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## 1 Introduction

The SUFISA project aims to identify practices and policies that support the sustainability of primary producers, looking at 22 case studies in contrasted settings all over Europe.

This report constitutes Deliverable 4.2 of the SUFISA project. WP4 aims to identify sustainable practices and policies in the agricultural, fish and food sectors that support the sustainability of primary producers and to develop future scenarios aimed at countering the identified market imperfections. Scenarios consist of the combination of food system narratives and a set of potential solutions to address key sustainability issues implied by each narrative

In Deliverable 4.1 (D4.1), four food system narratives were developed to test the relevance and the potential impacts on producers' sustainability of a number of solutions – the term encompasses here both public policies and collective strategies – in a variety of configurations. This report draws on the theoretical framework mentioned in D4.1 and on the results gathered in 22 case studies to explore how European producers' sustainability could be enhanced by 2030 .

European farmer and fishers are facing various sustainability issues such as high pressure exerted on prices by downstream actors, an incapacity to paying off debts, a decrease in incomes, a high exposure to price volatility with little resilience, but also from a more environmental point of view, a decrease in the biodiversity of the European countryside, water pollution, nitrogen leakages, etc. Sustainability issues are affecting producers depending on the specific conditions they have to cope with within their commodity chain. Producers respond to and manage internal and external conditions through strategies. Thus, strategies are defined as actions that allow producers to respond to and manage internal and external conditions.

These strategies are embedded in a specific context depending on the product and the regional context. In order to refine the global scenarios and solutions identified in D4.1, scenario workshops were organized at a case study or national-level in order to shed light on specificities of sectors and territories.

The report is divided in three main parts. The first part lays down the theoretical and methodological framework with a reminder about narrative construction, the workshop organization, and the quantitative assessment methodology. The second part builds on stakeholders inputs in the scenario workshops to develop pathways of change based on the narratives. Finally, the last part presents a quantitative assessment of the four final scenarios, which are visualized in Figure 1.



Figure 1: Scenario drawings (source: SUFISA Belgian scenario workshop report)

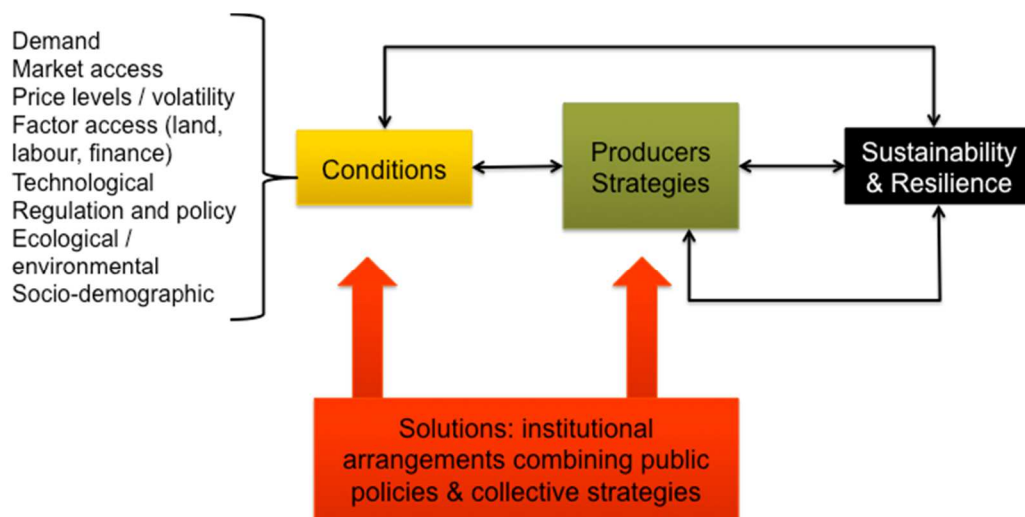
## 2 Theoretical and methodological framework: discussing scenarios with stakeholders

### 2.1 Analytical Framework

The main objective of this research is to identify solutions to increase the sustainability of primary producers in Europe by 2030 through a scenario exercise. In this chapter, we start by defining what we call a “solution” in this context and the normative framework we established to think about sustainability before presenting the methodology used to develop scenarios.

#### 2.1.1 What are solutions?

The SUFISA conceptual framework proposes to consider the level of sustainability of primary producers<sup>1</sup> as the result of the strategic choices they make, which themselves result from the broader conditions (economic, environmental, technological, market...) in which they are embedded (Grando *et al.*, 2016). This approach is summarized in Figure 2.



