organic demand stays private	Fragmented public procurement	Public procurement boost
POLICY	Eco-schemes, national/ regional policies OF	Unfavourable CAP	Neutral CAP	Favourable CAP	Unfavourable CAP	Neutral CAP	Favourable CAP
	NGT in OF	NGT liberalisation	NGT only in conventional	NGT-free EU	NGT liberalisation	NGT only in conventional	NGT-free EU
	Subsidised credit for OF/processor	Credit crunch for organic farmers	Credit lines for organic farmers	Organic finance	Credit crunch for organic farmers	Credit lines for organic farmers	Organic finance
FARMERS PERSPECTIVE	Conversion of arable farming systems	Concentrated growth	Lagger countries catching-up	Widespread uniform conversion	Concentrated growth	Lagger countries catching-up	Widespread uniform conversion
	Conversion of livestock systems	Concentrated growth	Lagger countries catching-up	Widespread uniform conversion	Concentrated growth	Lagger countries catching-up	Widespread uniform conversion
	Farm-gate relative prices of OP vs CP	No more premium	Uneven premiums	Premium prices are there to stay	No more premium	Uneven premiums	Premium prices are there to stay
AKIS	Capacity building in organic NGOs	Fragmented NGOs	Few EU/National strong lobbying	Development of Organic NGOs	Fragmented NGOs	Few EU/National strong lobbying	Development of Organic NGOs
	Training and education for OF	Organic AKIS stay marginal	Common AKIS for farming	Knowledge boost in OF	Organic AKIS stay marginal	Common AKIS for farming	Knowledge boost in OF

Figure 5. Graphical storylines of the scenarios for the organic agricultural sector

2.2.2.Scenario knowledge generation for the organic aquaculture sector

The scenario analysis was designed and managed by an experienced facilitation team that provided the necessary preparatory work and toolkits for the one-day workshop (11 September 2023) conducted in Lecce (IT). The European Union was selected as the spatial framework, and the scenario team chose the year 2035 as the time horizon for the scenario analysis. This timeframe provides sufficient length to plan potential structural changes in the aquaculture sector, while a medium-term outlook also facilitates a more realistic vision for the team. The scenario generation process is described in Figure 6.

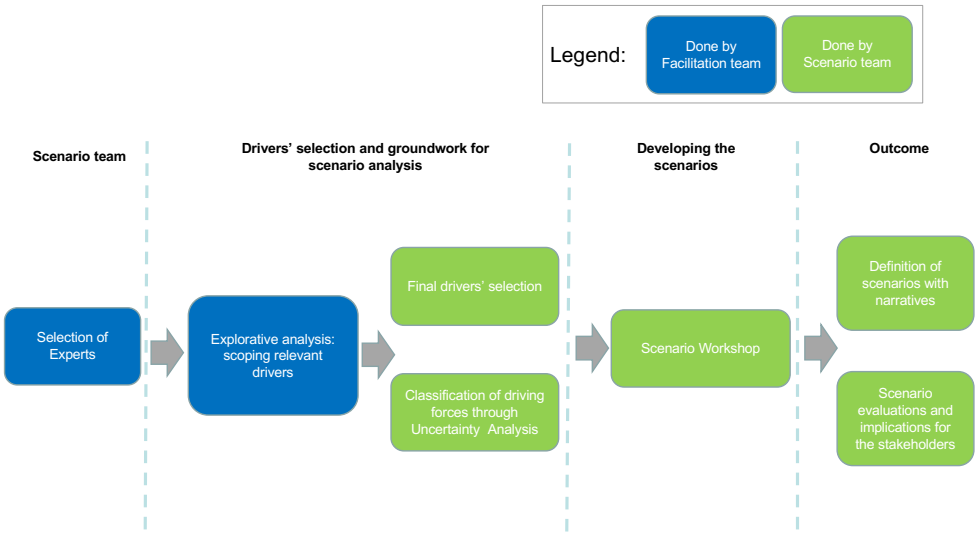


Figure 6. Drivers' selection and the scenario generation process for the organic aquaculture sector

Scenario team

Eight experts and stakeholders from the aquaculture sector were involved as a scenario team to contribute to the scenario-generation process. Skills cover the following fields: academic and research, organic producers, umbrella organisations, certification and consultants. Geographical coverage included Mediterranean countries, central European countries and northern European countries.

Driver selection and groundwork for scenario analysis

An explorative list of potentially relevant drivers for organic aquaculture was defined based on an extensive literature review. The explorative list consisted of forty drivers and covered the following topics: Macro Trends, Consumers' perspective, Farmers'/supply chain perspective, Regulatory/policy environment, and Aquaculture Knowledge and Innovation System (KIS).

The next step was to select, through a web survey involving the scenario team, a reduced list of highly relevant drivers that could be effectively managed in the scenario workshop. Fourteen drivers were identified and described using short, manageable labels. A concise description was provided for each driver. Two or three possible states were qualitatively defined and described to span the potential evolution of each of the selected drivers by 2035. The drivers' states were defined by trying to encompass, for each driving force, possible mutually exclusive and contrasting outcomes. The final list of selected drivers with the respective states is shown in Appendix D.

The approach to the scenario analysis was to consider, as a starting point, contrasting combinations of the two drivers with both the highest plausible impact and the highest degree of uncertainty. A driver is considered to have a high impact if it could have substantial consequences (positive or negative) for the development of the aquaculture

sector. A driver is considered uncertain if its future evolution (strengthening or weakening) cannot be clearly predicted. For instance, aspects like demographic trends are characterised by limited uncertainty as they could be quite precisely predicted for the next decades; however, their impact is certainly relevant to many socio-economic aspects.

The selected driving forces were classified using the Impact-Uncertainty Analysis (IUA). Members of the scenario team rated the importance and uncertainty scores using a five-degree Likert scale in a voting procedure on the Qualtrics™ web platform. A graphical representation of the IUA classification of the drivers is shown in Figure 7. The origin of the coordinate axis refers to the arithmetic means of impact and uncertainty scores. IUA analysis allows for identifying the drivers with the highest impact and uncertainty. The voting procedure indicated "*Food preferences*" and "*Changes in market globalisation process*" as the drivers with the highest sum of impact and uncertainty scores. It was selected to build up the "starter scheme" to kick off the discussion for the scenario development. Combinations of the states of the two drivers are reported in a double-entry table (Table 1). The scenario team was asked to eliminate the combinations they perceived as less relevant or interesting to explore to reduce the complexity of the analysis. As a final result, four combinations were maintained that provided the basis for developing four scenarios.

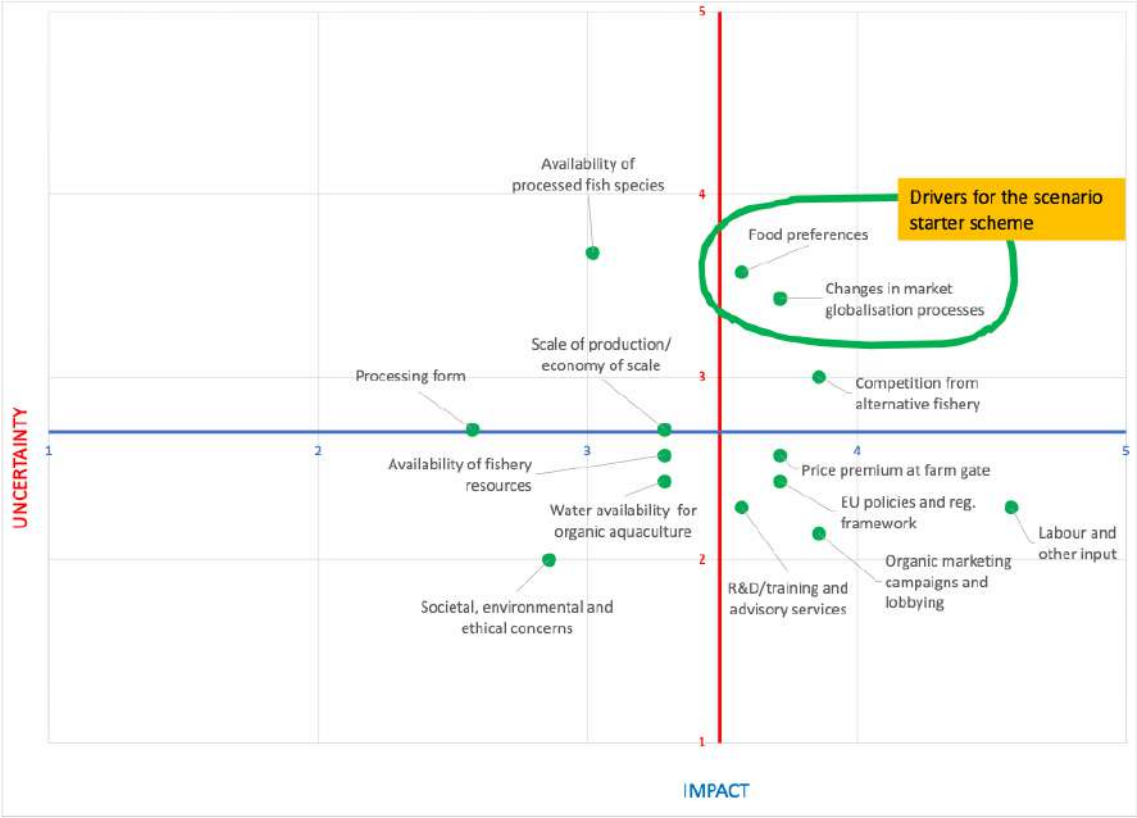


Figure 7. Classification of organic aquaculture drivers: results from IUA

Table 1. Organic Aquaculture Scenario Starter Scheme

CHANGES IN MARKET GLOBALISATION PROCESSES	FOOD PREFERENCES: ++	FOOD PREFERENCES: +/-	FOOD PREFERENCES: --
++	Sustainable [illegible] diets prevail; Re-[illegible]	Fragg[illegible]mers' [illegible]ence; R[illegible]	Unsusta[illegible]healthy [illegible]; Re[illegible]
+/-	Sustainable & healthy diets prevail; Fortress EU	Fragg[illegible]mers' [illegible]ence	Unsustainable & unhealthy diets prevail; Fortress EU
--	Sustainable & healthy diets prevail; West-East Polarisation	Fragm[illegible]mers' [illegible]ence; West[illegible]ation	Unsustainable & unhealthy diets prevail; West-East Polarisation

CHANGES IN MARKET GLOBALISATION PROCESSES	FOOD PREFERENCES	
	Sustainable & healthy diets prevail	Unsustainable & unhealthy diets prevail
	Fortress EU	Fortress EU
	Sustainable & healthy diets prevail	Unsustainable & unhealthy diets prevail
	West-East Polarisation	West-East Polarisation

Developing the scenarios

A one-day workshop was organised to develop four scenarios, engaging the scenario team in a practical exercise to co-create a shared foresight of the future for the organic aquaculture sector by the year 2035.

Based on the combinations of the states of the two most relevant drivers shown in the "starter scheme" (Table 1), the scenario team was encouraged to develop a more complete picture of the future of organic aquaculture. During practical and interactive sessions, the experts of the scenario team linked different states of all the remaining drivers to generate graphical storylines that build up the skeletons of the final scenarios (Figure 8). Unexpected and 'surprise' storylines were encouraged. Storylines could be considered the "skeletons" of the scenarios, which were then fleshed out, adding consistent narratives to obtain the whole scenario's representation. Figure 8 presents the complete set of graphical storylines and scenario names in a visual representation inspired by Mora et al. (2020), where different colours distinguish the various storylines defined by the scenario team.

Based on the graphical storylines, the complete scenarios were developed by adding narratives. The facilitator encouraged the experts in each group to agree on a short, vivid name for each scenario. The participants were then instructed to write a concise narrative summary of each scenario storyline. This process was to collectively "tell the story", enriching each scenario storyline with natural language and incorporating key details and implications to strengthen its internal consistency and credibility. Each group's scenarios (storylines and narratives) were then presented and discussed in the plenary session to give the whole team an overview of the scenario-generation process. The scenarios were named *Weak EU*, *Green and Fair*, *Gloomy* and *Big Mac Organic*.

DRIVERS	DRIVERS' STATES			DRIVERS' STATES		
Changes in market globalisation processes	Re-globalisation	Strong EU	West-East polarisation	Re-globalisation	Strong EU	West-East polarisation
Food preferences	Sustainable & healthy diets prevail	Fragmented consumers' preferences	Unsustainable & unhealthy diets prevail	Sustainable & healthy diets prevail	Fragmented consumers' preferences	Unsustainable & unhealthy diets prevail
Water availability for organic aquaculture	Water conflicts	Mixed corporate-public governance of water	Circularity and regulated water	Water conflicts	Mixed corporate-public governance of water	Circularity and regulated water
Competition from alternative fishery production standards	Mainstream aquaculture dominance	Entropy of standards	Organic primacy	Mainstream aquaculture dominance	Entropy of standards	Organic primacy
Availability of fishery resources	Business as usual		Reduced availability of Fishery resources	Business as usual		Reduced availability of Fishery resources
Availability of processed fish species	Low	Medium	high	Low	Medium	high
Processing form	Fresh (unprocessed)	Preserved (dried, smoked, canned, etc.)	Frozen	Fresh (unprocessed)	Preserved (dried, smoked, canned, etc.)	Frozen
Price premium at farm gate for OA	No more premium	Uneven premiums	Premium prices are there to stay	No more premium	Uneven premiums	Premium prices are there to stay
Labour and other input costs	OA stays cost-inefficient	Moderate improvement in cost efficiency	Cost efficiency achieved for OA	OA stays cost-inefficient	Moderate improvement in cost efficiency	Cost efficiency achieved for OA
Scale of production/ economy of scale for org. aquaculture sector	OA sector stays embryonic	Prevalence of SME	Big is better	OA sector stays embryonic	Prevalence of SME	Big is better
EU policies and regulatory framework	Common rules	Patchwork regulation	Regulatory overload	Common rules	Patchwork regulation	Regulatory overload
Societal, environmental and ethical concerns	Green but not fair	Greenwashing	Green & Fair	Green but not fair	Greenwashing	Not green & Not fair
Organic marketing campaigns and lobbying	Fragmented NGOs	Few EU/National strong lobbying	Development of Organic NGOs	Fragmented NGOs	Few EU/National strong lobbying	Development of Organic NGOs
R&D/training and advisory services for OA	Organic knowledge system stays marginal	Common knowledge system for aquaculture	Knowledge boost in OA	Organic knowledge system stays marginal	Common knowledge system for aquaculture	Knowledge boost in OA
	WEAK EU	**GREEN AND FAIR**		**GLOOMY**		**BIG MAC ORGANIC**

Figure 8. Graphical storylines of the scenarios for the organic aquaculture sector

2.3. Scenarios Results

The final version of the narratives presented below incorporates comments and revisions from the validation and approval process, in which all scenario team members (workshops' participants) provided input before the final edits were made. Based on the storylines and narratives, the scenario team was then asked to evaluate the implications of the scenarios for the main stakeholders of the organic agriculture and aquaculture sector. Narratives and scenario evaluations are reported below.

2.3.1. Narratives of the organic agriculture scenarios

Green Public Policy

Growing concerns among the public and policymakers regarding significant environmental challenges such as climate change, biodiversity loss, and issues related to water and soil have intensified. In response, there is a heightened focus on bolstering and improving European policy frameworks, including initiatives like the Green Deal, Farm 2 Fork, and Biodiversity Strategies, along with subsequent policies. The escalating severity of extreme weather events, such as droughts and floods, combined with rising costs for energy, fertiliser, and imported feed, is prompting farmers to adopt and cooperate with green policies to mitigate risks increasingly.

The evolving political landscape, marked by the formation of new farmer networks, signals a proactive engagement with environmental concerns and a shift in production systems. There is an increasing collaboration between organic and agroecology organisations and environmental NGOs. This collaborative effort extends to establishing diverse production standards and ensuring long-term resilience.

Building upon the commitments outlined in the CAP 2023-27, the future CAP reform strongly emphasises organic farming and agri-environmental support. Given the added environmental benefits, this strategic shift makes organic production more appealing, especially for arable producers. The pig and poultry systems witness a transition toward localised feed sourcing, leading to reduced intensity. Overall, livestock numbers decrease alongside reduced consumer demand for meat and dairy products.

The push for conversion to organic practices is primarily driven by policy initiatives and public support rather than market forces. While premium prices are not guaranteed and may experience fluctuations, policy measures actively support the organic Agricultural Knowledge and Innovation Systems (AKIS), supply chain, and market initiatives to encourage and facilitate conversion.

There is growing acceptance of organic practices at the national and local levels, with organic food becoming the standard in public institutions such as hospitals, canteens, and schools. The widespread adoption of organic practices is particularly encouraged in regions facing significant environmental challenges. Regions struggling with issues such as abandonment are finding new opportunities to re-engage with farming.

As current organic regulations gain prominence, there is increasing pressure from other farming groups to develop alternative standards, such as integrated and regenerative approaches, including the introduction of EU sustainability labelling. Efforts to standardise and reduce greenwashing are essential to avoid the proliferation of competing standards. Adaptations to organic regulations are necessary to address emerging challenges related to climate, biodiversity, and consumer expectations, ensuring the continued predominance of organic practices.

Divergent Pathways for the Organic Sector

Concerns regarding food security, high inflation rates, and unfavourable reactions from farmers to reduced profitability contribute to a diminished focus on environmental policies. The prioritisation of social issues over environmental concerns results in an escalating trend of social fragmentation. A heightened emphasis accompanies this shift to a productivist agenda, leading to the rollback of the Green Deal and a general weakening of the European Union's influence.

Certain Member States or regions opt to uphold and cultivate robust organic policies and agri-environmental support. Committed Member States actively encourage the consumption of domestic products. Organic non-governmental organisations play a pivotal role in sustaining political interest in these regions, with high levels of public engagement and demand acting as catalysts for imports and production from regions with less established domestic consumption.

Standards on greenwashing (green claims) reduce the proliferation of competing standards, and national organic regulations address new challenges, such as climate, biodiversity, and consumer expectations, to maintain the predominance of organic standards. This makes it more attractive for arable producers to convert to organic production, which offers added environmental benefits. The policy supports organic AKIS, supply chain and market initiatives to motivate and facilitate a conversion. Conversion would be widespread, and farmers in regions where abandonment is a problem would find new opportunities for re-engaging with farming.

Conversely, in various other countries, backing for organic and environmental policies faces withdrawal, prompting a minority of the public to harbour ongoing concerns about environmental issues. Mainstream agriculture revivals and lobbies enhance efforts to support conventional farming development. This leads to a neutral approach to farming policies, with no significant changes toward more substantial support for organic farming conversion.

NGTs are allowed in conventional agriculture but are banned from organic agriculture. The quality of conventional products often fails to meet adequate standards, leading to food scandals for specific products. Food preferences become polarised, and consumers are segmented into supporters and detractors of organic products. Consequently, individuals are compelled to seek solutions independently due to uneven government engagement. This has led to a discernible split within the agricultural sector, with organic initiatives emerging in opposition to conventional methods, thereby deepening divisions among different regions, farmer groups, and social demographics.

Innovative solutions are imperative within the organic sphere to address these challenges, placing a significant emphasis on fostering solidarity within the supply chain. Notably, organic non-governmental organisations (NGOs) play a pivotal role in organising autonomous initiatives that support the organic sector. The financial sector has also transformed, with private-sector sources, including organic companies, retailers, foundations, and payments for ecosystem services (such as water, carbon, and biodiversity offsetting), assuming heightened importance in sustaining these initiatives.

The conversion to organic practices aligns more closely with market demand rather than purely environmental considerations. The growth of the organic sector is becoming concentrated in specific regional hubs for both arable and livestock systems, with consumption patterns gravitating towards urban centres where consumers wield greater purchasing power. Price premiums remain steady for most organic products. Additionally, some countries and regions strategically orient themselves towards exporting organic products to areas characterised by high demand.

In this evolving landscape, the concept of organic districts has gained popularity, providing focal points for concentrated organic activities that lead to large and stable organic supply chains. This multifaceted approach underscores the dynamic nature of the organic movement, where economic, environmental, and regional considerations

intertwine to shape the future trajectory of the sector, particularly in regions with high demand.

Organic on Every Table

Organic farming's benefits for the environment and society are well understood by citizens and policymakers alike, and this is broadly reflected in their actions towards organic farming.

The Green Deal is challenged by the polarity between long-term green targets and emergency needs triggered by global crises and trade. However, evidence of climate emergency and water issues keeps environmental considerations prominent, triggering the agrifood industry's push for NGTs. However, thanks to the lobbying of organic and like-minded NGOs and national authorities, the Green Deal remains, and NGTs are kept out of organic.

Organic farming is connected to the push for protecting biodiversity and groundwater resources and reducing oxygen loss in rivers, lakes and local watercourses. It helps reinforce the favourable political climate for organic.

Organic primacy is propelled and stands out from attempts from alternative standards and schemes to gain room and legal recognition in the sustainability and market domain.

Nearly all people recognise the organic label as a guarantee of the food values they care about.

Organic food has reached all European families – in their homes when preparing dinner, at work, and in restaurants - and is increasingly associated with health-related attributes and claims. Through targeted green public procurement policies, organic food is widely included in schools and public canteens.

The organic premium still exists, but the price differential is smaller (except for animal products), partly because supply chain actors are empowered, and farmers have more direct involvement in the distribution chains. They can broker better agreements with processors and distributors, which is reflected in the prices offered by large retail chains to their customers.

Large-scale retailers play a leading role in facilitating the mainstream availability of organic products by increasing the range of products and getting more involved in the organic food chain. They have also incorporated and consolidated some small-scale alternative and specialised retailers. However, alternative models are expanding and innovating, e.g., e-commerce, digital box schemes and CSAs, farmers' markets, new distribution models, and general farmer-consumer partnerships.

Organic farmers receive preferential credit due to their ecosystem services (e.g., carbon and biodiversity credits). Private investment funds and public support are essential in financing the sector.

While the generally positive policy and market conditions encourage a widespread conversion to organic for arable and permanent crops, livestock production is carried out in the context of broader societal shifts concerning the diminishing role of animal products in healthy and sustainable diets. Appropriate production methods, animal welfare, and other considerations are essential, and grazing animal farming doesn't

expand overall. Still, it is concentrated in specific areas, such as mountain regions and less favoured areas.

Organic Agricultural Knowledge and Information Services (AKIS) are widely available in all schools, agricultural training and advisory services, universities, and research institutions, and are becoming mainstream.

The current trends in AKIS sustainable farming are mainstreaming organic agriculture, placing it alongside agroecology and regenerative methods.

Organic Power to the People

The heavy consequences of runaway climate change, biodiversity collapse, and escalating water scarcity profoundly affect European citizens. In the context of a divide between supporters and detractors of organic products, mainstream agricultural lobbies are increasingly targeting consumers to highlight the safety and convenience of food products derived from New Genetic Technologies (NGT). This practice is allowed for conventional products only.

In the face of inadequate political action at the European level, leading to the failure of Green Deal policies, citizens are taking initiatives to maintain the availability of organic food, as they recognise its crucial role in mitigating health and environmental crises.

Recognising the market potential, the private financial sector is developing specific credit lines for organic farmers. The steady market demand leads to stable premium prices for organic products, keeping organic farm-gate prices consistently higher than conventional ones for most products. Consequently, the organic sector is witnessing a general increase in conversion for both arable crops and livestock systems.

Consumers are exerting significant pressure on retailers, driving the growth of alternative models through digital tools such as e-commerce, direct sales platforms, and strengthened cooperatives of producers and consumers. In response, retailers are expanding their organic offerings and playing a more active role in facilitating future supply by encouraging farm conversion and fostering more equitable, sustainable relationships with other supply chain actors. NGOs and civil society movements play a crucial role in facilitating these connections and safeguarding the interests of all parties involved.

Despite a lack of action at the European level, national and regional governments are heeding the call of their citizens to address climate, nature, health, and resource scarcity issues. They provide funding and resources to expand organic agriculture through public procurement policies. National policymakers, the food value chain, and citizens are renewing their appreciation for the significant value of organic agriculture as the only legal standard.

In certain countries, the development of organic agriculture is also supported by active networks, where farmers share knowledge and experiences. This knowledge sharing is mainly facilitated by the rise of social networking and citizen science initiatives, driven by a deeper engagement and interest in environmental and health issues.

2.3.2.Narratives of the organic aquaculture scenarios

Weak EU

As market globalisation processes unfold, they increasingly highlight a noticeable polarisation between the Western and Eastern hemispheres. This trend deepens existing economic divides and underscores disparities in opportunities and access to resources. Amidst these shifts, food preferences play a pivotal yet concerning role. Despite growing awareness of the importance of sustainable and nutritious diets, prevailing food choices often turn towards convenience over health, contributing to the prevalence of unsustainable and unhealthy dietary habits worldwide.

Conflicts over water allocation persist among diverse users engaged in various activities within shared spaces. Corporate interests predominantly influence governance structures, although the EU government exerts some oversight. Meanwhile, alternative sustainable and organic aquaculture standards compete for dominance, complicating regulatory frameworks. The abundance of fishery resources does not significantly impact organic aquaculture production. The pricing dynamics further highlight the disparity between organic and conventional products, with organic farmers requiring substantially higher farm gate prices to justify conversion or maintain organic standards for aquaculture. The high cost of organic inputs, coupled with inefficiencies in production systems, hampers the attractiveness of organic aquaculture, leaving it in a nascent stage. Moreover, the regulatory framework in the EU remains fragmented and burdensome, impeding the sector's growth and leading to concerns of "greenwashing" as environmental and ethical considerations are overshadowed. With societal influence on the decline, lobbying efforts are concentrated in a handful of countries, limiting broader advocacy for organic aquaculture. Consequently, the knowledge system surrounding organic aquaculture remains marginalised within this complex ecosystem.

Green and Fair

In this scenario, the European Union remains a formidable economic entity but increasingly isolates itself from global trade, erecting higher tariffs and non-tariff barriers. This protectionist stance aims to shield domestic industries from international competition.

Meanwhile, public investments in water infrastructure across EU nations alleviate water scarcity, promoting water reuse, particularly in organic aquaculture. This supports sustainable practices while ensuring sufficient water for production.

Consumers within this fortress prioritise organic and healthy food sourced sustainably, favouring certified products. Organic aquaculture gains primacy, with alternative standards failing to gain legal recognition. Consumers increasingly perceive organic aquaculture as the superior environmental and biodiversity conservation choice.

However, challenges arise as fishery resources diminish due to climatic shifts, overfishing, and potential policy interventions. In response, seafood preparation methods diversify, including preservation, drying, smoking, and canning, while the frozen chain facilitates the distribution of farmed fish.

Despite increased availability, organic premium prices erode slightly, yet cost efficiency improves for organic aquaculture, enabling profitability despite higher input costs.

Supply chains integrate small and medium-sized enterprises into organic districts or cooperatives, enhancing profitability through economies of scale.

EU policies establish common rules and regulatory frameworks, emphasising safety and quality standards for organic aquaculture. Societal, environmental, and ethical concerns drive a green and fair agenda supported by organic marketing campaigns and lobbying efforts.

However, challenges persist in differentiating research, training, and advisory services between organic and conventional aquaculture, highlighting the need for further development in this area within the organic sector.

Big Mac Organic

The world population keeps rising, and there is an increasing demand for aquatic products, particularly sustainable and healthy aquatic foods. Fisheries are not sufficient to meet a sustainable and healthy diet. Organic aquaculture is seen as one solution, but there are several particularities linked to the West-East polarisation context.

Production is consolidated by only a few companies that own vertical supply chains. Large-scale production and automation are the only viable business models in this scenario. The sizeable geographical trade has several implications. First, there will be diverse standards with the risk of confusion among “green” standards. In that case, the role and development of organic NGOs appear critical for consumer knowledge and campaigning for organic aquaculture. Second, thanks to trade deals, the market offer can be diversified in terms of species and products, and distributors are major players in that purpose. Finally, national regulations might prevail, leading to uneven production rules and potential unfair competition for EU producers.

There is a willingness for green production and a sustainable lifestyle, supported by a strong knowledge of the organic added value. However, the trade situation implies a lack of access to the market for some producers/actors, especially small producers and will not promote local production. This trading context will lead to a moderate improvement in cost efficiency (e.g. aquafeeds). However, premiums might differ among species/products.

Gloomy

In a scenario of European autarchy, the continent endeavours to limit imports and achieve self-sufficiency to the greatest extent possible. However, this pursuit is accompanied by a constrained purchasing power and a prevailing disregard for sustainability, quality, and the healthiness of food. Instead, the ethos of "cheap is king" dominates, prioritising profit over environmental and ethical considerations in aquaculture. Consequently, consumers prioritise affordability over the manner of production, leading to a lack of interest in environmentally friendly and socially responsible practices.

Only the wealthy segment of society demonstrates concern for the health and safety aspects of food consumption, while sustainability remains primarily disregarded. Aquaculture producers cope with water usage conflicts, a complex interplay governed by private and public entities. Certification schemes, including organic standards, hold

minimal sway in the market, with organic products relegated to a niche sector commanding premium prices.

The aquaculture industry holds limited influence, characterised by a sparse presence of companies with limited scale. Consequently, production efficiency suffers, leading to diminished availability of aquaculture products. The organic movement is marginalised, with associated NGOs disappearing from the landscape.

Distributors and processors wield significant influence, dictating consumer choices mainly based on price considerations. Both consumers and farmers, alongside stakeholders within the Aquaculture KIS, are relegated to the status of mere bystanders, failing to leverage their potential decision-making power.

2.4. Scenario evaluations and implications for the stakeholders of the organic farming and aquaculture sectors

2.4.1. Scenario evaluations and implication for the stakeholders of the organic agricultural sector

The four organic agriculture scenarios were analysed from the perspectives of the following stakeholders of the organic agribusiness: Farmers, Processors, Distributors, Consumers and AKIS. At this stage, experts again actively participated in interactive sessions to evaluate scenarios and stakeholders' involvement (Figure 9).

Figure 9. Experts participating in an interactive session during the organic farming scenario workshop

Scenario evaluation was performed by asking experts to indicate which scenario could be preferable for which stakeholder, through a simple voting procedure (Figure 10). Results in terms of relative preferences by stakeholders are shown in Table 1. The

highest desirability scores are for the Organic on every table, followed by the Green public policy-driven scenario. The Organic power to the people scenario is considered a favourable environment for consumers only, while the Divergent pathways for the organic sector is a less desirable scenario.

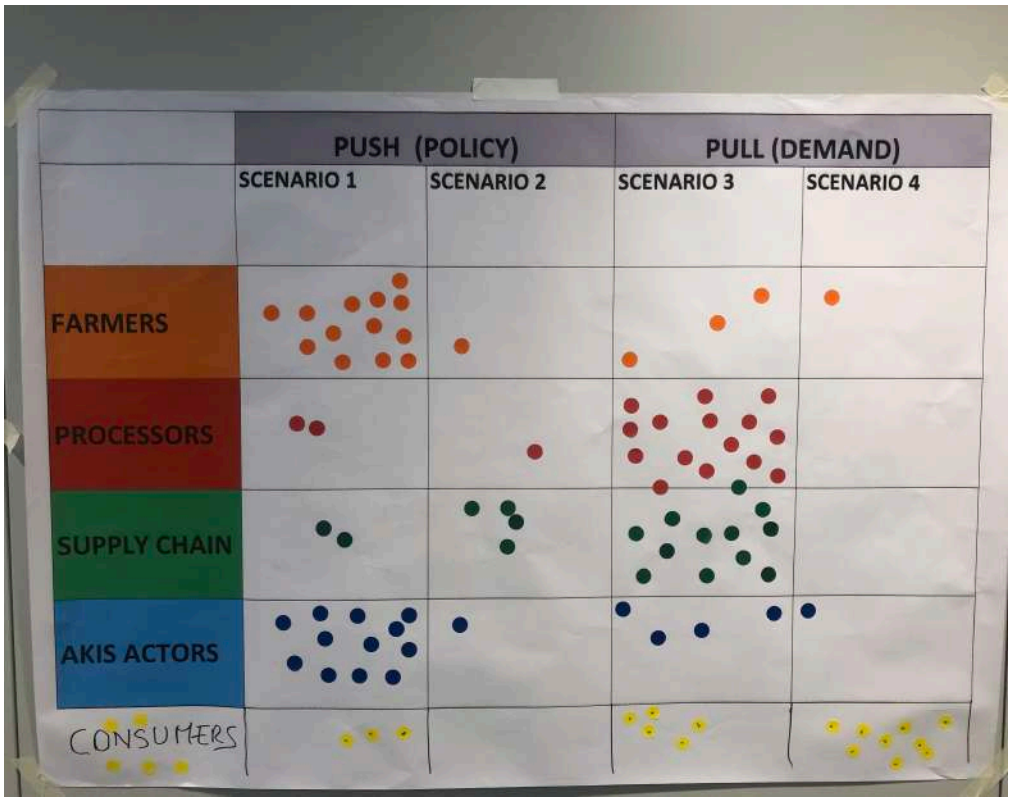


Figure 10. Scoring procedure for the organic farming scenario desirability matrix

Table 2. Organic Farming Scenario desirability matrix

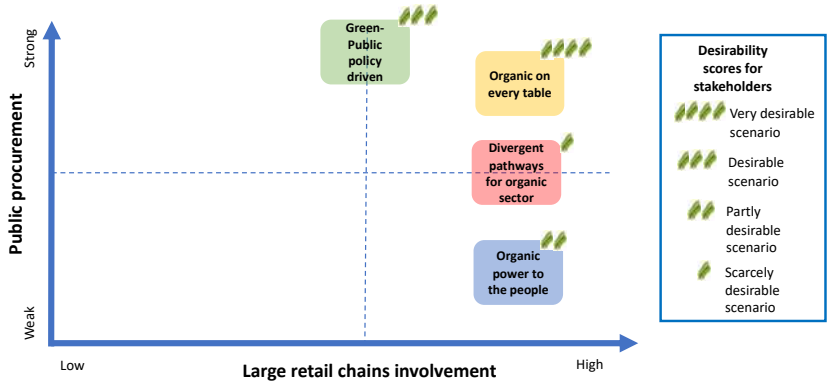
	Green public policy-driven	Divergent pathways for the organic sector	Organic on every table	Organic power to the people
Farmers	72%	6%	17%	6%
Processors	11%	6%	83%	0%
Supply Chain	11%	22%	67%	0%
AKIS actors	67%	6%	22%	6%
Consumers	17%	0%	28%	56%

The scenario analysis results outline six key drivers that will play a prominent role in the future development of the organic sector. All have been considered among the list of drivers and play a central role in each of the four scenarios considered:

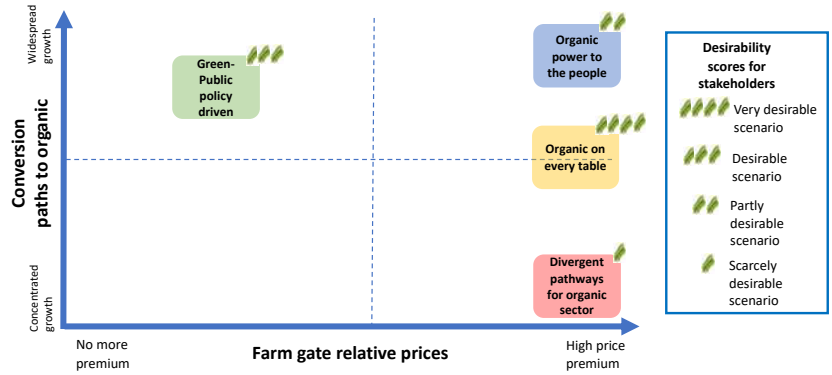
- Public procurement refers to changes in the demand for organic products in the public sector. Large retail chain involvement involves investing in organic products by increasing assortment and display.
- Conversion path to organic concerns reaching the organic F2F targets by increasing conversion of livestock-based farming systems and plant production and arable farming systems.
- Farm gate relative prices for organic products refer to the ratio of organic and conventional farm gate prices.
- The political climate towards organic farming concerns education, media coverage, and societal concerns for sustainable development.
- Capacity building in organic NGOs implies strengthening the capacity of the organisations to deliver their services and achieve their mission.

A mapping of the four scenarios in the context of pairwise comparisons of selected crucial drivers is shown in Figure 11. Each scenario, with its respective desirability score, is mapped according to the states of each relevant driver (

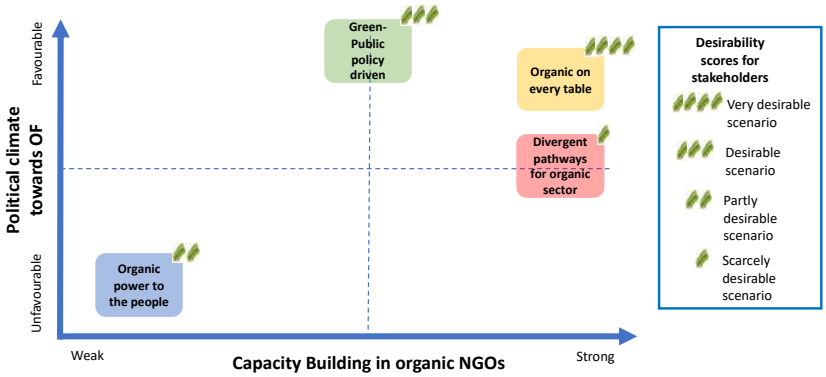
Figure 5). The positioning of the alternative scenarios in the outcome space of the selected general drivers is somewhat subjective. Still, it provides a synthetic visual representation that depicts the relative position of each scenario with respect to the others.



a) Public procurement vs Large retail chain involvement



b) Conversion paths to organic vs Farm gate relative prices



c) Political climate towards OF vs Capacity building in organic NGOs

Figure 11. Organic Farming Scenarios' mapping according to key drivers

Finally, experts assessed stakeholders' roles based on an "Interest-Power" classification of each stakeholder group under each scenario. An example of the "Interest-Power" classification scheme is provided in Figure 12. For example, if farmers are considered to have high power and high interest in a specific scenario, they are ranked as "Key players". This classification was made for each stakeholder under each scenario through dedicated voting sessions among experts. The result of the voting procedure is shown in Table 3

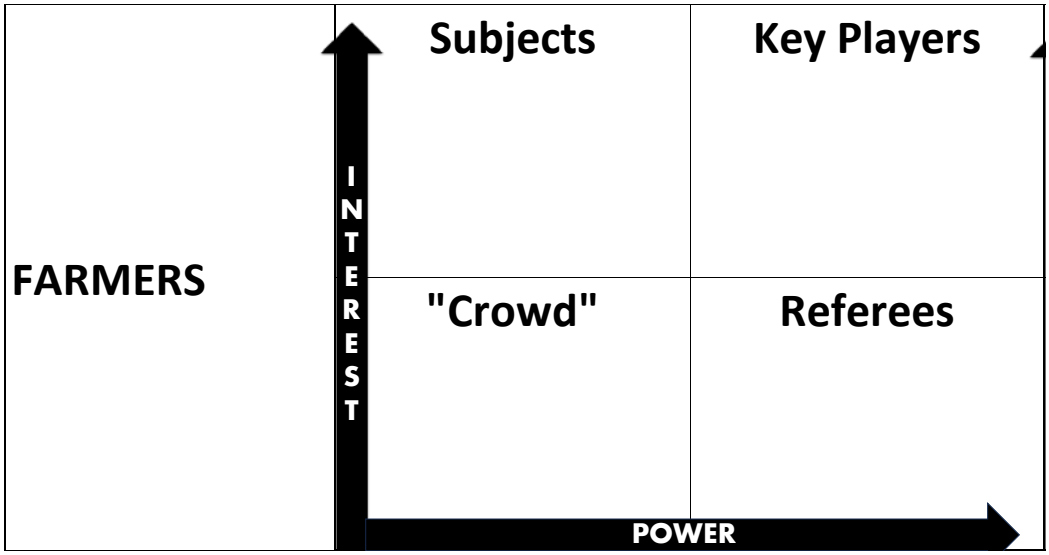


Figure 12. "Interest-Power" classification scheme

Table 3. Most voted role by stakeholder category for all scenarios

Stakeholder category	Most voted role	Score
Farmers	Subject	51%
Processors	Key players	69%
Distributors	Key Players	76%
AKIS	Subject	45%
Consumers	Key players	46%

Scenario evaluations and implication for the stakeholders of the organic aquaculture sector

The four scenarios were analysed from the perspectives of the main stakeholders of the organic agribusiness: Farmers, Processors, Distributors, Consumers and

Aquaculture KIS. At this stage, experts again actively participated in interactive sessions to evaluate scenarios and stakeholders' involvement
Scenario evaluation was performed by asking experts to indicate which scenario could be preferable for which stakeholder through a simple voting procedure. Results in terms of relative preferences by stakeholders are shown in **Errore. L'origine r iferimento non è stata trovata.**. The highest desirability scores are for the Green and Fair, followed by the Big Mac Organic scenario. The Gloomy scenario is considered a favourable environment for distributors only, while the Weak EU, which can be considered as a business-as-usual (BAU context, is the least favoured scenario, where no stakeholders are represented.

Table 4. Organic Aquaculture Scenario desirability matrix

	Weak EU (BAU)	Green and Fair	Big Mac Organic	Gloomy
Farmers	0%	**94%**	6%	0%
Processors	0%	19%	63%	19%
Distributors	0%	0%	**69%**	**31%**
KIS actors	0%	63%	38%	0%
Consumers	0%	**94%**	6%	0%

A mapping of the four scenarios is shown in Figure 13 and provides a graphical synthesis of the performance of the organic aquaculture sector under different combinations of the crucial drivers selected for the scenario starting scheme (Table 1).

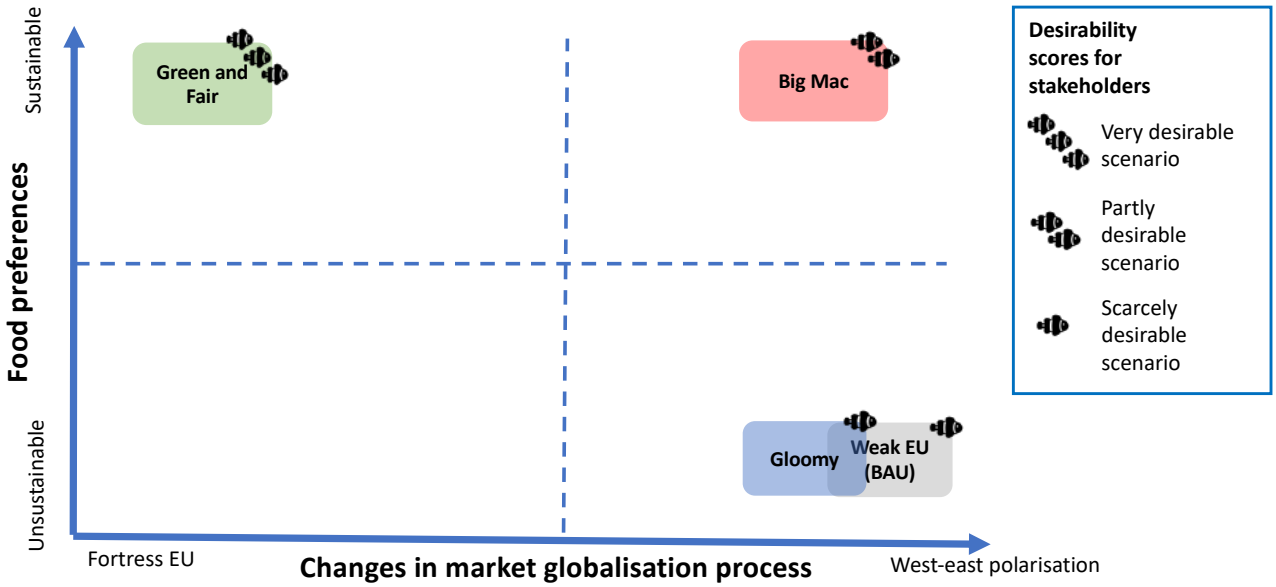


Figure 13. Organic Aquaculture Scenarios' mapping according to key drivers

Specific stakeholders' roles in each scenario were also considered according to two dimensions: their interest (i.e., if they have a particular stake or involvement in a scenario) and their power (i.e. if they can influence events and/or other actors in a scenario). We used the "Interest-Power" classification scheme shown in Figure 12 as a basis for a voting procedure. The result of the voting procedure is shown in Figure 14, and a synthesis of stakeholders' classification is provided in Table 5.

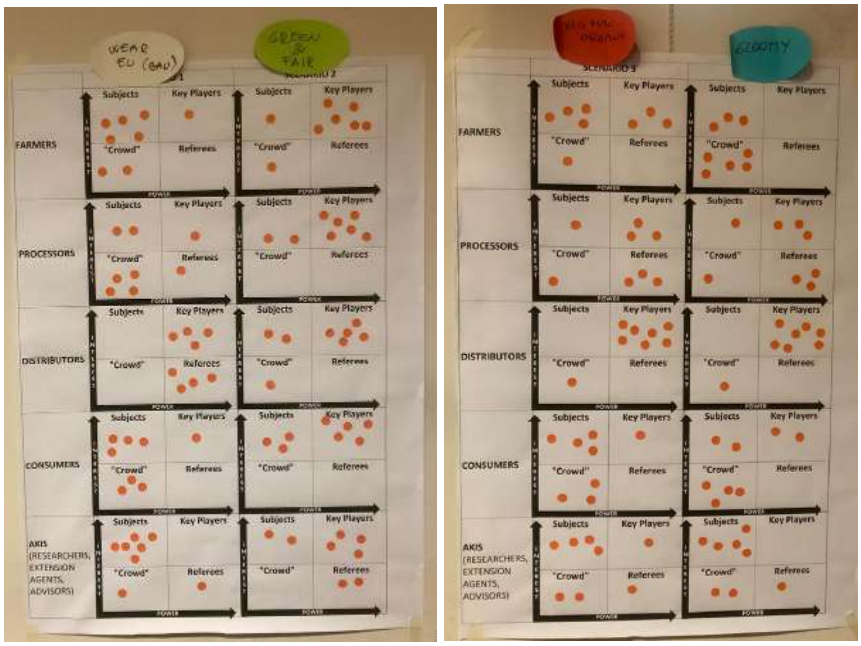


Figure 14. "Interest-Power" classification for stakeholders by scenario

Table 5. Most voted role by stakeholder category

Stakeholder	Most voted Category	score
Farmers	Subject	41%
Processors	Key players	41%
Distributors	Key Players	71%
Consumers	Subject	39%

KIS	Key players	53%

3. Backcasting European scenarios into national pathways

Based on the four European organic agriculture scenarios (chapter 2), national transition pathways for reaching 25% of land in organic farming, through a backcasting approach at national level, has been elaborated. Five backcasting studies have been conducted in five countries (Denmark, France, Germany, Italy, Hungary). These backcasting studies illustrate, in each country, the kind of actions that should be implemented in various domains to reach the 25% target.