**Figure 2: The SUFISA conceptual framework, Source: authors, based on (Bonjean & Mathijs, 2016 ; Grando *et al.*, 2016)**

Within such a framework, solutions include all the interventions that could help primary producers to better cope with, take advantage of, or alter a given set of conditions (hereafter also referred as the business environment of the producer), most notably through the development of new / renewed strategies, towards increased sustainability. Solutions can take different forms – such as public policies or collective strategies, both vertical and horizontal – but often combine a both under the form of various institutional arrangements (Bonjean & Mathijs, 2016). A wide range of such solutions will be examined through the scenario building exercise, to contribute to ongoing – and often heated – debates on their respective merits.

#### 2.1.2 Building scenarios

Scenarios are a tool for future research that can have a broad range of purposes from strategic development, business development to policy consultation. In the perspective adopted here, a scenario is a combination of a food system narrative and a set of potential solutions to address key

<sup>1</sup> The term “primary producers” encompasses farmers, aquaculture producers and fishermen.

sustainability issues implied by each narrative. Three main steps were followed to build the scenarios that are presented in this report:

1. A first step was to develop “Food system narratives”, which reflect how societal changes could affect the organization of European food systems in different and contrasted ways, quite independently from agricultural policies and producers’ strategies. Four narratives have been developed, based on five main variables: trade policies, global demand for agri-food products, European diets, food chains organization, and agricultural technology (see explanation and Figure 3). For each food system narrative, we then made hypotheses regarding how the specificities of this narrative were likely to affect the main producers’ conditions – putting aside environmental conditions: climate change has indeed been considered identical in each narrative and is by far the main driver of environmental change; The variables and the narratives are briefly described in part 2.1.3.
2. In a second step, we explored expected producer strategies and the sustainability issues associated in each narrative to end up with solutions that could be implemented to address these issues. In order to distinguish producer strategies and suitable solutions by sector and by geography, participatory workshops were led at the case study or national level. Particular focus was given to the social and political processes through which each identified solution could come into force and be effective. As we shall see, in some cases, the social configuration implied by a food system narrative proved to be incompatible with the adoption and implementation of one or several proposed solutions;
3. The last step consisted in an ex-ante assessment of the impact each scenario would have on the sustainability of producers. To put it another way, we assessed the type of sustainability transition producers would be the most likely to experience in each scenario. A quantitative assessment of final scenarios is proposed in the last part following a methodology explained in section 2.3.

### *2.1.3 The initial four narratives in a nutshell*

In the first phase of WP 4, we developed a first set of scenarios, through a literature review and high-level stakeholder discussions. A preliminary analysis of past long term evolutions of European agriculture was firstly carried out in order to draw hypotheses on the evolution of future food systems in 2030. The most important and interesting trends and drivers identified by this retrospective analysis were selected, putting aside the ones linked to farmers’ strategies and agricultural policies – which are precisely the kinds of solutions that need to be tested/analyzed in the four different narratives. We considered three kinds of components determining the shape of the four narratives:

- Fixed components (4): they are the same for all of the four narratives: climate change, level of European integration, cost of energy, demography and human development;
- Determining variables (2): the components which we estimated as highly responsible for the shapes of the four different atmospheres, namely the type of trade policy in place and the global market dynamics;
- Descriptive components (3): the aspects of food chains; the characteristics of European diets; the characteristics and availability of research and technology.

The process to build narratives followed two steps. First, we combined the two determining variables to construct four main contexts. In each of those contexts, we then identified the most relevant hypothesis for each of the three other components we considered (food chain organization, diets, agricultural technology). This eventually led to four narratives, whose structure is represented in Figure

3. Each narrative has its own internal logics and focuses on one or two main issues, reflected in its title as much as possible.

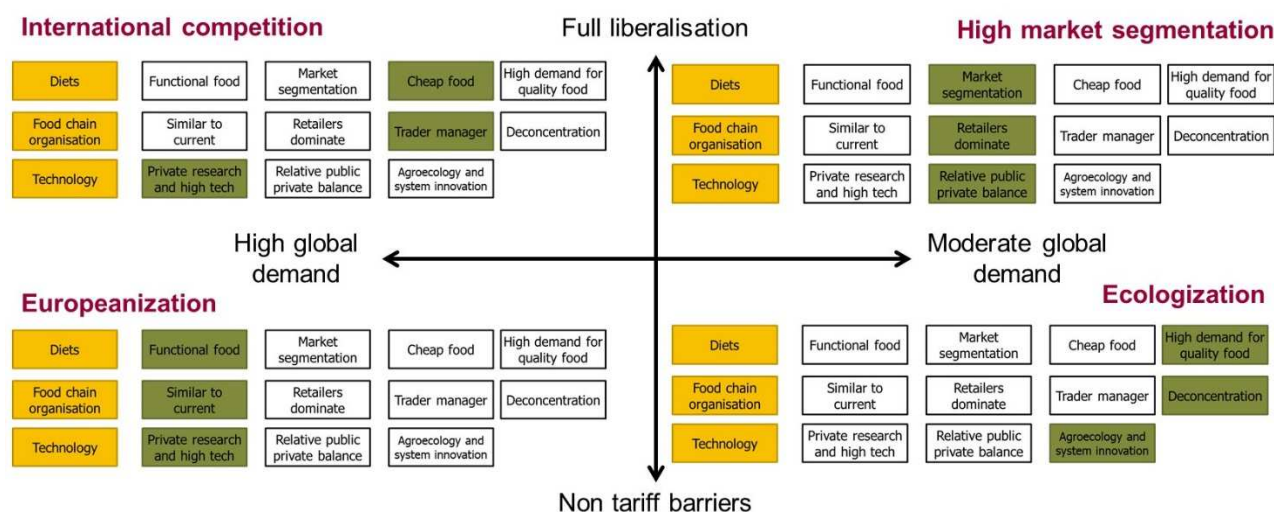


Figure 3: The four narratives in a snapshot (elaboration: authors)

A summary of the four narratives' main elements is proposed below:

**Narrative 1: Global competition.** In 2030, under this narrative, global markets are totally liberalized either through bi- or multilateral agreements. Non-tariff barriers based on sustainability or sanitary criteria going further than the existing ones have not been set up. As a consequence, European producers are mostly competing with new global players from emerging countries, who are often more competitive. Although an important share of EU agri-food exports still consists of primary agricultural products, the export market is dominated by processed food as a result of the EU's competitive advantage in this sector. The EU is a global export leader of high value added specialized products. Meanwhile, the majority of consumers in the EU favors convenience and low prices over environmental or health criteria. The market share of organic products in the EU is about 4%, with the share of the household budget spent on food at 10%. Technology development in the agricultural sector is primarily driven by the private sector and oriented towards physical productivity gains through yield increases.

**Narrative 2: Europeanization.** Under this narrative, very high levels of food safety are demanded by consumers and, to a lesser extent, environmental sustainability criteria. Most of the public norms in this respect are introduced as non-tariff barriers in bilateral trade agreements under civil society pressures. These new norms create new constraints for producers and mostly result in higher production costs, inducing a loss of competitiveness which cannot be compensated by public subsidies. As a consequence, Europe loses its role on global markets for agricultural products and gives place to emerging global players like Brazil, Argentina or Russia, especially when it comes to conventional products. The majority of European agriculture thus comes to feed the domestic market. European products still have a good reputation in terms of sanitary quality and maintain exports for niche markets. The food market is shaped by the increasing role of high-tech solutions in the food sector and by a high demand for convenience food by European consumers. Food diets are mostly made of transformed products, selected for their convenience. The market share for organic food is not very significant, at about 6 %. Consumers are ready to pay a higher price for the convenience of the food they consume, with the food budget share of overall household expenditure at about 15%. The

development of technology is dominated by private research and by the search for higher productivity and higher competitiveness linked to the increased demand for safe products.

**Narrative 3: Ecologization.** High levels of food safety demanded by consumers. In 2030, trade is mostly ruled by bilateral agreements, with a decrease in global trade compared to the present time. European consumers are extremely aware about the safety and the environmental impact of food products. NGOs are very vocal on social and traditional media on issues like animal welfare, healthy diets and the role of agriculture in environmental degradation. The market share for organic and other certified high quality products reaches 20 %. The fifth nutrition transition is well engaged (Drewnowski & Popkins, 1997), with a strong reduction in the demand for animal proteins in favour of a rise in the demand for plant-based proteins. Consumers' willingness to pay for quality food is high and the share of the food budget in the overall household budget is around 18%. Supply chains are smaller and less commodified. Added value is more fairly distributed along the supply chain. The market share of the big five national retail brands falls down to roughly 40%. An important part of the research and innovation system is oriented towards agroecology and system innovation (Meynard *et al.*, 2017) and is well-funded, mostly by public money.