The aims of these backcasting studies were to assess the feasibility of the four European scenarios in 2040 in selected countries with national stakeholders and researchers, and to reinforce the actors' strategic thinking and anticipation capacities. These studies contributed to the finalisation of the European scenarios of 25% of land in organic agriculture and to inform public policies recommendations.

3.1. The backcasting approach: some conceptual elements

Backcasting is a method that analyses backward from a desirable future that is considered an end-point, the actions (innovation, public policies…) that need to be taken to reach that future. It is a normative method, first described by Robinson in the 80's to work on energy transitions (Robinson, 1982). It aims to describe how a new or adapted system may evolve out of a previous system (De Koning et al., 2021).

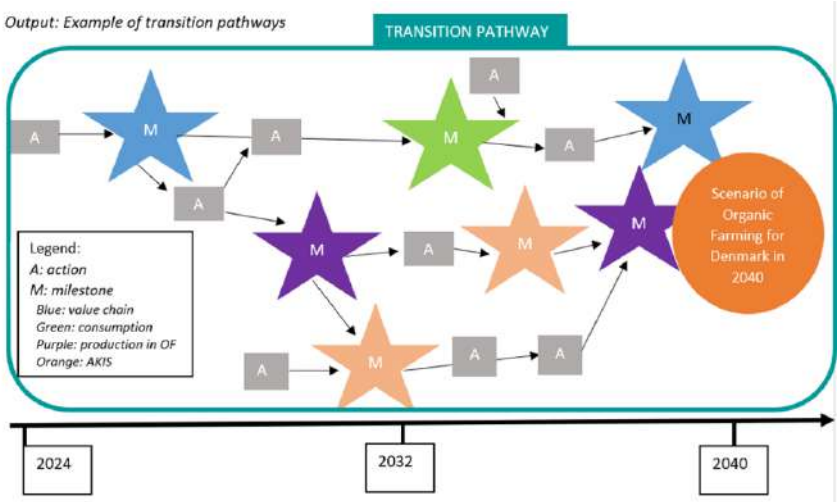


Figure 15. A transition pathway built with a method of backcasting

The backcasting method is particularly appropriate to our study. It allows addressing long-term and complex issues, where the dominant trends are part of the problem and that involve many aspects of society as well as technological or organizational innovation, and public policies. The backcasting method works well to address an issue or to reach a goal when systemic changes are needed (Kishita et al., 2024). By breaking down the future into incremental small steps, it contributes to making scenarios plausible and feasible, and to listing the various steps necessary to achieve them (Dreborg, 1996). Backcasting can help actors to define their strategy and to prioritise their action to implement a transition and policy-makers to define public policies consistent with the transition.

The backcasting method consists in working backwards from a particular desirable future (the endpoint) to the present, in order to determine the milestones and actions that would be required to reach that point. By identifying, articulating and organizing chronologically those milestones and actions, this approach allows to build a transition pathway from the present to the endpoint (**Errore. L'origine riferimento non è stata t rovata.**15).

The backcasting methodology used in OrganicTargets4EU is based on previous foresight studies conducted by INRAE DEPE (Mora et al., 2023; based on Kok et al. (2011) and Hines et al. (2019). In this methodology, the backcasting approach has been articulated with a downscaling approach for building national scenarios from European scenarios (Figure 16).

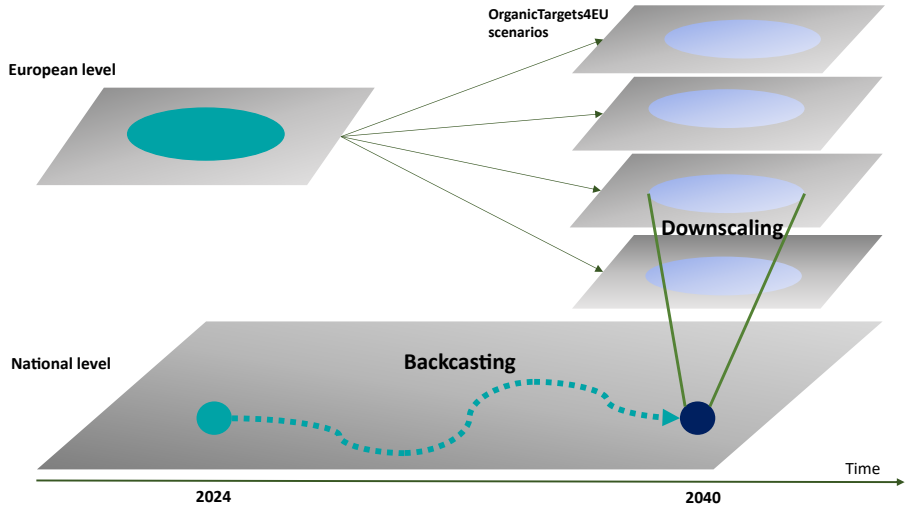


Figure 16. The general method articulating downscaling and backcasting approaches developed by INRAE DEPE team

3.2. Applying the method to national backcasting studies

Based on the European organic agriculture scenarios, the approach just described was applied to downscale the scenarios to the national level and to build transition pathways for 2040. The longer time horizon allowed to widen the option space and to imagine a long-term transition pathway including ruptures.

3.2.1. Selection of the countries for the national studies

Organic share of farmland %		Focus country	Focus country	Organic share in retail sales %	
Above average	26.5	Austria	Denmark	13.0	Above average
	16.7	Italy	Austria	11.6	
Average (+/- 50% EU average)	11.5	Denmark	Germany	7.0	Average (+/- 50% EU average)
	10.8	Germany	France	6.6	
	9.9	EU-27 average	EU-27 average	4.7	
	9.6	France	Italy	3.4	
	5.9	Hungary	Hungary	0.3	Below average
Below average	4.3	Romania	Romania	0.15	

Based on data from: Eurostat/ FiBL, Rees et al. 2023a[3]

Figure 17. Selected country based on development on organic sector (share of farmland and share in retail sales) (from Deliverable 1.3. Synthesis of key drivers and lock-ins for organic sector development)

The countries were selected from all focus countries, because they represent different stages of development of the organic sector in Europe (Figure 17) and for geographical diversity.

The five selected countries correspond to the three categories of development of the organic sector in terms of share of their land covered in organic and share in retail sales, identified in WP1 (Reinecke et al., 2024) previously. They are also geographically diverse including Northern and Southern parts of Europe, and Eastern and Western parts of Europe. The five countries selected are Hungary, France, Denmark, Italy, and Germany. Taken together, these countries account for a major part of European agricultural land.

The aim was to build a transition pathway at the national scale to reach a desirable endpoint in 2040 which goes beyond the 25% target in 2030. This endpoint was the downscaling at the national scale of one of the four EU scenarios. The longer time horizon allowed to widen the option space and to imagine a long-term transition pathway including ruptures.

3.2.2.Steps to downscaling and backcasting European scenarios

INRAE developed the approach for downscaling and backcasting the European scenarios and produced guidelines structured in five steps (Figure 18) (for detailed information, see Mora et al. 2023). These guidelines (Annex I) were implemented in close collaboration with the practice partners. A first meeting with all the practice partners was conducted on 19/01/2024 to inform them about the process of participatory backcasting at national level.

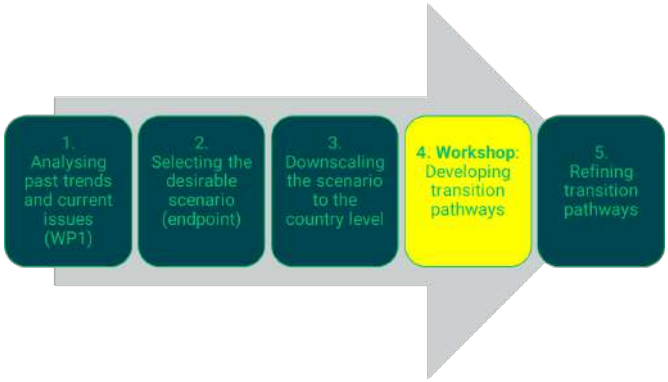


Figure 18. Five steps to build a transition pathway for the organic sector at national level

Step 1: Analysing past trends and current issues for organic at the national level

The first step gave a foundation for thinking possible future changes by analysing past and current trends for consumption and citizens, value chains, production and farmers, agricultural knowledge and innovation systems, and public policies. It was conducted through the analysis of past trends, drivers and lock-ins available from WP1, and through specific exchanges, experts' judgements and literature reviews for considering additional elements characterising the temporal dynamic of changes.

At the end, a dedicated online meeting between national practice partners selected for the national studies (see below) and INRAE DEPE was conducted to finalise the description of past trends.

Step 2: Selecting one of the four scenarios (the desirable endpoint) based on national context

The practice partners were asked to choose one scenario to work with, which seemed desirable, considering the current trends and direction of development of national organic sector and the attractiveness and plausibility of the scenario from their point of view. Each scenario has been backcasted in one country and all four scenarios were covered.

Step 3: Downscaling the European scenario to the national scale

The specific hypotheses of change were taken from the selected overarching European scenario and then downscaled to the national level by adapting them to the national context of the organic sector. This national-context adaptation produced country-specific assumptions for the organic sector in 2040 and led to the development of a national scenario narrative for 2040.

Specific workshops were dedicated to the building of the national scenario in 2040, with the practice partners and specific national experts.[2].

These workshops were organised by the INRAE DEPE team which provided the methodology for downscaling the European scenario at the national level (see below).

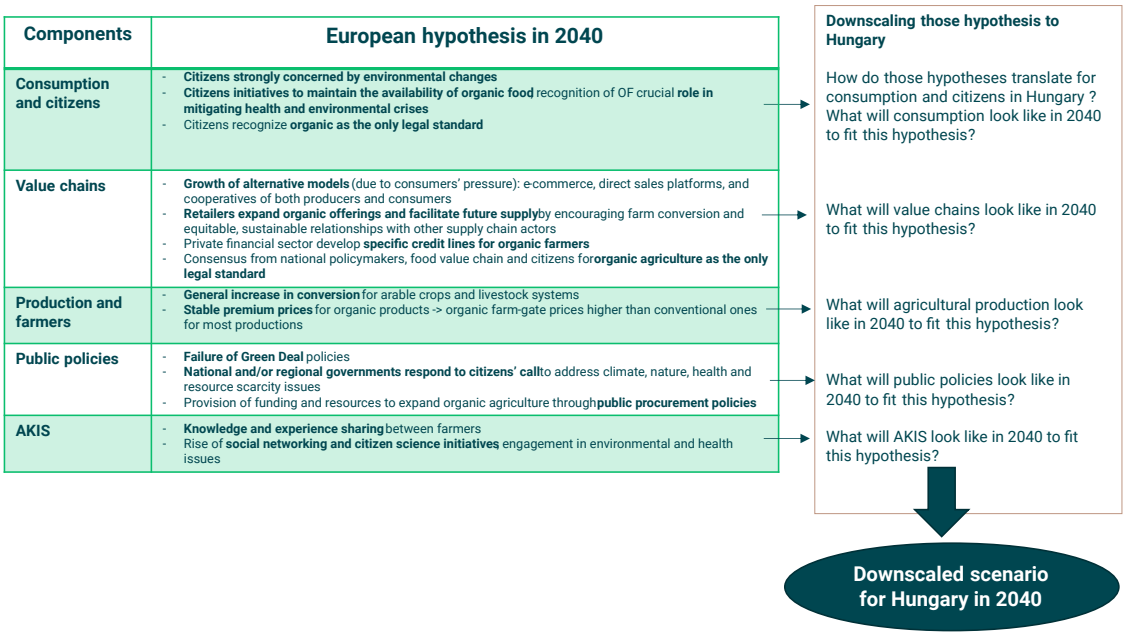


Figure 19. Downscaling the European hypothesis into national hypotheses: an example for Hungary

The hypotheses from the European scenario have been translated into national hypotheses for the country considering the various components of the scenario: consumption and citizens, value chains, production and farmers, public policies, agricultural knowledge and innovation systems (Figure 19). Based on these national hypotheses, a national scenario has been developed by the national partners supported by INRAE team, by building connections between hypotheses and identifying causal links between them.

[2] The workshops were held online on 27/03/24 with ÖMKi (Hungary), on 27/03/24 with ICOEL (Denmark), on 25/03/24 with ITAB (France), on 08/04/24 with CIHEAM (Italy), on 26/06/08 with Naturland (Germany).

Step 4: Developing a transition pathway in a participatory backcasting workshop

The workshop was aimed at building a trajectory of change for organic farming development by 2040, thanks to collective thinking, through changes in production, AKIS, consumption, value chains, and public policies. It gathered actors from farming, processing, retailing, public policies, civil society and research. The goal of the workshop was to elaborate a timeline from 2024 to 2040 of actions and milestones that altogether could achieve 25% of agricultural land under organic farming by 2040 (Figure 21).

A one-day participatory workshop with 10 to 15 stakeholders (all the organic sector) was dedicated to exploring the actions that would need to be taken to reach the national scenario in 2040 and organize them into a timeline of actions and milestones (Figure 20). The workshop was intended for participants to: interact and discuss the future of organic farming in a participatory and multi-actor workshop; build a shared vision of the transition among stakeholders; reinforce strategic thinking and anticipation capacities for the organic sector.

Followingthe three-steps described below and following the guidelines (Annex 1), backcasting was applied during the workshop: building a transition pathway by identifying and articulating the opportunities, obstacles, actions and milestones. This work was conducted in relation to four components of the system:

a) production and farmers,
b) Agricultural Knowledge and Innovation Systems (AKIS),
c) value chains and
d) citizens and consumers.

Public policies were considered as a cross-cutting issue and were considered in the four components, especially during the discussion about actions.

The workshop was organized in three main steps:

- Identifying obstacles, opportunities and milestones for reaching the endpoint
- Defining necessary actions for reaching the endpoint
- Building the transition pathway by articulating milestones and actions in a timeline

For the first two steps on obstacles, opportunities, actions and milestones, participants were split into two sub-groups according to their expertise and domain of activity. The first group worked on production and farmers and AKIS, the second group on value chains and consumers and citizens. Results from those activities were presented and discussed in plenary meeting. Participants stayed in the same sub-groups for the first two steps. The third step consisted in building the transition pathway by articulating the identified milestones and actions in a timeline (Figure 21Figure 20). During this final step, all participants worked together since the aim was to articulate milestones and actions across all components.

The INRAE team supported the practice partner in selecting stakeholders and in planning, preparing, and facilitating the backcasting workshop through email exchanges and online meetings. During the workshop, the team also provided facilitation support.

Five national workshops were conducted between May 2024 and November 2024:

- in Budapest (Hungary) organized by ÖMKi and INRAE DEPE: 16th May 2024 (based on European scenario: Organic Power from the People)
- in Paris (France) organized by ITAB and INRAE DEPE: 24th May 2024 (based on European scenario: Organic on Every Table)
- in Billund (Denmark) organized by ICOEL and INRAE DEPE: 13th June 2024 (based on European scenario: Organic on Every Table)
- in Bari (Italy) organized by CIHEAM, UNIVPM and INRAE DEPE: 8th October 2024 (based on European scenario: Divergent Pathways for Organic Sector)
- in Berlin (Germany) organized by Naturland, Thünen Institute and INRAE DEPE: 8th November 2024 (based on European scenario: Green Public Policy)

Figure 20. Photos of participatory backcasting workshops in Denmark, Hungary, Germany, France and Italy (From top to bottom, left to right)

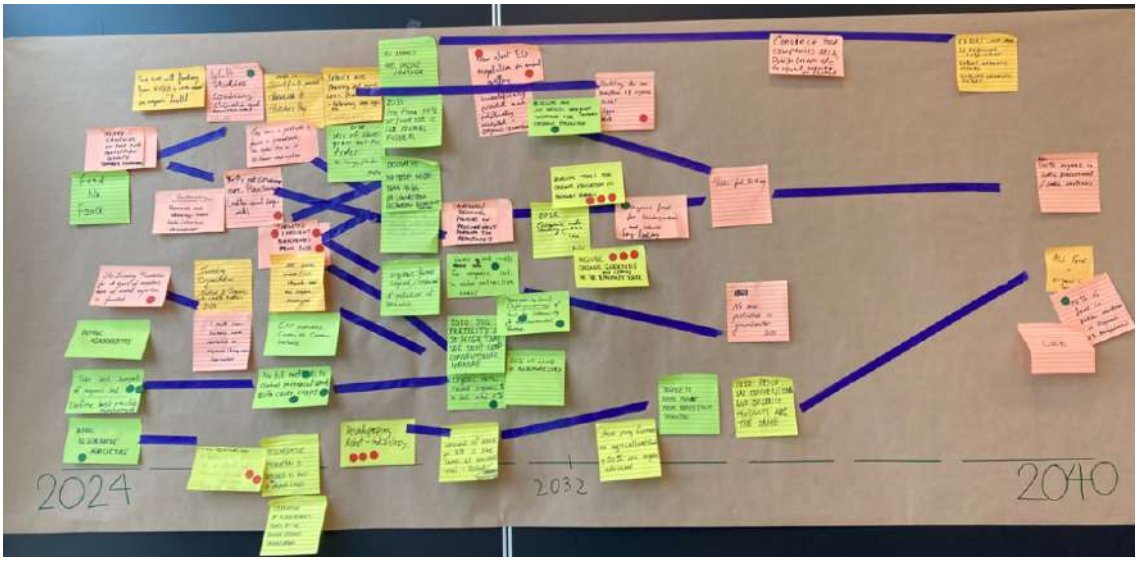


Figure 21. The transition pathway elaborated during a backcasting workshop: the example of Denmark (13/06/2024)

Step 5: Refining the transition pathway

Refining the transition pathway required making choices, highlighting some milestones and actions and gathering others. The aim was to stay consistent to the workshop materials while proposing a clear, readable and coherent transition pathway.

After the workshop, INRAE DEPE and the practice partners synthetized the results of the workshop and elaborated the final transition pathways (Figure 22). In addition to the timeline, this last step consisted of writing a narrative of the pathway.

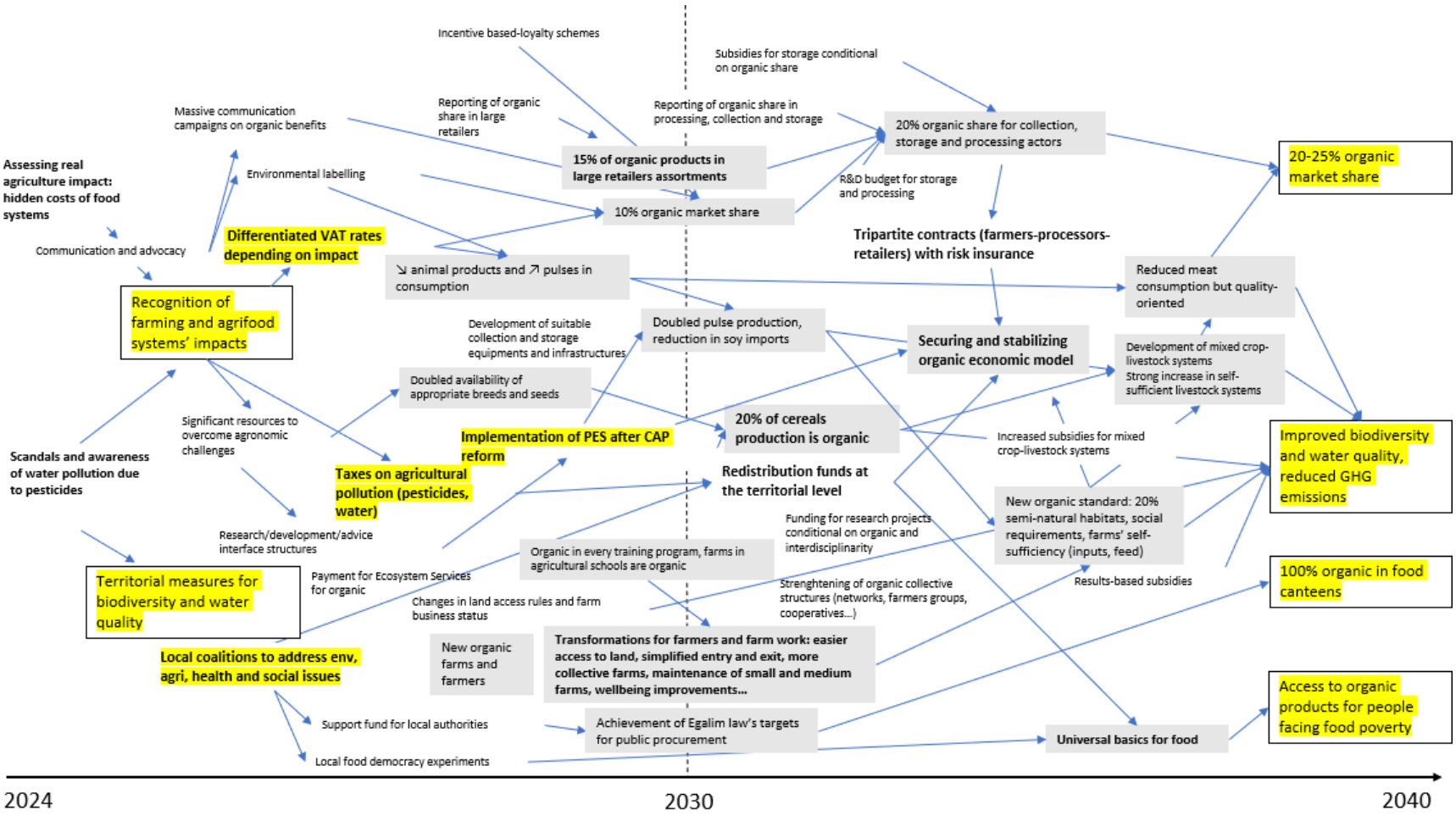


Figure 22. Timeline for the transition pathway for the "Organic on Every Table" scenario: the example of France

A final national report on the main results in English was written by INRAE DEPE in exchange with the practice partners and occasionally with workshop participants, and disseminated to the workshop participants.

4. Results from backcasting: national transition pathways

This section presents the final outputs of the backcasting studies conducted in Germany, Italy, Denmark, France and Hungary. The first sub-section presents the transition pathways built in five countries that are resulting from participatory backcasting workshops with a group of national stakeholders. A second sub-section develops the insights from these diverse studies for building a transition towards beyond 25% of land in organic farming by 2040.

To develop transition pathways at the national level, EU scenarios first needed to be downscaled to the national level. Five national scenarios were developed with national experts, with all the EU scenarios covered in at least one country. The national scenarios are available in the national reports (Annex 2). These national scenarios provided the endpoint to reach in 2040.

Table 6. Overview of scenarios and countries in which they have been downscaled

Green Public Policies	Policy-led transformation with strong EU frameworks driving organic adoption and environmental resilience.	Germany
Divergent Pathways	Fragmented policies and social divides lead to regional disparities and market polarisation in Europe.	Italy
Organic on Every Table	Broad societal and institutional support mainstreams organic food, integrating supply chains and knowledge systems.	Denmark, France
Organic Power to the People	Grassroots mobilisation and consumer pressure compensate for weak EU governance, fostering organic growth through civil society and digital platforms.	Hungary

4.1. Transition pathways for the five countries

The transition pathways between the current situation (2025) and the endpoint from the scenario of organic farming in 2040 have been built during participatory workshops in Germany, Italy, Denmark, France and Hungary. After the workshop, the transition pathways were refined by each practice partner and INRAE DEPE. Below the five narratives of the transition pathway for Germany, Italy, Denmark, France and Hungary are presented.

4.1.1. Transition pathway for Germany (corresponding to EU scenario Green Public Policy)

By 2040, at least 25% of organic land is reached in Germany.

The transition unfolds in three main phases. The first period sets the stage for further organic development with nutrition and food plans and the development of a joint food strategy from health, food and economic advantage that focuses on organic and healthy food. Policies also strengthen industry and processing for organic. Cross-sector cooperation is growing and organic is increasingly integrated to other targets. Debates focus on planetary boundaries, bringing agriculture back within those and the contribution of organic to this goal. The ensuing recognition of organic's benefits leads to higher CAP funding for organic. Organic capacity to respond to social and ecological challenges is increasingly recognized. The Federal States also set organic targets in law. As a result of those policy changes which transform funding structures, organic conversion and maintenance becomes economically attractive. The bureaucratic efforts for organic farmers are lightened, further reinforcing the viability and competitive and advantage of organic.

The second period sees the development of AKIS to support the implementation of EU policies that seek to develop organic. Organic AKIS becomes available everywhere with comprehensive advisory services for all sectors. Organic is better integrated into agricultural training and trainings for food-related occupations as students and teachers are trained and assessed accordingly. Transfer from research improve with knowledge and research sharing places for farmers. New research focuses on ecosystem services. Research in organic agriculture benefits from increased funding and progressively reaches 30% of national and EU funding allowing many research gaps to be closed. Nutrient gaps are closed and suitable organic seeds (including in the climate change context) are widely available.

In the third period, the effects of EU, federal and regional policies and strategies and of AKIS strengthening materialize in agricultural and food systems. The federal government further support the setting-up on organic farms, including through land access policies. Sustainable nutrition becomes more important in education in all grades and a mandatory action area for municipalities, districts and federal states. The effects of policies aiming at bringing agricultural back in planetary boundaries are visible, for instance on circularity with the closing of nutrient gaps and on livestock systems. Value chains are well structured with a system of connected value chain managers that help regions managing their organic farming and supply and enhances coordination across the whole chain. Organic harvests ramp-up helps to close the raw material gap and organic value chains have become the major growth factor in the food industry.

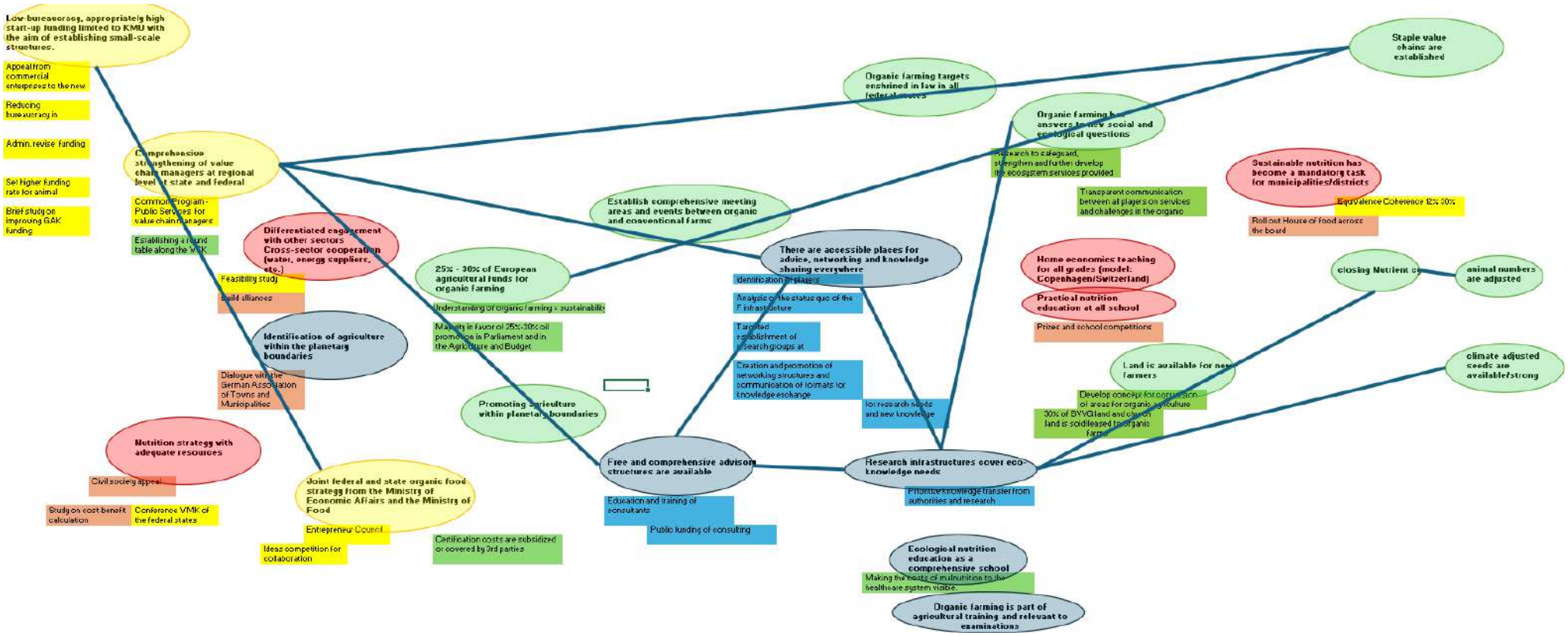


Figure 23. Transition pathway towards the German desired scenario

4.1.2. Transition pathway for Italy (corresponding to EU scenario Divergent Pathways)

In 2040 more than 30% of agricultural land in Italy is devoted to organic farming.

This achievement has been reached in three steps: i) a reorganization of the Italian organic sector with the establishment of a strong representative body able to do lobbying at the national and regional level; and push for a national communication strategy centred on the recognition of Italian organic excellence, ii) a central period around 2032 where the Italian "model" of organic agricultural policy influences the CAP that increases the budget for organic farming based on positive results of true-cost accounting and impact assessment of the conversion to organic farming, iii) a final period where the outcomes of the previous phases results in strengthening the consumption (public procurement, health claims and environmental indicators) and the research (creation of research centres, working on climate change) and an integration of supply chains (with markets outlets), partnerships with processors (increasing the offer in supermarkets), with in parallel a development of short circuits.

In more details, after many years of fragmentation, a strong representative body of the organic sector has finally been established, and the sector has been able to "speak with one voice". At the same time, a new ministry of agriculture, "a friend of the organic sector", has been appointed. These favourable events have led to the drafting of a new National Organic Action Plan (NOAP) and soon after also to the setting up of an Organic Agriculture Department at the ministerial level.

The issuing of the new NOAP has represented a politically significant strategic move triggering in the following years a number of important changes in the structures, in the performances, and the prospects of the sector.

In the following years, a new well-structured communication strategy to promote organics has been set up. An "Organic Made in Italy" label has been created, adequate resources have been allocated for its promotion and consortia created for its protection and valorisation on the market.

Also, a public food education programme and a promotional campaign to increase organic consumption have been launched and adequately funded to fuel organic demand.

In terms of production, access to land for young farmers has been supported prioritising organic young famers. A survey of abandoned and fallow lands has been conducted. Generational renewal is boosted via substantial funding of the various land intervention funds for young farmers at ISMEA, assisting regional governments in land reorganization activities. New organic farm businesses are established through the acquisition of agricultural properties from retiring/retired farmers or inactive landlords under specific aid schemes. Periodic calls for reserved land assignments to young organic farmers are launched by the Banca delle Terre (Land Bank), funding up to 100% of purchase price.

The setting up of an interprofessional multistakeholder panel on organic value chains including representatives of organic associations, cooperatives, and companies has contributed to aggregate the sector, make it more powerful and lobby to reduce the often-lamented bureaucratic hurdles (bureaucratic overkill). In the meanwhile, thanks to a stronger and more influential national organic sector, Italy has lobbied for a pro-organic revision of the CAP with significant allocation of funds for the organic sector based on true cost accounting considerations showing the benefit of organic food & farming

systems. As a consequence, agricultural policy in Italy shifts from a measure-based to a outcome-based approach where payments are directly connected to ecosystem services and the polluter pays principle. Besides, the revised CAP has linked organic payments to the farmers' direct involvement in organic agri-food value chains, thus reducing the abuse of organic conversion only for area subsidies.

Around 2032, in a complementary way, the organic legislation has been revised in the direction of a stricter ethical principles focused on animal and workers welfare. The new organic assurance and guarantee system has moved from traditional third-party certification by increasing value chain/group guarantee schemes - without the turnover (and land size) restrictions currently limiting this option - and by introducing remote sensing and AI-powered control systems.

The organic sector's efforts towards aggregation, encouraged by the supportive institutional and regulatory framework progressively put in place at the national level, has produced the reorganisation and strengthening of organic agri-food value chains. As a consequence, the Italian organic sector exhibited a more efficient and effective flow of organic products from farm to fork, with significative effects on the market supply and, therefore, on final prices. Farmers have gathered in sectoral (not horizontal) Organic Producer Organisations, with significant supply aggregation at both the regional and national level. The first organic-only national grocery wholesale market platform has been created, and at least one organic logistic platform has been established in all regions. The national platform is connected with regional ones with common IT management systems. An interprofessional agency is established at the national level with representatives of organic farmers associations, cooperatives and industry.

Such achievements would not have been possible without the significant investments made since the beginning to enhance organic advisory services and AKIS to ensure adequate scientific and technical & support to the growth of the sector.

Few years before 2032 a "Knowledge Fund for Organic Agriculture" has been established as part of a 20-year plan for organic AKIS.

Under a national plan, agreements with professional associations have established training for organic advisors and consultants, and infrastructure for organic advisory services. Financial support has been provided to organic farms for mandatory technical advice and business consultancy, encouraging peer-to-peer exchanges. By 2032, a coordinated system of technical assistance for organic agriculture was in place. An Italian "Research Centre for Organic Agriculture" was created, with €50 million/year allocated for research projects. By 2040, efforts to improve the organic AKIS resulted in widespread technical competence in organic farming, addressing climate change issues effectively.

After 2032, food and environmental education have been introduced in public school programmes, also supported through projects funded by regional laws, specifically targeting children and youth.

The positive impact of such educational initiatives, combined with a €50 million/year investment to increase organic public procurement through flexible approaches and different organisational models, have resulted in 70% share of products in public canteens (schools, hospitals, etc.).

Health and environmental claims have been scientifically validated and introduced on organic labels, substantiated by evidence produced by a robust system of indicators, and appealing to youth's concerns for the health of people and the planet. As a consequence of these claims and demographic changes, younger organic consumers are becoming the most prominent market segment, surpassing adults and elders.

To meet increased consumer demand modifications have occurred in organic products distribution also as a result of new legal provisions concerning the opening of retail outlets. Organised organic supply chains have opened their own retail outlets, partnerships have been established between the organic industry and large retailers and discounters to expand the organic assortment on the shelves. Policy support through simplified bureaucracy and tax breaks have encouraged many more new organic e-commerce platforms and farm shops to open. As a result, local organic consumption with lower food-miles reached 25% share of the organic market.

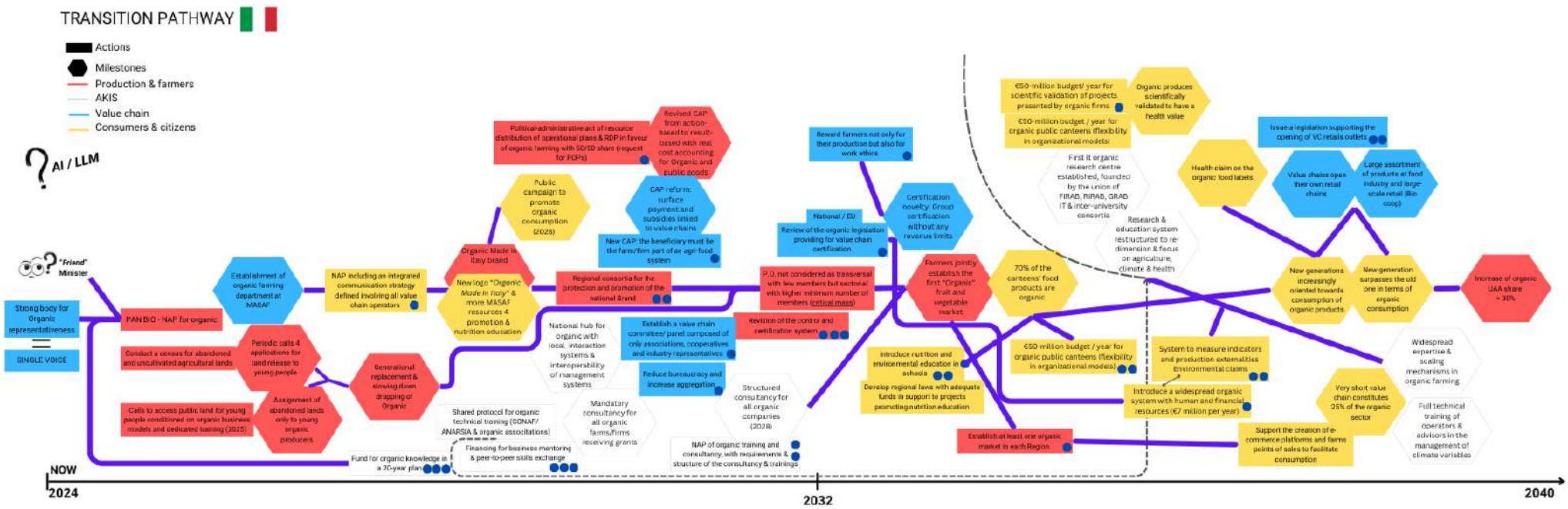


Figure 24. Transition pathway towards the Italian desired scenario

4.1.3. Transition pathway for Denmark (corresponding to EU scenario Organic on Every Table)

In 2040, 25% of agricultural land in Denmark is dedicated to organic farming.

At the beginning of the transition pathway from 2025, research funded and supported by cancer associations has provided evidence of the health benefits of consuming organic products. Additional studies have demonstrated the positive impact of organic production on water quality conservation, biodiversity, soil health, and climate mitigation. As a result, organic food has been scientifically proven and politically recognized as healthier for consumers and significantly beneficial for the environment. This has fuelled a new wave of consumer-targeted campaigns driving increased demand and awareness of organic products.

Around 2028, policymakers have introduced taxes on agricultural production, based on the "polluter pays" principle, targeting issues like water pollution and other environmental impacts. These measures have helped bridge the price gap between organic and conventional products. Long-term national and regional policies have prioritized organic products in public procurement, with tax reductions (VAT) encouraging their adoption. As a result, organic share in public procurement has reached 50% in 2035 and 100% in 2040. Simultaneously, food production education programs including practice hours in the field have been developed in primary schools, featuring organic gardening and cooking, further promote awareness and engagement from a young age.

On the production side, from 2025-2026 onwards standardized scores for biodiversity, crop rotations and agroforestry have become widespread, showing consumers the products' impacts on the environment. Regular soil testing on organic farms has been conducted, to establish best management practices for soil health. No-till methods that control perennial weeds have been developed and improved, with support from a land foundation for organic production allowing wealthy citizens to invest in and promote organic agriculture. Robot technologies have been introduced to reduce labour intensity per hectare, enabling organic farming to compete effectively with conventional agriculture.

By 2028, targeted and efficient eco-schemes have been implemented to protect water quality and enhance biodiversity. CAP subsidies have also rewarded increases in carbon storage in agricultural soils, boosting soil organic matter and fertility on organic farms by 2030. Twenty percent of organic agricultural land has been dedicated to agroforestry, and a minimum of 200m/ha for border density has been introduced to enhance biodiversity connectivity. Water extraction areas have been governed by strict regulations prohibiting the use of chemicals in drinking water catchment zones. These measures have stimulated organic farming and significantly improved water quality by reducing nitrogen pollution streams. From 2032 onward, public authorities could expropriate landowners or users for environmental pollution reasons. By 2035, all public areas, including church-land, are managed organically.

From 2030 onwards, retailers have been increasingly phasing out conventional animal products driven by research on the impacts of agricultural production systems, pressure from NGOs, and new stringent EU regulations on animal welfare. With over a third of consumers having adopted flexitarian diets, the demand for organic meat, eggs, and milk has doubled, shifting the focus of animal product consumption toward quality over quantity. Livestock systems have prioritized outdoor grazing (for ruminants), significantly minimizing competition between animal feed and human food. Major food companies have also expanded their organic exports, particularly in the animal product sector, and processed plant proteins.

After 2030, principles of regenerative agriculture, such as no-till farming, soil cover, and agroforestry, have been integrated into the organic certification standards, and thereby controlled and labelled according to EU regulations. Organic agriculture is heading to become standard, whereas conventional agriculture is betitled as chemical agriculture.

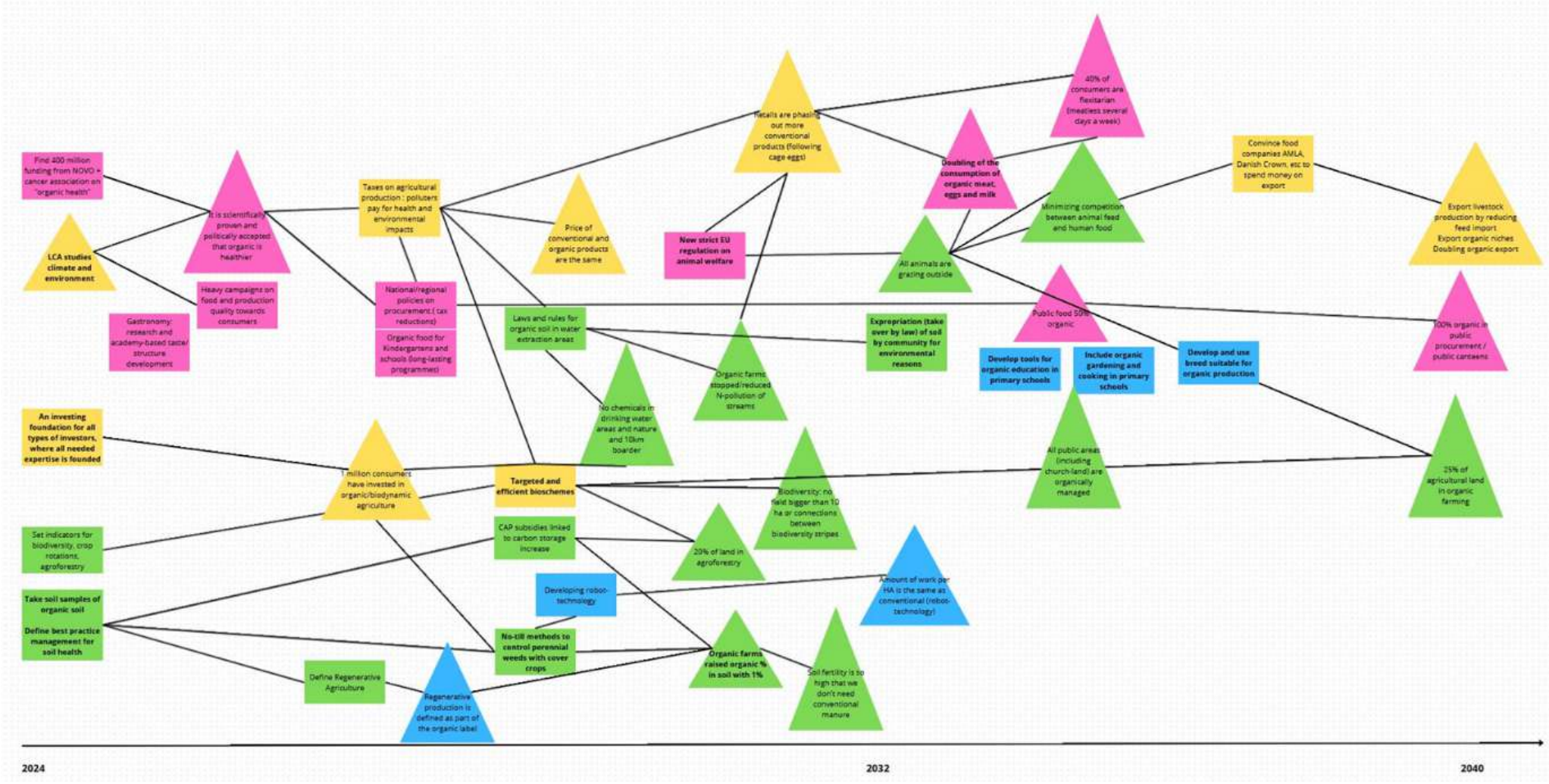


Figure 25. Transition pathway towards the Danish desired scenario

4.1.4. Transition pathway for France (corresponding to EU scenario Organic on Every Table)

From 2024-2025, measures to steer both production and consumption towards organic development are implemented. This follows a recognition of agrifood systems' and different farming systems' health and environmental impacts. This recognition is achieved thanks to voluntarist communication and advocacy actions, assessment and awareness of hidden costs of food systems and scandals and rising awareness of water, soil and air pollution due to pesticides. Differentiated VAT rates on food products are implemented to account for their different health and environmental impacts, leading to reduced taxation of organic produced and increased taxation of conventional, ultra-processed and animal products. Environmental labelling also contributes to steer consumers' choices. On the production side, taxation of pollution linked to agriculture is generalized (water quality and quantity, pesticides regulation, biodiversity impacts). Significant resources are devoted to identifying and overcoming agronomic challenges to organic development. Local coalitions are forming to implement measures for biodiversity, water protection and pesticide reduction. They include actors like water agencies, local governments which have developed an integrated vision of environmental, health and food issues where organic is the primary level for transformation. Those coalitions protect water catchment areas through local Payment for Ecosystem services (PES) for organic, ensure the continuity of agricultural activities, protect biodiversity in agricultural landscapes or provide the most vulnerable with access to quality food (through local food democracy experiments or food cooperatives).

From 2028, territorial actors rely for their actions on Payment for Ecosystem Services (PES) established by a major Common Agricultural Policy reform. Therefore, support for organic systems and organic farmers is justified by its environmental benefits.

Measures on the consumption side have led to changes in food diets with a higher share of organic products, a decrease in animal products consumption and an increase in pulses consumption. Driven by those changes in diets, pulses have become more prominent in farming systems. Value chains have organized and structured to promote organic products and meet consumers' demand for organic. Following the introduction by the state of a compulsory scheme, retailers must publicly disclose the organic share in their assortments. Organic products reach 15% of the assortment in 2030 and account for 10% of households' food purchases.

Local coalitions have played a key role in organic farming development through the setting-up of new organic farms and farmers, public procurement and interfaces between research, development, advice and training. Those actions have been partly financed by the taxes on agricultural production. New farmers benefit from a facilitated access to land and from transformations in farm work (collective farms, new farmers without farming or family background, simplified entry and exits from farming…). Thanks to local Research & Innovation structures, agronomic bottlenecks (fertilisation, weeds, yields…) are overcome. Redistribution funds are created at the local level. Funded by pollution taxes, they compensate income losses from transition periods, adverse climatic conditions or market fluctuations.

After 2032, value chains transform with the widespread implementation of long-term tripartite contracts between farmers, processors and retailers. They secure outlets and fair prices for farmers over several years. The reporting scheme is extended to the whole value chain: collection, storage and processing. Subsidies and tax exemptions are conditional upon a minimum organic share. Storage and processing actors strengthen their capacities and reach a 20% organic share in their activities. Those changes as well

as organic farming subsidies (including PSE) lead to produce organically 20% of cereals. Food democracy experiments are generalized to all territories, thereby establishing universal basics for food.