**Narrative 4: Dualization** In 2030, global markets are liberalized and European agri-food actors are competing with new global players from emerging countries, who are often more competitive. The European market for agricultural products is highly segmented. Segmentation is high within retail groups but also across retail groups. One of the five large European retail brands has specialized in discount products, whereas another one has sold its discount subsidiaries to specialize in high-quality, certified products. This is consolidating the oligopolistic structure of the European retail sector, strengthening their bargaining power. High market segmentation corresponds to a highly fragmented consumer demand. Consumption patterns are strongly individualized but the overall demand for quality food is high and continues to grow; demand for discount products is also high. The share of the budget spent on food as a share of the overall household budget varies between 10 and 16 %. The market share of organic products is around 14%. Retail labels become very important as a way of addressing complex consumer demands. NGOs recognize retailers as important market players and push the segmentation even further by continuously asking for higher standards, as well as playing an important role in scrutinizing certification processes. The power balance within the food chain is clearly in favour of the downstream sector, and more particularly the retail sector, with the big five retail brands holding 70 % of the market share. The research and innovation system is balanced between public and private investments. Digitalization is an important part of R&D in the agroecology as well as the mainstream research system.

It could be noted here that the role of our four “food system narratives” in the scenario development process is somewhat similar to the one played by Shared Socio-economic Pathways (SSP) in the climate change community (O'Neill *et al.*, 2014), although their time span is much shorter and their focus quite narrower: They allow us to think critically about how different societal changes could challenge or favour sustainability transition for primary producers and, more broadly, for the entire agri-food sector.

#### 2.1.4 Enriching the scenarios: seeking for context-specific solutions

In a second phase, scenario workshops were organized to refine the four scenarios and solutions based on discussions at multiple levels with a range of stakeholders. This included case study or national-level workshops that consider the possible impacts of the scenarios identified and possible solutions. From the literature on scenarios concerning the territorial dimension or the landscape, the local scale is shown to be the most fruitful for public participation, in that stakeholders can relate to an area they

know well and actively engage in the discussion (Carvalho-Ribeiro, Lovett, and O’Riordan, 2010). Each workshop was a mean for stakeholders to shed light on the specificities of their sector and territory.

The workshops were firstly an opportunity to reformulate narratives based on stakeholder insights. It was outlined that the narrative could be too rigid and inflexible. Many of the strategies described by participants should be considered transversal to at least two of the different scenarios, thus indicating to the probability that fuzzy situations that encompass different aspects of at least two or more scenarios are more likely than the occurrence of any single one.

Some stakeholders outlined that the scenarios fit better traditional agricultural inland sectors. Narratives are easier to construct for agriculture and livestock because these are much more organized sectors. Moreover sectors like fisheries would hardly be impacted by any development at the European or international level. For example Greek fisheries production is almost exclusively directed to the national market. Wine production also significantly differs from other sectors. Wine is a highly heterogeneous product, hyper differentiated on the markets with considerable price differences depending on the type of product and the producing regions. The differentiated consumption patterns are hardly reduced to a global demand trend.

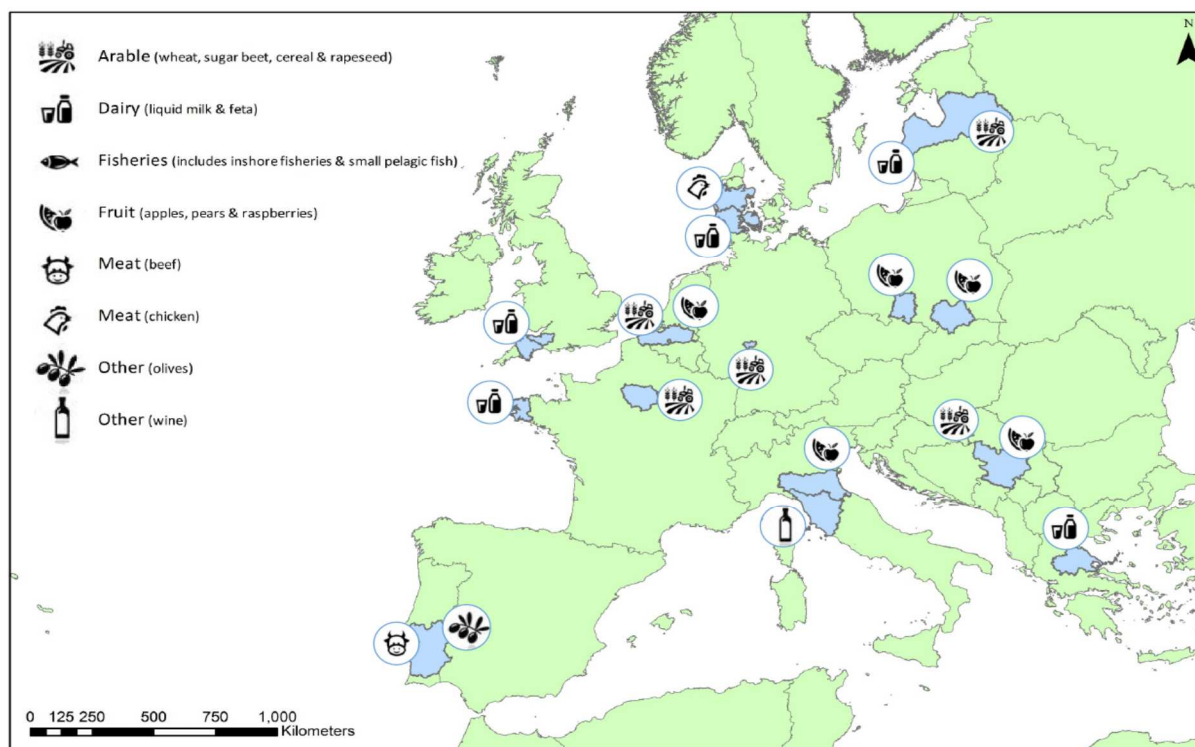
Some participants expressed the view that the question of costs is not developed enough in the scenarios. Allocation of costs is a key issue currently seen as unfair to primary producers. Reallocation of costs should be analyzed also taking into account the role and strategy of food industry.