The organic economic model for farms is stabilized and secured through tripartite contracts that includes risk insurance to cover crop losses, Payment for Ecosystem Services and redistribution funds at the territorial level. As a result of discussions on organic's role, productions standards for organic farming evolve and include new environmental (at least 20% of semi-natural habitats in landscapes), social (quality of working conditions including working time and income; farm transferability), and farm autonomy criteria (in terms of inputs and animal feed). To address this challenge, mixed farming systems and self-sufficient livestock systems are growing rapidly, consistently with a trend towards reduced but more quality-oriented consumption of animal products. Feed imports (especially soybeans and soya bean meals) decrease. Public policies are shifting towards results-based rather than means-based support.

In 2040, as the organic share reaches 20% in collection, storage and processing and food democracy schemes become widespread, organic accounts for 20 to 25% of households' food purchases. In particular, consumption of legumes (and production) has more than doubled. In public catering, school and nursery canteens are fully organic. Thanks to universal basics for food, people in food insecurity have access to organic products. Biodiversity is significantly enhanced in agricultural landscapes (+20% richness and specific abundance compared to conventional systems) and water quality is improved. Net greenhouse gas emissions have been halved on arable farms that have converted to organic production. Organic farming accounts for more than 25% of agricultural land.

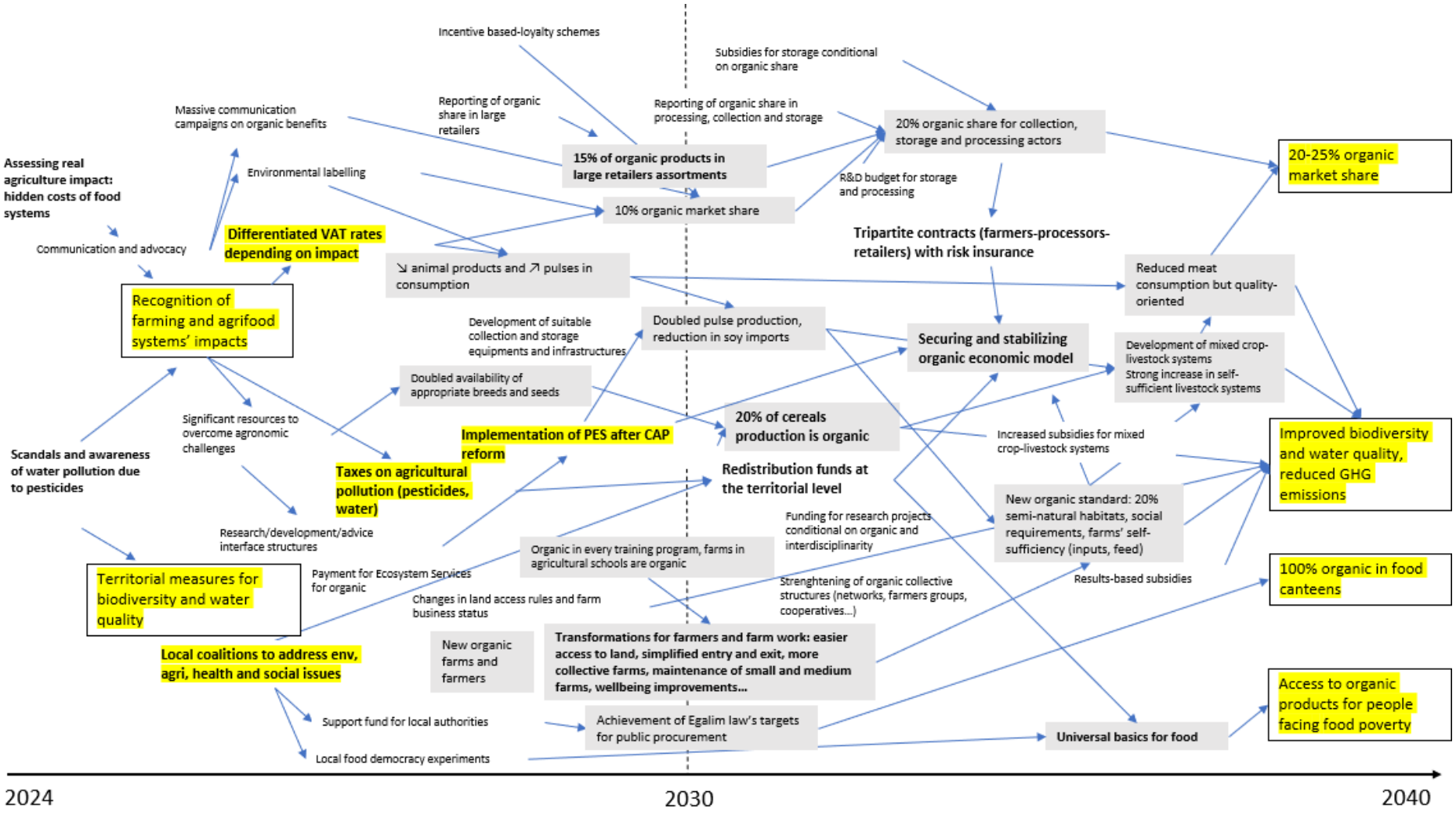


Figure 26. Transition pathway towards the French desired scenario

4.1.5. Transition pathway for Hungary (corresponding to EU scenario Organic power to the people)

The transition towards a more organic and sustainable agriculture in Hungary is envisioned as a structured and evolving pathway from 2024 to 2040 in the consumer-driven scenario *"Organic Power to People*. This journey reflects extensive stakeholder engagement and is shaped through the growing influence of civil society, evolving consumer preferences, and the consequent policy measures.

2024: Laying the groundwork

At the outset, key institutional and policy frameworks begin shifting towards organic agriculture (e.g. tax benefits, certification system for regenerative agriculture, channelling extra funding to organic from carbon programmes). Research and development initiatives focus on understanding the impact of organic farming, while tax benefits and subsidies encourage farm conversions. Public awareness campaigns highlight the benefits of organic products, and educational programs integrate the theory and practice of organic farming into school curricula from kindergarten to university level. Advisory organisations support farmers in a holistic farm management. Technological guidelines aid stakeholders in adopting organic cultivation. Obstacles such as rigid regulatory structures, limited consumer trust, and logistical barriers in processing industries present challenges to immediate large-scale adoption. Soon, however, public awareness is raised through various pathways from educated actors in healthcare, education and media. Several factors contribute to the price gap decrease between organic and conventional foodstuffs: input materials become more expensive / are withdrawn from the market, raw material supply chains suffer and short supply chains multiply. 'Free-riders' are filtered from the subsidy scheme by preferring full conversion eligible for payment.

2032: Scaling up and strengthening the market

By the early 2030s, momentum builds as scientific evidence supports the environmental and health benefits of an organic diet. This fosters stronger farmer organizations, helping to streamline supply chains and enhance cooperation. Market forces adapt, making organic products more accessible and competitively priced. Labelling, data transparency and control procedures improve consumer trust, while the government enforces policies that prioritize organic food in public catering. Also, there is ample evidence by now on the health and environmental benefits of organic. Processing industries expand and get specialized, ensuring that more domestically grown organic products reach consumers. The concept of "shorter value chains" becomes a reality, reducing dependence on imported goods and reinforcing regional food systems. Local governments take a leading role in fostering food sovereignty either by being a hub for best practices or indirectly via land use policies. More and more mixed farming enterprises start up, providing local stores with a range of locally sourced, organic products.

2040: Mainstreaming organic agriculture

By 2040, the organic sector is deeply embedded in Hungary's agricultural and economic landscape. Consumer behaviour shifts significantly, with 40% of households regularly purchasing organic products. Pricing disparities between organic and conventional products disappear, eliminating affordability barriers. Public institutions source up to 40% of their food supplies from organic farms, reinforcing the mainstream adoption of sustainable agriculture. Strong control on advertising prevents misleading or socially /environmentally harmful marketing tactics.

Key enablers of change

The success of this transition is driven by several enablers:

Policy and subsidies: financial incentives support farm conversions, while stricter regulations ensure credible certification and efficient use of resources.

Consumer engagement: Awareness campaigns, improved labelling, and educational programs empower consumers to make informed choices leading towards a more decentralized, circular economy.

Farmer networks: Strengthened farmer cooperatives enhance knowledge-sharing, resource access, improved representation and resilience against market fluctuations.

Processing and infrastructure: Investment in processing industries ensures that highly diverse domestic organic products are available at competitive prices.

This transition pathway highlights an ambitious yet achievable vision, ensuring that Hungary's agricultural sector embraces sustainability while balancing economic and social priorities. Through collaborative efforts, organic farming transforms from an alternative niche into the foundation of the national food system.

As a result of the scenario analysis, participants indicated that this is a desirable but rather optimistic scenario. It does not take into account at all the risk of the emergence, proliferation and strengthening of highly centralised and single-person-driven powers that ignore the ideas of civil society, and that contribute greatly to the rise of anti-science and governmental ignoring of climate change mitigation initiatives.

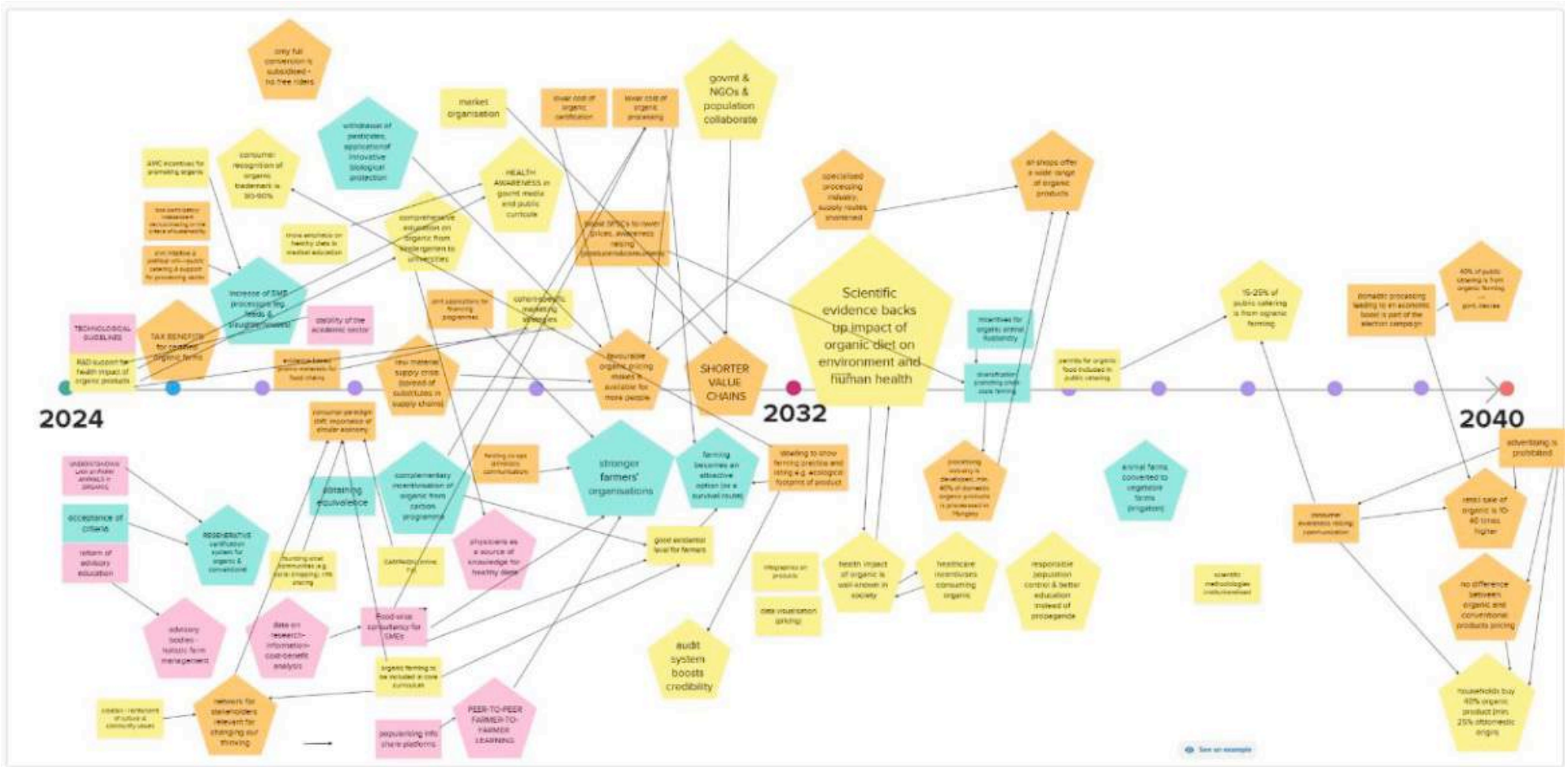


Figure 27. Transition pathway towards the Hungarian desired scenario

4.2. Lessons from national transition pathways: what does backcasting tell us about conditions to achieve the scenarios?

Triggers for the transition pathways

Triggers of the transition pathways are key elements of the transition pathways. They launch the transition; they initiate and shape the sequence of subsequent actions. Strategically, they also provide short-term actionable levers and reflect the strategic thinking of workshop participants. Most pathways display several triggers, although with a dominant one, that can be classified into three families.

- Public policies as main triggers
    - In Germany: the importance of policies is logical as the work builds on the Green Public Policy scenario, although in the pathway, it is not really agricultural policies: a joint food strategy (between health, food and economic affairs ministries) that focuses on organic and healthy food, policies for industry and transformation development and integration of cross-sector cooperation to integrate organic to other policies.
    - In Hungary: key institutional and policy frameworks shift to favour organic (with more funding, tax credits…). This role of public policies as trigger is more at odds with the Organic Power to the People scenario.
- Researching and recognizing organic benefits for health and environment leading to policy change
    - For France and Denmark (which share the Organic on Every Table scenario), we have very similar processes. First, organic benefits for environment and health are made explicit through research activities (with a focus on health for Denmark, involving cancer associations). The political recognition of those benefits leads to fiscal measures (taxes and subsidies) to steer production and consumption towards organic. Therefore, public policies are part of the triggering phase for this second family but changes unfold after preliminary steps.
- Internal reorganisation to strengthen the organic sector and improve political influence
    - In Italy the first steps are mainly about sector aggregation, to have a united voice and be able to better push organic demands and influence policy-making. This also contributes to new organic action plan and to the creation of an organic agricultural department at the ministerial level.

Beyond this typology of triggers, at least four takeaways emerge from the pathways.

The triggering phase in the different transition pathways shares many common elements although their importance and timing differ. In addition to their dominant driver, the different pathways often incorporate drivers from the other families, with a more secondary role. Those common elements are: public policies, debates about the impact of agrifood systems on planetary boundaries and health (which are also important in the beginning of the German pathway) and the recognition of organic benefits (Hungary has in among the first actions research on the impact of organic farming, and public awareness campaigns to highlights these benefits). Communication

campaign on organic is a strong commonality as well: it highlights those benefits (France, Denmark, Hungary) or the national organic excellence (Italy).

The need for research on and recognition of organic benefits for the environment and health strongly emerges from the triggering phases of the transition pathways. This can be broken down into two necessary but distinct aspects:

- The research needs: on organic benefits for health, environment (Denmark, France, Hungary at least), the impact of different farming systems, hidden costs (France, Italy although it comes later in the pathway…)
- The recognition of organic benefits: as a second step. For instance, in the German pathway, it is more about setting a debate on agriculture and planetary boundaries, and organic benefits. A question is whether is stems naturally for research results or requires supplementary actions (like in France with advocacy activities and scandals about pesticide pollution of water, soil, etc.).

The **importance of complementarity or association of organic with other issues**: obviously environmental issues (biodiversity, water, etc) but also health and nutrition issues.

Finally, **public policies are essential to triggering the transition** (at least in four countries while in Italy the trigger is really the sector aggregation and structural policy change comes later).

4.2.1.Public policies options and their role for reaching 25%

Most transition pathways (arguably to a lesser extent in Hungary) are **quite reliant on public policies** in the triggering phase but also beyond. This allows for the identification of **numerous and diverse public policy options** to achieve 25% of land under organic farming. **Those policies target every part of the food system** (see table 1 for an overview of public policies in transition pathways): agriculture, AKIS, markets/value chains, research & innovation, organic regulations and standards but also cross-sectoral policies (environment, food, health, nutrition…).

One of the key lessons from the transition pathways is that organic could be a (policy) tool used by national, local governments and actors or the EU to address many issues: biodiversity, water quality, climate change mitigation and adaptation, animal welfare health, food (including social aspects of food in some pathways) ... This is most visible in Denmark (particular emphasis on water quality, health, climate and animal welfare), France (biodiversity, water quality and health) and Germany (planetary boundaries, health) but it is also the case in Italy (addressing hidden costs, fighting agriculture abandonment) and Hungary (health, food sovereignty, rural vitality).

Although most policy actions in the pathways are at the national or local levels, **in every country but Hungary, the need for changes in the CAP with higher funding for organic is highlighted** and integrated in the transition pathway (with sometimes other EU policies, for instance Denmark for animal welfare). This is often connected to ecosystem services with payments for ecosystem services (PES) for organic in France, more specific eco-schemes or PES in Denmark to reward biodiversity enhancement, water quality or carbon storage in soils. In Italy, the increase in organic funding is based on true costs accounting with subsidies shifting to a result-based approach: organic is remunerated for its ecosystem services while pollution is taxed. Overall, the CAP

becomes greener and funding for organic is significantly higher based on the ecosystem services it provides.

On the other hand, **actions and policies at the regional or local level are quite important in several pathways**. This is most visible in France with the formation of local coalitions between territorial actors to address environmental, food and social issues and in Germany with federal states setting organic targets in law and giving access to land. In most countries, regional or local governments also play a role to ramp up organic supply in public procurement and sometimes in food education, or local initiatives for food democracy or local value chains.

In France, Germany and Italy, regional governments are key for **land policy** and for providing land for organic farms. This issue of land access and policy is therefore important in many pathways and sometimes include strong policies like in Italy and Denmark. In Italy, a large package is implemented with a focus on abandoned and fallow lands, funding for generation renewal, for land acquisition from retiring farmers, calls for reserved land assignments for young organic farmers… In Denmark, all church-owned farmlands are converted to organic and landowners or users can be expropriated for environmental reasons.

Public procurement policies feature in all pathways. This provides a market for organic products, but equally importantly, it is a food education action and serves to create and shape food habits. Moreover, it is coupled with the integration of food system, agriculture and organic teaching in general education in all pathways.

Policies are also essential in demand-driven scenarios (France, Denmark, Hungary). This reflects actors' perception that market or consumption cannot sustain a transition by itself. It needs to be steered with driving policies, different economic incentives… As such, value chains and consumption policies are paramount to increase the organic supply in distribution and stimulate consumption.

Policies are needed to shift economic incentives: in all pathways, thanks to changes in subsidies, taxes or markets, the inclusion of **hidden costs** (and non-policy factors like value chain improvements, input prices), organic becomes a (or the) economically attractive option for farmers and the price gap for consumers is reduced, or bridged.

The topic of organic regulations is a recurring question in the transition pathways. **All pathways but Germany include changes to organic regulations** whether it is the integration of new issues, changes and simplification to the certification process or both. New issues integrated to the certification include biodiversity (France), principles of regenerative agriculture like agroforestry, no-till, soil cover (Denmark), worker welfare and social issues (France and Italy), animal welfare (Italy) and farm autonomy (France). This is to address competition from other standards, stress organic added-value, institutionalize existing practices and to align with the rationale for organic support (environmental benefits). In Italy, certification processes are reformed with a new organic assurance and guarantee system that included value chains and group guarantee certification schemes. A related (but distinct) point is the need for simplification and reduced bureaucracy hurdles which is pointed out in Italy, Hungary and Germany.

Policy options are important, but the drivers of policy changes also matter: why do policies change? This question is tackled in varying degrees in the different pathways,

as discussed above for the triggering phase. Mechanisms for policy change include the recognition of organic benefits taking into account hidden costs (France, Denmark, Italy, Germany), a stronger and more united representation of the organic sector (Italy), civil society pressure (Hungary, France to some extent).

Table 7. Public policies options from national scenarios and transition pathways

Policy area	Policy options

Agriculture	• Public funding system to strengthen public goods and reward environmental outcomes (biodiversity, water, nitrogen, climate…)
	• Payments for ecosystem services (usually process-based) preferably through CAP or ecoschemes strongly supporting organic
	• Revised CAP to result-based policy with real cost accounting for organic and public goods
	• Minimum organic share in rural development programs of CAP.
	• Subsidies for nitrogen-fixing crops and water management practices
	• Policies for livestock systems restructuration: on livestock restructuration:
	  ○ Funding for restructuring of livestock systems and buildings conditional upon decrease of animal numbers and organic compatibility
	• - Compensation measures for reducing number of animals or dropping out of animal farming have been set up.
	• - Feed independence policies and legumes development programmes newly implemented or extended
	• Redistribution funds to derisk organic farms
	• Organic farming targets inscribed in laws of regional authorities
	• Low-bureaucracy for implementation of public policies in agriculture (CAP)
	• Land policies:
	  ○ give preferential access to land for organic, subsidize land acquisition, boost generation renewal with the setting-up of new farms
	  ○ expropriate owners and users for environmental reasons

Markets	• Differentiated tax rates on products (for example through VAT) • Public labelling scheme for animal welfare with organic as highest level

Policy area	Policy options
	• Standards on greenwashing, regulation on allegations • Compulsory reporting of organic share for value chain actors (storage, processing, retail) • Conditional subsidies for processing actors depending on organic share
Research & Innovation	• Funding increase for research on organic farming and biodiversity, environmental and health benefits • Long-term plans to address research needs • R&I for processing, storage and retailing of organic products • Collaboration between advice, research and farmers • Integration of organic training to agricultural and general education
Environmental, nutritional and cross-sectoral policies	• Tax instrument to mitigate agricultural impacts: Polluter pays taxes on agricultural production (water, nitrogen, biodiversity) • Policies for cross-sectoral cooperation integrating organic farming: on water, pesticides, biodiversity, food and nutrition, energy… • Local coalitions integrating organic farming into environmental, food, social policies →Territorial policies based on CAP 2nd pillar to set up new organic farms, PES at the local level • Development of public support through AKIS for farming, value chains and public procurement … • Nutrition policies supporting plant-based diets • Nutrition strategy integrating organic products • Public procurement support for organic (fund, training). • Regional laws to support project promoting nutrition education • Consumer information: campaigns on organic benefits (environment + health), environmental labelling • Implementation of universal access to food (universal basics) • Cross-ministerial plan for organic food

Policy area	Policy options
Organic regulations and standards	• Integration of new issues (biodiversity, climate change, social, autonomy) • Changes in certification processes (group certification, new technologies…) • Launch of national logo

4.2.2. Other elements in transition pathways: farming systems, value chains and AKIS

The evolution of farming systems and farms is relatively scarcely addressed in the transition pathways, perhaps since the national scenario provide some answers. Exceptions are Denmark and France. In Denmark, farming systems evolve in a clear direction: inspiration from regenerative agriculture (soil health, no-till methods, carbon storage) and robotisation (to reduce labour intensity) while ensuring water quality and biodiversity connectivity. In France, agronomically the focus is on legumes and semi-natural habitats. For livestock system both countries prioritize grazing and reduce feed/food competition. The French pathway also integrates feed autonomy and mixed crop-livestock farming and incorporates evolution in farms labour and farmers' profile: more collective farms, farmers without family farming background, facilitated entry and exits from farm work. Generation renewal concerns feature in France and Italy as mentioned in the policy discussion.

Value chains changes are important and feature quite prominently in the pathways in Italy, France and Germany to a lesser extent. In France, value chain evolutions pursue two main outcomes: **stabilizing the organic economic model and increasing organic products supply**. The former is achieved mainly through PES, pluriannual tripartite contracts (between farmers, processors and retailers) to secure outlets and fair prices and redistribution funds to cover crop losses and market risks during and beyond the conversion period. The latter is achieved also through compulsory reporting schemes of the organic share for value chain actors as well as conditional subsidies and support for organic R&I.

In Italy, **the outcomes are the strengthening of value chains and improvements in logistics**. This occurs through the creation of spaces for dialogue and coordination (multistakeholder panels, sectoral organic producer organisations to organise supply at the regional level, an interprofessional agency with representatives of farmers, cooperatives and industries) and the creation of infrastructures like logistic platforms in all regions, or an organic-only national grocery wholesale market platform. There are also significant changes for distribution with organic supply chains developing their own retails, partnerships with large retailers and discounters to increase assortment and the development of e-commerce platforms and farm shops that benefit from simplified regulations. In Germany, similarly to Italy, the focus is on improving coordination at the regional level.

In Denmark, while there is little development on the evolution of value chains organisation, a distinctive feature is the **proactive role value chains actors play in shaping food consumption** and increasing organic consumption as they progressively phase-out conventional animal products.

Actions in AKIS are also needed in the transition pathways in three main areas: improving research and innovation, strengthening advice and better integrating organic in agricultural training.

As for research, as already mentioned numerous times, research on the benefits of organic in terms of environment (biodiversity, water, climate change, nutrients…), ecosystem services, health and hidden costs plays an important role in all pathways to trigger the pathway, maintain momentum (in Hungary for instance) or to underlie policy changes. It includes new measurement tools and indicators. R&I is also important enable organic development by overcoming agronomic obstacles in France, Denmark (no-till organic practices or crop protection) or closing nutrient gaps (Germany), ensuring seeds availability or managing storage and processing of organic products (France). In several pathways, research becomes more relevant and effective thanks to cooperation

between research, development, advice and production. The ramp-up of organic research is also made possible by increased funding (specifically channelled towards organic), sometimes new research centres and long-term plans.

Regarding advice, actions from the pathways can be classified in two families: (1) improving AKIS relevance and quality for organic through scientific and technical support, training for advisors, new interfaces between research, innovation and advice, development of guidelines, the promotion of a more holistic visions of farm management; and (2) improving AKIS availability through new infrastructures, organisation, and financial support for farms. In several pathways, farmers also benefit from stronger peer-to-peer exchanges. Finally, the strengthening of organic's place in agricultural training is a recurrent action in the transition pathways.

4.2.3. Key Lessons Learned from Backasting

The transition pathways share many commonalities that can be considered **robust elements**. They consistently emerge as necessary in the stakeholders' view for the transition. Among the most important are triggers of the transition pathways, the reliance on strong public policies targeting every part of food systems, the use of organic by many actors as a tool to address different issues (mostly environmental and health), and agricultural policies focusing on the rewarding of ecosystems services and the polluter pays principle. Research, recognition and communication of the **impact and benefits of organic** compared to other systems play an essential role in the pathways. The transition pathways also underscore the need for **coordination and actions at different scales**: changes are needed in EU policies (CAP), the national is essential for further public policies, for campaigns, or sector representation but regional or local scales are important for food procurement, land access, value chain management and local coalitions.

Some issues are more overlooked: the evolution of conventional agriculture which will necessarily interact with organic, the international markets (with only Denmark mentioning exports), social issues for farmers or citizens (only addressed in France and Italy for farm work) whereas organic could also be a tool for food democracy, farmers welfare. The issue of competition with other claims does not appear as a major impediment for organic development. It is relatively quickly tackled through assessment of organic benefits (France), inclusion of practices in the organic label (Denmark) or public regulation on allegations (Hungary).

There are some **discrepancies between national scenarios and transition pathways**, reflecting methodological limitations. For instance, in Hungary climate change is an essential driver in the national scenario but is much less important in the scenario. Similarly, the Italian pathway pays little attention to biodistricts compared to the national scenario and the regional differences in terms of production and consumption are not particularly visible. In Germany, the scenario stresses transformations in livestock production which are not really mentioned in the transition pathway. When taken together, the national scenarios and transition pathways provide a large vision of actions, drivers and policies for the transition, showing further similarities, for instance between French local coalitions and Italian biodistricts.

5. Option Planning: Testing policy recommendations in the scenarios

The Project team developed draft policy & strategic recommendations[3], that were discussed during the Final Project Conference held in Brussels in November 2025. A world-café-style workshop was organised with all partners and various external invited stakeholders. Each table covered one of nine potential areas for policy action.

During the workshop the policy recommendations were a discussed and an option planning exercise allowed to test the robustness of the various policy and business strategy options proposed against the different scenarios. Workshop participants considered the various options against the four scenarios to test how the policies might perform in different conditions.

Option planning, also known as windtunneling or stress-testing of policy options, helps identifying how to make policies robust to future conditions in multiple plausible futures(Government Office for Science, 2024).

We report here the policy recommendations that appeared more robust, since they were judged to work in at least 3 or 4 scenarios. The list of all presented options is reported in Appendix F.

With reference to agricultural policy & strategic options, stakeholders consistently prioritised **cross-cutting system** enablers**,** such as targeted research and innovation support (including clearer specification of organic priorities in Horizon calls), improved data availability and market intelligence (e.g., observatories), stronger price transparency, and governance/coordination tools such as stakeholder engagement, peer-to-peer AKIS initiatives, and public–private partnerships. Measures such as BioDistricts, capacity-building centres, diversification of market channels, and actions to increase consumer accessibility were also widely supported, though slightly more scenario-sensitive.

[3] These policy recommendations are the outcome of WP7 and will be reported in detail in Deliverable 7.1.

Table 8. Agriculture option planning

Scenario Policy/Business Strategy Option*	Green Public Policy	Divergent Pathways	Organic on Every Table	Power to the People
BioDistricts	X		X	X
Centres of excellence for capacity building	X		X	X
Clear specification of organic in HORIZON RTDI Calls	X	X	X	X
Diversify market channels & broaden product availability in retail stores	X		X	X
Ensure specific organic focus on organic in generic AKIS programmes	X		X	X
Facilitate integration of policy measures for organic	X	In some countries	with private funding too (e.g. water companies)	X
Financial support for organic research	X	X	X	X
Improve access to good quality data and information	X	X	X	X
Improve price transparency	X	X	X	X
Increase accessibility for all consumers	X		X	X
Maintain/enhance promotion	X	X		X
Market observatories	X	X	X	X
Stable prioritised organic market support and public procurement	X	In some countries	X	In a second phase
Peer-2-peer AKIS initiatives	X	X	X	X
Public-private partnerships to extend producer/supply chain support	X	X	X	X
Stakeholder engagement	X	X	X	X
Realistic conversion targets at national/regional level	X	X	X	
Research, networking, coordination	X	X	X	X
Specify/Quantify environmental outcomes & targets	X	X	X	X
Supply chain coordination & hubs	X	In some countries	X	

*Options In **bold** are deemed robust across all scenarios.

Table 9. Aquaculture option planning

Scenario Policy/Business Strategy Option	Weak EU	Green & Fair	Big Mac Organic	Gloomy
Review regulation problems	Re-regulation, specific national approaches	Focus on rule alignment & new sustainable objectives	X	X
Supply chain development	In some countries	X	X	Investment aid
Public procurement	In some countries	X		X
Build consumer demand	X	X	X	
Research & innovation non-aquaculture budget innovation hubs	X	X	X	green sector-only, integrated with lower cost

*Options In **bold** are deemed robust across all scenarios.

In aquaculture, the most robust options concentrated on stimulating **consumer demand** and strengthening **research and innovation** (including innovation hubs), while regulatory changes, procurement, and supply-chain development were seen as more contingent on national contexts and, in some cases, requiring investment aid or phased implementation.

Overall, **research and innovation** appear to be the most robust option, stimulating the organic sector development across all scenarios, from the more to the less favourable. **Demand-side policy support**, either via public procurement, marketing interventions to stimulate demand or more indirect actions (improved market and price transparency, supply chain development, etc.) are also policy options that can be implemented – with some adjustments – in all scenarios.

One limitation of the option-planning approach is that stakeholders may be prone to confirmation bias when assessing policy options across different scenarios.

6.Conclusions

The foresight analysis presented in this deliverable confirms that business-as-usual trajectories are insufficient to achieve the Farm to Fork target of 25% organic farmland

by 2030. In the absence of structural transformation, the share of organic Utilised Agricultural Area (UAA) is projected to stabilise between 12% and 19%.

The four scenarios developed in this study illustrate alternative futures, ranging from policy-driven expansion (Green Public Policy) to citizen-led mobilisation (Organic Power to the People). Collectively, they demonstrate that achieving the Farm to Fork objectives for the organic transition requires coordinated, multilevel collaboration among governments, markets, and citizens. Integrating organic practices into broader sustainability strategies—supported by inclusive governance, transparent markets, and continuous knowledge exchange—will be essential for addressing the environmental, economic, and social challenges shaping the future of European agriculture.

Insights from the national transition pathways strengthen this conclusion by showing *how* change is likely to start and then be sustained. Across countries, pathways tend to be triggered by a combination of decisive public policy action, research and societal recognition of organic's environmental and health benefits that then translate into policy change, and internal sector reorganisation to increase collective capacity and political influence.

Crucially, even in the more demand-driven scenarios, stakeholders do not expect markets or consumption to deliver the transition alone: public steering remains necessary to align incentives, scale solutions, and stabilise demand. Option planning (windtunnelling) adds a further, EU-relevant layer: when policy and strategy options are stress-tested across contrasting scenarios, the most robust measures are consistently "system enablers"—research and innovation support (including a clear organic focus in Horizon calls), AKIS strengthening (including peer-to-peer initiatives), improved market intelligence (market observatories, better data access), and price transparency—combined with governance and coordination tools (stakeholder engagement, networking/coordination, public–private partnerships). Taken together, pathways and windtunnelling suggest a key EU-wide generalisation: **organic expansion is most resilient when the EU and Member States prioritise enabling capacities that keep working under high uncertain times, rather than relying on single instruments in isolation.**

Across all envisioned futures, four conditions emerge as fundamental:

(i) Policy coherence and regulatory integrity at the EU level. This includes the maintenance of area support for organic farmers while enhancing demand-side policies such as public procurement, promotions and other market interventions. Transition pathways underline that EU-level change—especially via the CAP—is repeatedly seen as necessary (in all countries but one) to increase organic funding and reward ecosystem services, sometimes complemented by "polluter pays" approaches and true-cost accounting to shift incentives more structurally.

In parallel, option planning indicates that demand-side actions (including procurement and promotion) can be implemented across diverse scenarios, albeit often requiring sequencing or tailoring by country context, and that market/price transparency measures are among the most robust across all scenarios.

(ii) Active engagement of supply chain actors, particularly large retailers and SME networks. Pathways highlight that value-chain transformation is essential to stabilise the organic economic model and scale supply: examples include multiannual contracts

to secure outlets and fair prices, redistribution or risk-sharing funds to manage conversion and market risks, and measures that make downstream actors accountable (e.g., reporting obligations and conditional support). This aligns with windtunnelling results that prioritise coordination, partnerships, and—where feasible—supply-chain support and hubs, while also signalling that some value-chain infrastructures may be more country-specific and need differentiated implementation pathways.

(iii) A pivotal role of Agricultural Knowledge and Innovation Systems (AKIS)—and particularly Research & Innovation—in fostering a societal transition toward organic food and farming systems. Transition pathways repeatedly identify research on environmental/health benefits, measurement tools and indicators, and problem-solving innovation (e.g., agronomic constraints, nutrient gaps, seeds, processing/storage) as critical both to *trigger* change and to maintain momentum, especially when research is connected to advice and farmer practice through stronger interfaces and training. Windtunnelling corroborates this by ranking R&I and AKIS-related options among the most robust across scenarios (e.g., organic priorities in Horizon RTDI calls, financial support for organic research, peer-to-peer AKIS initiatives, and an organic focus within broader AKIS programmes).

(iv) Trust-building and capacity development within civil society and non-governmental organisations. Transition pathways emphasise that legitimacy and societal buy-in are reinforced by communication and recognition of organic's benefits, and by coalitions at local and regional levels (including around procurement, food education, land access, and territorial value chains). Option planning complements this by showing strong cross-scenario support for stakeholder engagement and coordination instruments, which can help sustain trust and collective action under divergent futures.

Organic farming thus stands out as the cornerstone of a sustainable European food system. To realise its full potential, the European Union must safeguard regulatory ambition, enhance supply chain readiness, and leverage public procurement as a strategic driver of demand. Transition pathways further suggest that procurement is not only a market outlet, but also an instrument for food education and habit formation, especially when linked to broader curriculum and nutrition strategies—an insight that strengthens the case for procurement as a systemic lever rather than a niche intervention.

A sustainable growth of the organic sector should not be viewed merely as a quantitative goal (i.e., achieving a target of organic land) but as a systemic transformation—one that necessitates the alignment of political will, market structures, and citizen participation. At both national and EU-level, the foresight studies performed highlight the centrality of sustained public steering across the whole food system, strong AKIS and research-and-innovation capacity, better market intelligence and transparency, and coordinated multi-level governance linking EU frameworks to national policy direction and territorial implementation.

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Appendixes

Appendix A: Trend projections using RCS for different countries/crops/products

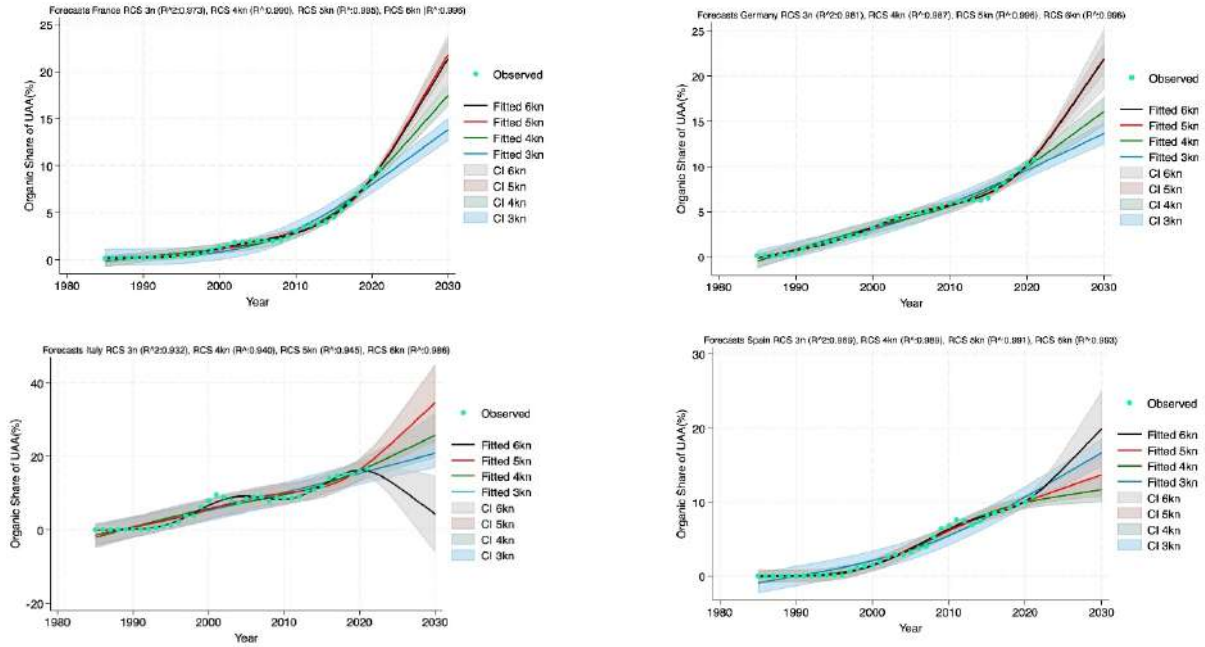

Figure 28. Trend projection of organic share for the Top 4 Countries by organic UAA

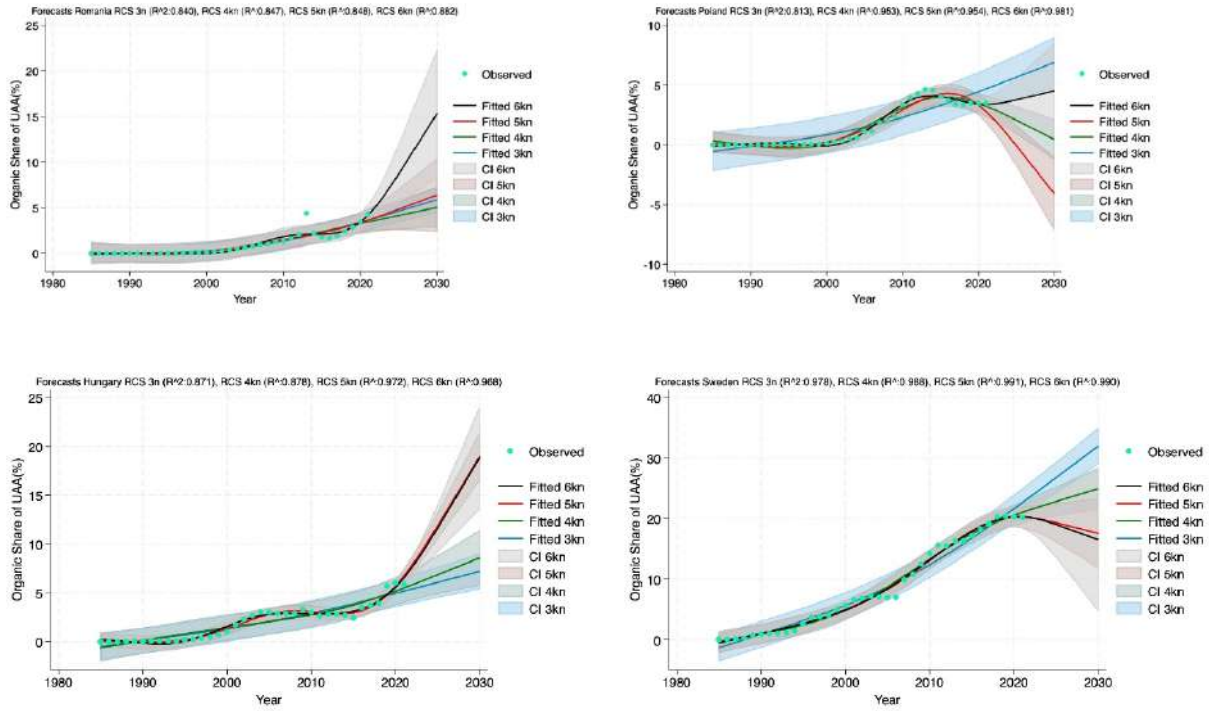

Figure 29. Trend projection of organic share for other relevant countries

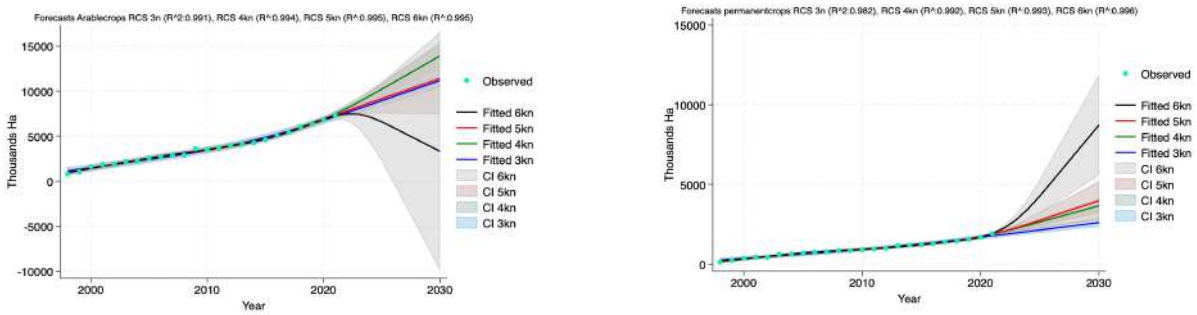

Figure 30. Trend projection of organic land area for arable and permanent crops

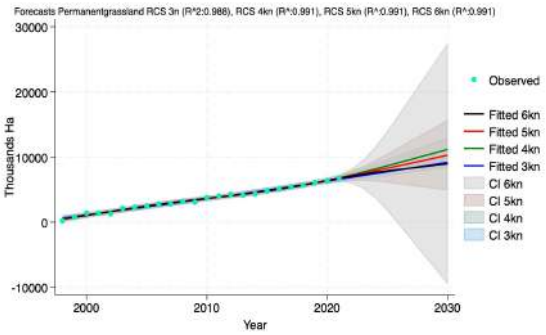

Figure 31. Retail sales for organic products (Billions Euro)

Appendix B: Preliminary list of relevant drivers for organic agriculture

1. Active dedicated organic advisory services
2. Agrobiodiversity
3. Availability of farm financial, market data for OF
4. Bureaucracy overkill
5. Capacity building in organic NGOs
6. Certification costs
7. Competition from alternative standards
8. Competition from local products
9. Consumer Price Index (CPI)
10. Conversion of arable farming systems
11. Conversion of livestock systems
12. Cost of access to advisory/extension services
13. Dedicated R&D in OF
14. Demand for OP
15. Development of bio-districts
16. Diffusion of more restrictive organic labelling
17. Digital / smart farming on OF
18. Direct producers' support for OF
19. Eco-schemes, national/regional policies for OF
20. Economic globalisation
27. Feed-food-fuel conflict
28. Food scares
29. Global warming mitigation policy
30. Household disposable income
31. Income distribution
32. Land availability and access to land
33. Large retail chains involvement
34. Lobbying
35. National/regional policies for OF
36. NGT in OF
37. Organic marketing campaigns
38. Organic public procurement
39. Political climate towards OF
40. Premium prices for organic food
41. Price of inputs
42. Price-gap between imported and domestic OP
43. Processors' production capacity for the organic sector
44. Reduced VAT for organic products
45. Regional/country speed of conversion
46. Relative profitability of OP for processors/retailers

21. Efficiency of organic food chains
22. EU organic regulation
23. Farm-gate relative prices of OP vs CP
24. Farmers' altruistic concerns
25. Farmers' relative profitability of OF
26. Farmers' risk attitudes
47. Role of Communities of practices/living labs/innovation hubs
48. Skilled workers availability
49. Subsidised credit for OF/processor
50. Sustainable and healthy diets
51. Training and education for OF
52. Vulnerability of OF to new pests
53. Water availability for farming

CP: conventional products; OF: organic farming; OP: organic products; NGO: no-profit organisations; NGT: new genetic techniques

Appendix C: List of selected drivers for organic farming scenario analysis development: description and states

DRIVER CATEGORY	SPECIFIC VARIABLES	DESCRIPTION
MEGA TRENDS	**Political climate towards OF**	Education, media coverage, societal concern for sustainable development
	Water availabilty for farming	The future development of natural availability of freshwater for agricultural use. This broad global pattern is accentuated by regional hotspots of too much or too little water
CONSUMERS' PERSPECTIVE	**Competition from alternative standards**	Competition from zero residue and other "greenwashing" standards (e.g. GGN, regenerative, outcome based certifications, PEF labelling etc.) may impact on organic demand
	Food scares	Bad practices and food scandals (both possible in organic and conventional farming)
	Sustainable and healthy diets	Healthier, ethical, sustainable consumption, including e.g. vegan/vegetarian-ism, fair trade, local consumption, etc. may impact on the demand of organic products
SUPPLY CHAIN	**Large retail chains involvement**	Large retail chains investing in organic by increasing assortment and display
	Organic public procurement	Changes in the demand for public sector for organic products (e.g. hospitals, canteens, schools, etc,) may impact on the supply of organic products
POLICY	**Eco-schemes, national/regional policies OF**	The new National ecoschemes may impact uptake of OF by either hampering or making conversion more convenient; These are likely to be coordinated with national/regional Policy measures other than direct payments
	NGT in OF	Impact of regulation on New Genetich Techniques if they are not more considered GMOs, and ruled admissable in organic farming
	Subsidised credit for OF/processor	Dedicated credit lines and subsidised interest rates, surety bonds, etc. for organic farming
FARMERS' PERSPECTIVE	**Conversion of arable farming systems**	Reaching the organic F2F targets may be pursuit by increased conversion of plant production and arable farming systems
	Conversion of livestock systems	Reaching the organic F2F targets may be pursuit by increased conversion of livetsock-based farming systems
	Farm-gate relative prices of OP vs CP	The ratio of organic and conventional farm-gate prices may impact on the conversion to organic farming
AKIS	**Capacity building in organic NGOs**	Strengthening the capacity of the organizations to deliver their services and achieve their mission by e.g., promoting collaboration, networking, and partnerships with other like-minded organizations and stakeholders
	Training and education for OF	Specific organic training for farmers and other supply chains actors, dedicated education at secondary and university levels including e.g. ESG, CSR, climate smart agriculture etc.

	DRIVER	STATE 1	STATE 2	STATE 3
MEGA TRENDS	Political climate towards OF	**Green Deal cancelled** - The Sustainable Use and the Nature Restoration Regulations not approved by the EP - agrobiotechnology as a solution to face food security and resource scarcity - tension rising among different EU states, with national sovereignity claimed back and increasing autonomy in agricultural policy	**Green Deal stalled** - The Sustainable Use and the Nature Restoration Regulations strongly diluted by the EP - tokenised, symbolic committment to organic farming and sustainable food systems - the EU is on muddy waters, with few countries imposing vetoes on common rules, with patchwork application of EU regulations	**Green Deal +** - Sustainable Use and the Nature Restoration Regulations are approved by the EP - organic food systems become central in EU policy - renewed EU cohesion creates the conditions a common framework on national OF policies
	Water availability for farming	Water conflicts -Increasing water scarcity creates conflicts of interest among different water users - price of water is high: different prices for drinking, irrigated and industrial water - some water sources become private asset - the lack of water may favour agrobiotechnology but also resilient OF systems	**Mixed corporate-public governance of water** - water availability and security improves - the private sector offers fresh solutions and financing to support water efficiency - the price of water is very volatile, due to very diverse public-private partnership agreements - water availability and prices in rural areas vary from region to region	**Circularity and regulated water** - strong public investments in water infrastructure reduce water scarcity - water reuse is required in most EU countries; new regulations mandate removal of micropollutants and microplastics - water remains a public good and prices are differentiate to allow soscial sustainability - good-quality water is available for agriculture
CONSUMERS PERSPECTIVE	Competition from alternative standards	**Mainstream agriculture revival** - hinging on food security concerns, mainstream agriculture lobbies increasingly target consumers to convince them of the safety and superiority of conventional food products - consumers are segmented into supporters and detractors of organic products	**Entropy of standards** - regenerative and other standards receive legal status and labelling - consumers becomes confused by so many different "sustainable" standards and "green" labels	**Organic primacy** - alternative standards don't attain legal status - an increasing share of consumers perceive organic products as differenciated from other standards and best option (e.g., for environment, biodiversity, etc.)
	Food scares	**Organic scandals** - abrupt scandals in the organic farming & food system (including ultra processed foods) spread panic among consumers - consumer trust in organic food is reduced	**No pain, no gain** - No special shocks and scandals - consumer trust in overall food safety remain unchanged, both for conventional and organic products	**Conventional food scandals** - abrupt scandals in the conventional farming & food system spread panic among consumers - consumers perceive organic food as safer
	Sustainable and healthy diets	**Going junky** - cheap and highly processed food increase their market share - lack of consumer awareness & persistence of unhealthy & unethical behaviours in food choice	**Healthy but Grey** - increase of healthy but not necessarily sustainable food (e.g., superfood or vitamin enriched increasingly popular) - health-conscious consumers don't overlap with ethical & organic consumers	**Healthy & Green** - organic food increasingly coupled with health-related attributes and claims (e.g., high in fiber, low fat, vegan, etc.) - organic and health-conscious consumer segments increasingly overlapping
SUPPLY CHAIN	Large retail chains involvement	**Fragmented supply** - prevalence of SMEs among processors fails to meet critical mass with unstable supply and inconsistent quality standards - earnings not growing - large retail chains do not increase organic range	**Networking** - supply chain integration of SMEs into organic districts or cooperatives - economies of scale at district level increase profitability of processors - large retail chains find better partners assuring good quality & stable supply	**Big is better** - mergers and acquistions result in few large processors; - processors retail a larger share of value added - large retails chains have stable, good quality supply but less market power
	Organic public procurement	**Organic demand stays private** - no relevant demand from public sector for organic products	**Fragmented public procurement** - uneven public demand of organic products, with differences at national/regional level	**Public procurement boost** - organic food becomes standard in all public institutions (hospitals, canteens, schools, etc.)
POLICY	Eco-schemes, national/ regional policies OF	**Unfavourable CAP** -ecoschemes discouraging organic farming development - conditionality relatively more favourable for CF - national/regional organic RDPs generally favour conventional farming	**Neutral CAP** - ecoschemes compatible with conventional farming with little restrictions - conditionality is neutral between OF and CF - national/regional RDPs neutral, no significant changes in support for conversion to OF	**Favourable CAP** - ecoschemes tailored to suit the development of organic farming - conditionality relatively more favourable for OF - national/regional RDPs favour organic farming, measures supporting conversion to OF
	NGT in OF	**NGT liberalisation** - NGT are allowed in both organic and conventional farming system across the EU	**NGT only in conventional** - NGT are allowed in EU conventional agriculture but banned from organic	**NGT-free EU** - NGT are considered GMOs and banned from EU agriculture
	Subsidised credit for OF/processor	**Credit crunch for organic farmers** - limited credit access due to financial negative situation - large consolidated agro-food business are favoured	**Credit lines for organic farmers** - subsidised interest rates, surety bonds, etc. for organic farming - public guarantee funds for loans to organic farmers	**Organic finance** - organic sector and organic supply chains included in international capital market (e.g. ESG effect on organic supply chain financial markets) - dedicated financial tools (e.g. ETFs) for organic agrofood
FARMERS PERSPECTIVE	Conversion of arable farming systems	**Concentrated growth** - increased conversion of arable crops (including horticulture and permanent crops) concentrated in few regions/countries; big organic countries lead the reach of 25% target	**Lagger countries catching-up** - conversion of arable crops (including horticulture and permanent crops) more accelerated in countries/regions with low organic share	**Widespread uniform conversion** - general increase in conversion for arable crops (including horticulture and permanent crops)across all countries
	Conversion of livestock systems	**Concentrated growth** - increased conversion of livestock systems concentrated in few regions/countres; big organic countries lead the reach of 25% target	**Lagger countries catching-up** - conversion of livestock systems more accelerated in countries/regions with low organic share	**Widespread uniform conversion** - general increase in conversion of livestock systems across all countries
	Farm-gate relative prices of OP vs CP	**No more premium** - organic premium prices eroded	**Uneven premiums** - premium prices unstable, cyclical and/or just for some productions	**Premium prices are there to stay** - organic farm-gate prices stable above conventional ones for all/most productions
AKIS	Capacity building in organic NGOs	**Fragmented NGOs** - IFOAM Oragnics Europe no longer representing the whole sector - lack of networking, limited capacity and collaboration at the national level	**Few EU/National strong lobbying** - IFOAM Organic Europe leads the change in the EU - only few countries have national NGOs really represeting the sector (e.g. BÖLW in Germany)	**Development of Organic NGOs** - IFOAM Organic Europe leads the change in the EU - development and increasing impact of dedicated organic NGOs at national/regional level
	Training and education for OF	**Organic AKIS stay marginal** - (dedicated) research & innovation funds for organic farming are sparse and not significant at EU and national level - dedicated organic training, education & research (Kassel model) is exceptional at both vocational, secondary and university level	**Common AKIS for farming** - AKIS for organic are integrated with those for conventional farming - training, education & research for farming is not sufficiently differentiated between organic and conventional	**Knowledge boost in OF** - (dedicated) research & innovation funds for organic farming highly increased at EU and national level - dedicated organic training, education & research (Kassel model) is widespread, at both vocational, secondary and university level

Appendix D: List of selected drivers for the organic aquaculture scenario analysis development, description and states

DRIVERS	DESCRIPTION	DRIVERS' STATES		
Changes in market globalisation processes	Issues on market globalisation including WTO, west - east polarisation, "Fortress EU" (self sufficiency attitude), re-shoring and near-shoring, potential EU member state exit	**Re-globalisation** - world trade booms again - sharp rise in interdependencies in global food supply chains	**Fortress EU** - EU stays large but becomes more isolated from the rest of world - increase in tariff/non tariff barriers to trade	**West-East polarisation** - world "divides" in few geopolitical blocks: e.g. EU, UK & NAFTA vs Russia, China with ASEAN countries, Oceania & India as free players - trade globalises but within geopolitical macro areas
Food preferences	Consumer preferences towards sustainable diets, healthier food, "superfood", nutraceuticals, etc.	**Sustainable & healthy diets prevail** - consumer diriven local or certified sustainable global food growth - attention to nutritional aspects	**Fragmented consumers' preferences** - large diversity of food preferences - food market segmentation: both sustainable/healthy diets and unsustainable/unhealthy diets coexist	**Unsustainable & unhealthy diets prevail** - (low) prices drive food choice - growing food-related health issues (e.g., obesity) with lack of consumer awareness & prevention
Water availability for organic aquaculture	Freshwater availability is becoming increasingly critical because of irrigation and urbanisation. About 70% of all water usage is meant for agriculture	**Water conflicts** -increasing water scarcity creates conflicts of interest among different water users - price of water is high: different prices for drinking, irrigated and industrial water - some water sources become private asset	**Mixed corporate-public governance of water** - water availability and security improves - the private sector offers fresh solutions and financing to support water efficiency - the price of water is very volatile, due to very diverse public-private	**Circularity and regulated water** - strong public investments in water infrastructure reduce water scarcity - water reuse is required in most EU countries; new regulations mandate removal of micropollutants and microplastics - water remains a public good and prices are differnatiate to allow soscial sustainability
Competition from alternative fishery production standards	Competition from sustainable fishing standards (e.g ASC), and other "greenwashing" standards may impact on organic demand.	**Mainstream aquaculture dominance** - hinging on food security concerns, mainstream aquaculture lobbies increasingly target consumers to convince them of the safety and superiority of conventional products - consumers are segmented into supporters and detractors of organic	**Entropy of standards** - ASC and other standards receive legal status and labelling - consumers becomes confused by so many different "sustainable" standards and "green" labels	**Organic primacy** - alternative standards don't attain legal status - an increasing share of consumers perceive organic aquaculture products as differenciated from other standards and best option (e.g., for environment, biodiversity, etc.)
Availability of fishery resources	Fishery resources may stay as in current situation or become less available due climatic condition, overfishing and (possibly) subsequent policy intervention to reduce fishing effort.	**Business as usual** - availability of fishery resources stays broadly as in current situation at European and global level		**Reduced availability of Fishery resources** - availability of fishery resources become less available due climatic condition, overfishing and (possibly) subsequent policy intervention to reduce fishing effort.
Availability of processed fish species	Nr of processed fish species may vary according to market conditions and processing capacity	**Low** - availability of processed fish species stays low	**Medium** - availability of processed fish species increases moderately	**High** - availability of processed fish species increases substantially
Processing form	Preparation of seafood and freshwater fish for human consumption.	**Fresh** - mainly unprocessed fish only available	**Preserved** - dried, smoked, canned, etc	**Frozen** - frozen chain available for farmed fish
Price premium at farm gate for OA	Level of price premium in organic aquaculture with respect to those available in the conventional sector	**No more premium** - organic premium prices eroded	**Uneven premiums** - premium prices unstable, cyclical and/or just for some specific products/markets from OA	**Premium prices are there to stay** - organic farm-gate prices sty stable above conventional ones for all/most productions
Labour and other input costs	Level of intermediate costs such as costs for feed, labour, juveniles, energy, etc. in organic aquaculture	**OA stays cost-inefficient** - Intermediate input cost remain too high due to limited availability and market size	**Moderate improvement in cost efficiency** - intermediate input cost reduced but still not enough to assure relative profitability	**Cost efficiency achieved for OA** - intermediate input costs for OA still higher than conventional but permit OA profitability
Scale of production/ economy of scale for org. aquaculture sector	Critical mass for organic aquaculture production, availability of appropriate organic inputs and technologies, availability of dedicated processing facilities for organic products	**Aquaculture sector stays embryonic** - outsorcing of OA production outside the EU - unstable supply of inputs and inconsistent quality standards - ROI not sufficient for growing up	**Prevalence of SME** - limited market size limit large farm development - supply chain integration of SMEs into organic districts or cooperatives - economies of scale at district level increase profitability of processors	**Big is better** - emergence of few large production/processing facilities - dedicated tech allows automation and optimisation of processing and farming in OA - processors retail a larger share of value added
EU policies and regulatory framework	Policy measures supporting organic aquaculture. Harmonised EU Regulation for organic aquaculture may impact aqua farmers, processors, retailers, and consumers uptake of organic aquaculture	**Common rules** - uniform, directly applicable legal framework at EU level - common standards for safety & quality requirements of OA	**Patchwork regulation** - incoherent EU regulatory framework for OA, leaving space for controversial application - national legislation prevails in non-harmonised areas, and harmonised rules are applied differently in different EU countries	**Regulatory overload** - increase complexity of regulatory framework for OA at EU level - bureacratic overkill and barriers to product & market innovation
Societal, environmental and ethical concerns	Concerns about ecology and fairness in food systems	**Green but not fair** - widespread societal awareness drives environmentally-conscious behaviours - agri-food systems develop without regard for social justice	**Greenwashing** - free riding and selfish attitudes prevail, with environemntal impacts and social injustice rising - consumers are misled by green marketing with no real changes in environemtal and social sustainability	**Green & Fair** - holistic vision for ethics and environment becomes mainstream (e.g. animal welfare taken for granted, etc.) - low waste and increased social wellbeing
Organic marketing campaigns and lobbying	Media coverage of organic food & farming and lobbying activities	**Fragmented NGOs** - lack of networking, limited capacity and collaboration at the national level - marginal media coverage for OA	**Few EU/National strong lobbying** - only few countries have national NGOs really represeting the sector - media coverage for OA stays moderate	**Development of Organic NGOs** - development and increasing impact of dedicated organic NGOs at national/regional level - significant media coverage for OA
R&D/training and advisory services for OA	Role of public and private resarch dedicated to organic aquaculture, including innovative techinques (e.g alternative nutritional factors, etc.). Guidance and advice to farmers and growers who want to shift to organic methods or improve their existing organic practices	**Organic knowledge system stays marginal** - (dedicated) research & innovation funds for organic farming are sparse and not significant at EU and national level - dedicated organic training, education & research (Kassel model) is exceptional at both vocational, secondary and university level	**Common knowledge system for aquaculture** - R&D for OA are integrated with those for conventional aquaculture - training, education & research for OA is not sufficiently differentiated between organic and conventional	**Knowledge boost in OA** - (dedicated) research & innovation funds for organic farming highly increased at EU and national level - dedicated organic training, education & research (Kassel model) is widespread, at both vocational, secondary and university level

Appendix E: National scenarios for backcasting

This appendix presents the five national scenarios developed with national experts by downscaling the EU scenarios (see the methodology section in the report) and discusses how the EU scenarios have been interpreted and taken up at the national level.

1. Downscaling Scenarios: Narratives of the five national scenarios

The narrative of the scenario Green Public Policy for Germany

In 2040, 30% of agricultural land is organic in Germany. This development has been mainly driven by green public policies. The public funding system for agriculture has been oriented towards the strengthening of public goods and the rewarding of environmental outcomes and fully recognizes the benefits of organic farming in that respect. The level of funding for organic makes conversion attractive to farmers. Organic therefore has increased its share of both overall funding for agriculture and environmental funding. Policy-makers recognize the special role of organic farming. The effects on organic are carefully considered when designing and implementing new policies. The consistency and synergies between federal and Länder policies have been improved. Federal and local public policies have also targeted AKIS (with every Bundesland developing institutional capacity and a centre of excellence for organic AKIS) and value chains with public investments to develop local capacity for processing and to provide better market data. Organic action plans have also been instruments to strengthen institutional capacities and increase organic share in public procurement at Federal and Länder levels.

Thanks to those proactive policies, which make organic financially attractive to farmers and ensure the availability of outlets and market, organic farming has developed, especially in regions and for crops where it was under-developed. Those regions and crops provide in 2040 the largest contribution to surface increase from 2025. Rotations are longer, more diversified and integrate more legumes (for animal feed). In particular, organic strongly develops in arable crops and regions like Lower-Saxony and Eastern Germany. In line with public support of organic for its environmental benefits, organic also develops in water-catchment, environmentally-sensitive and water-scarce areas. Conversion to organic has emerged as a strategy to enhance resilience in both arable and livestock sectors facing impacts of climate change.

Regarding livestock, voluntarist policies to decrease overall livestock numbers, in order to favour a land-based approach to livestock and to develop organic livestock have been implemented. Funding for restructuring of livestock systems and buildings has been made conditional upon decrease of animal numbers and compatibility with organic farming. Compensation measures for reducing number of animals or dropping out of animal farming have been set up. Feed independence policies and legumes development programmes have been implemented, converging with organic systems. Livestock systems have undergone fundamental changes with a decrease in overall livestock numbers and density, in line with the land-based approach. Livestock systems are more extensive, paving the way for the development of organic systems (pig, poultry and beef). Localized processing and slaughtering facilities have developed as value chains actors have access to comprehensive market data, allowing them to make informed investment

decisions, and have considerably improved the access of breeders to market (local and distant).

This development of organic farming relies on the support of organic AKIS. This institutional capacity has been developed, in collaboration with farmers' organisations. It has made available in-depth training by strengthening the links and networks with the agroecological community and farmers interested in environmental issues, building on a shared interest in ecological management of farming systems. The pro-active engagement of farmers for sustainability contributes to a greater recognition of shared interests across farmers' unions and organisations. This participates to changes in the national farmers' association's position, facilitating the development of green policies.

Retailers follow suit and engage strongly with organic products. In a context where organic has developed a brand identity and is valued by consumers as such (and for its environmental benefits), retailer chains compete to offer the greatest assortments and the most affordable organic products. The share of supermarkets in organic sale increase and organic supermarkets develop. To increase their assortment, they collaborate with other actors like farming and organic associations. They develop long-lasting relationships with farmers through multi-contracts and long-term contracts, providing them with fair prices and visibility and thus a stronger position in the value chain. Consistently with the evolution of livestock, consumption of animal product has sharply decreased, with an emphasis on meat quality instead of meat quantity. Producers and value chain actors use organic as a differentiation strategy as it ensures high standards of animal welfare and access to pasture for dairy and beef. The public labelling scheme for animal welfare has been extended to poultry, dairy and beef with organic remaining the highest level. Indeed, as part of green public policies, public authorities extend and build on initiatives from civil society, environmental NGOs and private actors to improve environmental outcomes and animal welfare.

The narrative of the scenario Divergent Pathways for Italy

In 2040, Italy has gone beyond 25% of agriculture land in organic farming. In the context of a weakening of EU environmental policies and a shift to a productivist agenda, Italy is one of the countries where organic farming has continued to develop in order to supply European and international markets. This increase in organic production has been driven by the development and structuration of value chains, as well as by market demand for organic and consumption growth both in Northern urban parts of Italy and in urban areas in the North of Europe. There is a national divide in both production and consumption: the South of Italy has largely converted to organic, while production systems in Northern regions remain mostly intensive; but consumption is concentrated in urban areas in the North. This is the result of different policy support (in terms of payment and resource invested) and value chain involvement at the regional level.

Permanent crops have become predominantly organic: wine and oil have converted to organic in the whole country, fruits, vegetables and citrus are overwhelmingly organic. In the South of Italy, cereals, especially durum wheat (to make pastas), have also converted. These productions are export-oriented and have benefited from improvements in transports and logistics, allowing decreased costs. However, the strengthening and improvements of organic value chains also allows fruits, vegetables and fresh dairies to be locally available thanks to better logistics. In the North, conversion

towards organic systems is lagging, but most of ruminant extensive livestock in mountains and marginal or unfavourable areas are fully organic. In general, the growth of the organic sector is mimicking the specialization patterns of conventional farming in terms of products and crops (e.g. organic pears in Emilia and table grapes in Apulia).

In a context of climate change inducing an increase in cost of production, and of increased competition, conversion to organic has often been the only choice for small farms as it allows them to benefit from a maintained price premium.

Organic consumption has increased dramatically due to the mainstreaming of organic in supermarkets while specialized organic outlets still prosper, especially for premium organic products. The geographical divide in consumption between North and South has been reduced but still exists. This development took place given the launch of a national logo around 2030 and public communication efforts. Both in Italy and in the EU, consumption growth is driven by affluent people with high-purchasing power in urban areas, many of whom are already established consumers. Moreover, public procurement schemes at the regional level have been reinforced with many public canteens in the North and in biodistricts almost fully organic. Organic has remained the predominant legal standard and the most recognized by citizens and public policies. National organisations and associations for organic have been strengthened, notably with the involvement of civil society, which contributes to the push towards organic. Nevertheless, the Italian organic sector remains strongly export-oriented.

In some regions (especially laggard), biodistricts played a role in developing and organizing value chains and AKIS at the territorial level, and thus for conversion. In other regions with a more advanced organic sector (like Sardegna or Marche), biodistricts represent hubs for managing support and supply management policies. Following regulation changes, biodistricts are implementing group certification initiatives allowing more efficient control of small farms. Biodistricts also allow to connect agriculture to other sectors like tourism and environmental policies, creating multifunctional farms and integrated territorial development.

In specific regions and situations, process-based payments for ecosystem services are also provided. Together with biodistricts, AKIS is also provided by private advice based on supply chain actors and consortiums, especially processors.

The narrative of the scenario Organic on Every Table for Denmark

In 2040, Denmark has gone beyond 25% of agricultural land in organic farming. Organic farming has been promoted, as its benefits for the environment (biodiversity, pesticides, nitrification, resilience to climate change impacts) and for animal welfare are recognized by citizens. Consumers infer health benefits from those environmental benefits: organic is regarded as healthy and sustainable. These changes result in an increase in organic products consumption and are part of a wider consumer shift towards healthier and climate-friendly plant-based diets.

The organic label for kitchens is reinforced and developed. Public procurement has reached the 75% target for organic products. Restaurants target consumers with organic products which are also promoted as high quality and better tasting.

In large-scale retailers, organic assortment has continued to increase. The price difference between organic and conventional products has decreased, contributing to an increase in organic products consumption, as a result of two factors: organic products benefit from lower VAT rates or other financial compensation to account for hidden costs of agriculture and food; as organic market share is rising, economies of scale are made across value chains. Value chains diversify towards more organic and plant-based products to respond to the shift towards healthier, flexitarian and climate-friendly diets. Alternative models like food box schemes expand but remain a niche.

There is an increase in arable conversions as conventional pig and ex mink farmers are converting to arable organic farming. The systems converting to organic are market-driven: they target high-value and highly demanded crops like legumes, vegetables and certain cereals. Fruits and vegetables productions suited to the Danish context and to changes in diets (like cabbages, salads, onions, apples, potatoes, and carrots) develop. Conversion in livestock systems is driven by ruminants grazing on nature areas, supported by payments for ecosystem services. Some arable conventional farmers have also converted to organic pig and poultry breeding. New sources of fertilizers (like human or household waste, composted or biogas digestates with conventional farm manure enriched with stripped nutrients) contribute to meeting organic systems' need for nutrients.

Diverse policies have supported such conversions. They were incentivized by national public support for organic farming (and consumption) for its environmental benefits (biodiversity, conservation of water resources and nitrogen management). The tax instrument is used to mitigate agriculture impact on the environment, benefiting low-impact organic systems, and organic products through reduced VAT and preferential credits. The Pillar 1 of the CAP is regulated, with subsidies allocated to environmental achievements. Nutritional policies supporting plant-based diets also benefit plant-based organic products.

Organic AKIS has supported these conversions by responding well to farmers' needs, and through an integration into the wider AKIS system. New advice has developed for legumes or vegetables organic crops. Advisory for organic pig and poultry production has developed and improved. Funding for research on organic farming has increased and has reached the level of financing for conventional systems. Research focus on assessing environment benefits of organic farming, especially on biodiversity and identifying and evaluating sustainable cropping systems.

The narrative of the scenario Organic on Every Table for France

By 2040, organic farming and food have grown significantly and in tandem with increasing recognition of their beneficial effects on health and the environment. Access to organic products has become widespread thanks to a variety of supply chains. Consumers, citizens, and public decision-makers now use organic farming as a tool for food democracy with the aim of strengthening global health (the "One Health" concept) as a common good. In 2040, the image of organic farming among the general public and public authorities has evolved with a better integration of environmental, nutritional, and climate issues.

Consumer recognition of the positive effects of organic farming on the environment and health is the result of an objective evaluation of the combined effects of organic food on human health and of agricultural systems on ecosystems (e.g. evaluation of ecosystem services, measurement of changes in species diversity using environmental DNA and metagenomics tools). This has led to the marginalization of other label proposals such as regenerative agriculture, the High Environmental Value (HVE) label, and the private label “zero pesticide residues”. At the same time, a regulation framework for environmental and health claims made by private label has been implemented, which has strengthened consumer confidence in organic farming by highlighting the robustness of its control and certification process (through third-party, group certification, or a participatory guarantee system). Between 2024 and 2040, the growth in demand for organic products is part of a shift among consumers towards diverse and healthy diets that include legumes, foods without chemical pesticide and not ultra-processed.

The access and availability of organic products have greatly improved in general retailers and discount stores. Large retailers have played a key role in making organic products widely available. Supermarkets have implemented marketing campaigns to promote the purchase of organic products among consumers: special offers and loyalty schemes have been introduced to attract consumers who were previously uninterested in organic products. Value sharing within value chains has been rebalanced through multi-year contracts that guarantee farmers purchase prices from collectors, processors, and supermarkets. Access to organic products for rural and urban populations is ensured by the coexistence of a variety of supply channels: supermarkets, specialized retailers, short supply chains and direct sales. However, it is also through collective catering, where organic products now account for 20% to 100% of supplies, and out-of-home consumption via commercial catering, that the consumption of organic products has grown among the population as a whole. The value chain has been organized to respond to these challenges, in particular by limiting the storage times of organic agricultural products by collectors and by strengthening the primary and secondary processing of products, particularly organic legumes in the food processing industries.

Consumer recognition of the organic label has led to the implementation of measures addressing environmental, health, and social issues—particularly through organisations guaranteeing social security of food—based on the production or consumption of organic products.

At the national level, the development of organic production is based on a process of desectorialization of policies targeting organic farming, moving towards cross-cutting and integrated policies that mobilize organic farming to improve water and soil quality, biodiversity, the nutritional quality of food, the climate, and health, and to combat food insecurity. As a result, policies on setting up and converting to organic farming are now coordinated not only with the “traditional” public and private actors (e.g., Chambers of Agriculture, Organic Farmers' Groups [GAB], Centres for Initiatives to Promote Agriculture and Rural Areas [CIVAM]), but also with, for example, water agencies, the Banque des Territoires, the French Office for Biodiversity (OFB), and land use planning stakeholders (e.g., Compagnie Nationale du Rhône [CNR]) at the regional and national levels, as well as stakeholders engaged in Territorial Food Projects (TFP).

The development of organic farming production is also supported by the continuation of the Common Agricultural Policy (CAP) at the European level, with direct aid for the

establishment and maintenance of organic farming in the first pillar, and increased transfers from the first to the second pillar to enable the implementation of integrated territorial policies.

Conversions to organic farming have mainly concerned arable crops, with the development of long and diversified rotations incorporating legumes, but the development of organic farming has also continued in perennial crops and market gardening. In mountain areas, ruminant farming has converted massively to organic farming, with the development of extensive farming and greater autonomy in animal feed. In general, farming systems that have converted to organic farming prioritize feed autonomy and animal welfare.

In addition, the research, education, training, and advisory system has focused its efforts on organic farming as a means of achieving the objectives set by agroecology. Advice to farmers has diversified according to sectors and territories, with both professional associations and networks of stakeholders (e.g., the network of Chambers of Agriculture and the FNAB network of organic farmers' groups), integrating territorial stakeholders (e.g., formalized within the framework of TFPs) or value chain operators (establishing private specifications). Hybrid collectives bringing together farmers, citizens, and value chain stakeholders have supported the conversion process through learning and exchange mechanisms.

The narrative of the scenario Organic Power to the People for Hungary

In a general context of strong impact of climate change Hungary (weather extremes, water scarcity) and rising cost of fossil fuels, environmental awareness in the Hungarian population in 2040, especially younger generations, is sustained by NGOs and citizen initiatives advocating for biodiversity, water, soil health and organic farming.

Against this backdrop of strong climate change impacts, high environmental awareness, and promotion of environmental and health benefits of organic farming, a strong organic movement based on citizens initiatives emerges and unites with initiatives and movements like biointensive gardeners, Community-Supported Agriculture, permaculture, etc. Alternatives distribution models (CSA but also direct sale, farmer shops, cooperatives to provide fresh products like fruits, vegetables or eggs) grow and spread in the country.

The organic sector seizes this opportunity and repositions itself towards domestic markets. Water issues and biodiversity are integrated into the organic standard. The positive impacts of organic farming are widely recognized and trusted in the population, thanks to actions and campaigns stressing the environmental benefits of organic farming, its ecological roots, the healthiness and quality of organic products, positioning organic farming as the only legal standard. Past food scandals in conventional foods combined with efforts from food and diet influencers, and environmental awareness contribute to increase consumer demand towards organic products (organic farming benefits from a transparent system).

Retailers and processors respond to strong citizen demand for healthy and sustainable foods: big retailers incorporate organic products, both domestic and imported, especially legumes, cereals and flours. This structuration and development of the value chain allows a decrease of the price of organic production (but producers' prices remain

stable). The price differential with conventional products is further reduced by an increase in the price of conventional products driven by rising prices of inputs (and synthetic fertilisers). Therefore, organic products become much more competitive, which further increases demand in a virtuous cycle, and organic farming has access to preferential credit (as certain financial institutions recognize environmental criteria like organic reliable thanks to its 3rd party certification system). Producing and supplying domestically-produced healthy and safe source is a source of national pride.

Farmers are incentivized to switch to low-input and resilient systems as inputs prices increase (especially synthetic fertilisers) and climate change impacts production. This contributes to the development of farming systems that are more sustainable and resilient to environmental conditions or geopolitical shocks. Supported by value chains, preferential credits and specific policies, it results in a general increase in organic conversion of wheat, winter cereals, drought-tolerant crops like sorghum or sunflower and legumes, and a decline in maize production. Rotations are longer and more diversified. The development of organic livestock is lower but some grazing systems convert. As the number of organic farmers increases, network of knowledge and experience sharing dynamics between farmers developed, mostly driven by the younger generation of farmers. Collective organizations and networks (e.g. farmers' associations) are also created and strengthened. The switch to organic is also facilitated and made more attractive and less expensive by changes and simplification in the certification process, notably the development of Participatory Guarantee Systems and blockchains. Farmers connect with citizen science initiatives that monitor biodiversity of insects, bird populations, invasive species and soil health. Those initiatives advocate for pesticide-free crop management, strengthening of ecosystem services, and monitoring the impacts of alternative practices.

Public policies respond to the strong citizen movement and demand for organic with new policies. New and increased subsidies dedicated to strengthen resilience of farming system in the new environmental context are implemented for nitrogen-fixing crops and water management practices (e.g. landscape-based water management). This supports, directly or indirectly, organic. A higher share of agricultural subsidies is also allocated to organic farming, in response to citizen demand for healthy and sustainable products. Public procurement policy supported short food supply chains, preferably organic, are also implemented.

2. Analysis of national scenarios and transversal lessons : how do they compare with EU scenarios ?

The Green Public Policies scenario for Germany

This German scenario includes some additions, adjustments and precisions when compared to the EU scenario. Six key points stand out:

1. Organic farming develops in regions and productions where it is currently under-developed and in areas facing environmental issues. More details are provided on organic conversion with the largest development of organic taking place in regions and crops were organic is currently lagging behind. In line with the green orientation of the scenario, organic also develops in water-catchment,

environmentally-sensitive and water-scarce areas and emerges as a resilience strategy against climate change. However, the issue of regions facing abandonment has not been picked up in the national scenario.

2. **The key principle for public policies is the strengthening of public goods and the rewarding of environmental outcomes.** To do so, they support organic farming, shape livestock systems. They don't only target farming systems but also value chains, AKIS, and markets.
3. **Voluntarist policies transform the livestock systems and animal welfare is a prominent issue, complementary with organic**. The scenario gives a lot of precisions on evolution for livestock with a package of strong public policies to decrease livestock numbers in line with a land-based approach and improve animal welfare: funding for restructuring livestock systems conditional upon a decrease in animal numbers and organic compatibility, compensation measures for reduced number of animals or dropping out of animal farming, feed independence policies including legumes development plans and a public label for animal welfare.
4. **The national scenario adds a lot of details regarding value chains evolution.** Thanks to public support, the available market data improve and localized processing and slaughtering facilities are developed. Organic develop as a brand identity and retailers compete for offering the most and cheapest organic products. For animal products, organic is a differentiation strategy as it guarantees high standards of animal welfare. The share of organic products in traditional supermarkets increase while organic supermarkets develop. Farmers gain a stronger position thanks to long-term contracts. However, public procurement is not considered as an important outlet in the national scenario.
5. **Coordination and collaboration are essential in the national scenarios**: coordination between national and regional policies for organic, collaboration between public authorities and civil society to improve environmental outcomes and animal welfare, collaboration between supermarkets and farmers or organic associations to increase organic share, coordination between public authorities and organic associations to provide organic AKIS, collaboration between organic and traditional farmers organisations whose position evolves.
6. **Organic has not faced significant competition from alternative standards and its regulations do not evolve.** The issues of pressure for alternative standards, associated efforts and policies to reduce greenwashing and adaptation to organic regulations have not been retained in the national scenario.

The Divergent Pathways scenario for Italy

The Italian scenario clearly positions Italy, especially some regions, in the group where organic continues to develop, strategically oriented towards exports to regions or countries with high demand without abandoning the domestic markets which grows significantly. However, Italy remains divided in terms of organic production and consumption, in line with the EU scenario.

When compared to the EU scenario, five key points stand out:

1. **The key enablers of organic development are market demand but also value chain structuration.** There is in the national scenario an emphasis logistics and transport improvement, both for the export and domestic markets (where organic becomes mainstream in supermarkets and specialised shops develop). Value chains actors also take organic AKIS but they do not really provide private finance (like payment for ecosystem services) and solidarity within the value chain is not mentioned in the national scenario. Food scandals and quality issue do not play a prominent role in the national scenario.
2. **Public policies are not that robust and are a secondary driver**. They revolve around the launch of a national logo, communication campaigns, public procurement and sometimes process-based payments for ecosystem services. Contrary to the EU scenario, NGOs do not play an important role to sustain political interest or compensation for the lack of public policies.
3. **Biodistricts play an essential role in the national scenario**. They structure and manage value chains (including public procurement schemes) as in the EU scenario but they also provide AKIS, connect agriculture to other sectors like tourism and organise group certification.
4. The national scenario provides details on conversion dynamics with permanent crops as a key driver of organic area increase and the growth of organic mimicking conventional patterns. For small farms, organic conversion is also driven by economic viability in the face of climate change and market competition. Regions facing abandonment issues are not specifically mentioned in the national scenario.
5. The setting of standards on greenwashing and changes in national organic regulation to address new challenges have not been retained in the national scenario.

The Organic on Every Table scenario for Denmark

The Danish scenario aligns well with the EU scenario but makes some adjustments and additions.

1. There is a strong emphasis on the support of organic farming by national policies (including CAP implementation) for its benefits on water, nitrogen management and biodiversity, for instance through payment for ecosystem services. Public policies use the tax instrument (for production and consumption with reduced VAT rates for organic) to address hidden costs which are explicitly mentioned in the national scenario. Nutritional policies are implemented to support plant-based diets.
2. **Health, animal welfare, water resources but also climate are key issues in the scenario and are connected to organic**. Diets are healthier and climate-friendly with value chains diversifying to accommodate more organic and plant-based products. Collective catering is important, the surge in organic products builds on the organic kitchen label and an image of organic as quality products. However, farmers do not have more direct involvement in the distribution chains in the national scenario.
3. **The national scenario provides details on conversion dynamics**: arable conversion responds to food demand and target high-value crops (including fruits & vegetables) while some livestock farming shift to organic arable systems. In livestock systems, organic conversion relies on grazing ruminants in natural areas.

4. **AKIS evolutions are also specified in the national scenario in terms of the organization and orientation of advice and research**. Advice follows conversion dynamics with new advice available for fruits, vegetable and improvements for livestock. Organic AKIS is integrated into the wider AKIS system and organic research receives as much funding as conventional and focuses on organic's environmental benefits and sustainable cropping systems. In the national scenario, organic stands out and is not side by side with agroecology and regenerative methods.

The Organic on Every Table scenario for France

In France, the Organic on Every Table scenario has been interpreted as the most favourable one as it combines a strong demand and market for organic with public policies favourable to organic agriculture and environmental issues, including at the EU scale. The national scenario therefore expands on the EU scenario, pushes its logic further by making some additions and adjustments to tackle a number of issues: agricultural, environmental (biodiversity, water), health in a broad acceptance, nutrition, but also social issues... Six key points stand out:

1. One of the highlights of the scenario is the "desectorialisation" of policies targeted organic. Organic is used in integrated policies developing by coordinated actors beyond agriculture to address this variety of issues. That includes food democracy initiatives and universal access to food: social issues are fully integrated in the scenario. Organic also benefits from comprehensive CAP support with conversion and maintenance support in the first pillar and strengthened environmental and territorial policies in the second pillar. Overall, public policies play a driving role in the national scenario.
2. Mechanisms are suggested to account for the positive perception of organic among citizens (which is part of the EU scenario and extended to climate): the evaluation of the effects of organic on human health and of agricultural systems on the environment, the emphasis on the robustness of the control and certification process (which can be either by third party, group certification, or Participatory Guarantee Systems in this national scenario) and the regulation of competing labels. However, the private sector does not play a meaningful role in supporting the sector in the national scenario.
3. To better address the broad range of issues, diets in this scenario are diversified with pulses, without chemical pesticides and ultra-processed food.
4. **Value chains specifications** are also provided with a supermarkets' incentives for consumers, mentions of specific issues for organic crops' storage and processing. Farmers' stronger involvement in value chains is reflected in a fairer distribution of value through pluriannual contracts ensuring fair prices.
5. **Details are provided on conversion dynamics with the bulk of area expansion coming from arable systems** (with a diversification of rotations and a key place for legumes), widespread ruminant systems conversion in mountain areas and organic livestock system characterized by feed autonomy and animal welfare.
6. **AKIS and knowledge sharing have diversified with farming, public, value chains and civil society actors**. New collective organisations favour learning, exchanges

and conversion. The relationship with agroecology is specified: organic is the way to the goals that had been assigned to agroecology.

The Organic Power to the People scenario for Hungary

When compared to the EU scenario, six key points stand out from the Hungarian scenario:

1. One of the key drivers for organic development in the national development is the impact of climate change (like water scarcity) and rising energy prices which makes inputs, especially synthetic fertilisers, more expensive. Therefore, organic develops as a resilience strategy against environmental or geopolitical shocks. The increase in input prices also contributed, with economies of scale in value chains, to reducing the price gap (contrary to the EU scenario) for consumers without affecting organic producers' prices.
2. Public policies play a larger role in the national scenario than in the EU scenarios where they are mostly restricted to public procurement. The implementation of practices that reduces dependence on inputs (nitrogen-fixing crops) and enhances resilience (water management practices) are supported by public policies. The share of organic in public subsidies also increases.
3. In the national scenario, the perception of organic by citizens goes beyond its role in mitigating environmental and health crises: the focus is also on the quality of organic products, strengthening organic products' appeal for consumers. Organic benefits from its position as the only legal standard and the domestic production and supply from quality, healthy and safe products emerge as a source of national pride. The promotion of organic by food influencers and scandals arising linked to convention products also favours organic products.
4. The national scenario includes details on the main crops converting to organic wheat, winter cereals, drought-tolerant crops like sorghum or sunflower and legumes while livestock conversion is slower. However, contrary to the EU scenario, retailers do not appear as actors of farm conversion, or fostering more equitable relationships with other value chain actors.
5. It also envisions changes to the organic label with the integration of water and biodiversity in the standard and changes and simplification to the certification process to make organic more attractive for farmers.

3. Transversal lessons: how do national scenarios compare to EU scenarios?

This section discusses how the EU scenarios have been interpreted and taken up at the national level by experts. What lessons can be drawn? Which elements from the EU scenarios have not been retained or have been adjusted? Have new elements been brought up? Overall, national scenarios provide insights on and for the EU scenarios and test them in different contexts. Several lessons can be drawn from these national downscaled scenarios.

The EU scenarios work well and make sense for national countries.

In most, if not all countries, at least one of the EU scenarios fits well in the national context and practice partners have been able to select a scenario consistent with national dynamics of the organic sector. For example, Denmark which has the highest organic market share in the EU, reflects a dynamic consistent with the scenario Organic on Every Table. Italy export-oriented and spatially differentiated organic production is consistent with the scenario Divergent Pathways. This reflects the diversity covered by EU scenarios and their interest for foreseeing transition pathways in diverse national contexts.

National **scenarios usually retain the main features of the EU scenarios but provide more details on specific topics**. Examples include livestock evolution in Germany, diets and value chain development in France for instance.

Crucially, **they also integrate or stress elements more specific to national context.** Examples are instance, animal welfare in Denmark or in Germany, competing allegations or universal access to food in France, biodistricts in Italy or water scarcity and climate change impacts in Hungary. Some of these specificities become key drivers for organic development in these countries.

Public policies play an important role in all national pathways and are more important than in the EU scenarios. Taken together, the national scenarios underline many drivers for organic development, but even in the two scenarios that are more demand-driven (Organic on Every Table and Organic Power to the People) public policies are important. The consequence is that the national scenarios include a large set of public policies from agricultural policies to environmental, health, value chains or research policies. Public policies that emerged from the backcasting studies will be discussed in more details in the next section.

The weight of public policies in national scenarios raises questions. For instance, the two scenarios Green Public Policies and Organic on Every Table become quite close and less distinct, as they share strong and supportive public policies, although the latter incorporates more consumption and local policies while the former is more focused on production. In the interpretation by practice partners and national organic sector members, Organic on Every Table is more policy-driven than Divergent Pathways (with export markets as the key driver in Italy). Divergent Pathways becomes closer to Organic Power to the People in terms of public policies.

The national scenarios stress the complementarity and connections between organic and diverse issues: health, animal welfare, climate change resilience, etc. In many cases, organic support is also useful to address them.

National scenarios always specify EU scenarios by giving details on organic conversion dynamics. This highlights the need for strong growth in arable land conversion to reach 25%. It also reflects the distinctive features of organic rotations: more diversified and more legumes. The importance of permanent crops and horticulture in conversion is also a significant take-away (at least in France, Italy and Denmark).

Some elements are recurrent across national cases, reflecting their importance.

- This is the case of **changes in organic standards** which can diverge from the EU scenarios in both directions: for instance, the Hungarian scenario includes

changes in the organic standard while the EU scenario does not. On the other hand the EU scenario used for Germany include changes in the organic standard that have not been retained in the national scenario.

- **Changes in certification processes** to simplify or extend the range of possibilities (group certification, participatory schemes) have been introduced in three countries (Italy, France and Hungary). This emerges as an important issue for organic conversion.
- The **price gap** is discussed in France, Denmark and Hungary.
- **The value of organic as a resilience strategy** is more or less emphasized in all national scenarios but Germany.

Conversely, certain topics recurrent in EU scenarios are overlooked in the national scenarios: NGT that might be considered as an EU matter, private finance for organic, regions facing abandonment, standards on greenwashing, and strikingly the role of NGOs.

Appendix F: Original list of policy and strategy recommendations considered for option planning

Consumer demand and promotion

- Broaden product range/visibility
- Improve product identification (logos)
- Improve price transparency/affordability
- Maintain/enhance promotion campaigns

AKIS (advice, training, innovation)

- Improve access to quality advice/information
- Improve integration in AKIS/EIPAgri/FAS
- Improve advisor access to knowledge, training, accreditation
- Encouraging peer-to-peer initiatives
- Specific focus on organic in generic programmes

Research and development

- Ensure financial support for organic research
- Clear specification of organic in calls
- Extend research to value chains
- Improve research/dissemination capacity
- Funding for stakeholder participation

Statistics and market data

- Long-term integration in all areas
- Restore SAIO cuts (conversion, livestock)
- Improve yield/output/price data
- Improve import/export data
- Improve FADN/FSDN representation
- Improve environment/sustainability data
- Establish market observatories

Organic support payments

- Specify/quantify environmental outcomes
- Reward environmental outcomes
- Realistic targets/payment levels
- Facilitate measure combinations
- Exclude premium prices
- Stable support base for market development

Supply chain development

- Prioritise organic in market support
- Green public procurement
- Funded project data/best practice
- Supply chain co-ordination
- Supply hubs/distribution
- Diversify market channels
- Increase range/visibility
- Data/training/advice for supply chain actors

Aquaculture

- Review regulation problems
- Specific actions in aquaculture strategies
- Encourage supply chain development
- Build consumer demand
- Research and innovation

Organic action plans

- New EU action plan for next CAP
- Strengthen OAP/CAP integration
- Best practice network
- Meaningful targets
- Stakeholder engagement
- Integrate capacity building
- Appropriate resourcing
- Effective monitoring/evaluation

Capacity building – beyond projects

- Ensure specific organic focus
- Long-term integration in mainstream
- Extend producer/operational group support to others
- Centres of Excellence
- Market Observatories
- Research networking/co-ordination
- Organic organisations engagement
- Public/private partnerships

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