## *2.2 Scenario discussion and contextualization: the workshops*

Participatory scenario workshops pursued two main objectives:

- The first objective was to enrich the range of strategies considered in each scenario by asking participants to describe the kind of strategies that are likely to be un- or favored in each narrative.
- The second objective was to enrich the solution section of each scenario. This was done either by identifying solutions which haven’t been discussed yet; or by giving more details regarding the way in which already identified solutions were effectively adopted, implemented, and have an impact.

Workshop were organized corresponding to every case study (see Figure 4), adding one final scenario workshop at the EU level to discuss the main findings of local scenario workshops in terms of strategies and solutions in the context of the CAP reform.



**Figure 4: Distribution of the case studies, by regions and commodities**

Some national teams took the decision to involve both commodities in one event rather than organizing two separate scenario events to overcome potential stakeholder fatigue, as well as ensuring that a good mix of national and regional stakeholders were present (UK, Belgium, Latvia, ... ). Some workshops held at the national level didn't formulate the scenarios on case study level but rather discuss general national situation of producers (Belgium, Latvia..). Nevertheless for some of these research teams the specific case studies play a dominant role in the discussion (Belgium). The Italian Wine case study followed a specific organization: firstly, the research team gathered all the relevant information and strategies and provided the scenario validation through seven single meetings. Secondly, all the information was integrated at academic level and a final return was provided with a discussion gathering the regional representatives of the Tuscan wine sector. For the Portuguese cases (Beef and Olive Oil ) the arrangement of the scenario discussions were also preliminarily discussed within two steering Committees, prior to the scenario workshop.

A key incentive to participate seemed to be the fact that the findings and outputs from these workshops would be instrumental for the EU level-scenarios, which it itself was widely considered as a valuable tool potentially influencing the development of the future EU agricultural policy.

Various methods to contact stakeholders were mobilized by the national teams. For some groups (Fisheries in Greece, Aquaculture in Germany) the consultation was done through interviews instead of common scenario workshop. Some country teams prepared a presentation document with the four narratives and their possible impacts for the national sector studied (Greece). Some choose not to provide further information about the scenario beforehand (Belgian).

The scenario formulation followed different framings depending on national teams. For some of them a particular effort was made to reformulate the scenario implications in the local case study context. For example specific components were added to the four narratives to adapt to the context of oilseed rape production in the Wetterau area for the German oilseed rape case study, such as high pressure on agricultural land due to strong urbanization processes, strategic decisions made by regional actors

(invest or not in a regional oil mill), collaboration with processing enterprises. Some teams changed the scenario in order to fit to specificity of the team sector: for the Italian wine case, a meeting with two technicians and experts from the Tuscany region provided relevant information to do so. In this way, the three main scenario variables were reformulated to better match the wine sector discussion: “consumption pattern” instead of “diets”, “distribution of power along the value chain” rather than “food chain organization” and “technological model” instead of “technology”. In the Belgium case the Ecologization scenario was reformulated in order to avoid to provide solutions within the narrative. Indeed farmers organizing themselves in the food market in the Ecologization configuration was understood as a potential solution, that could influence stakeholders views and was therefore not mentioned anymore.

Most of the workshops followed a common agenda: firstly commenting on the narratives then discussing on individual and collective strategies and finally debating on institutional arrangements and policy measures. To structure the discussion, participants were asked to identify strategies that are likely to be favoured or not by farmers in each narrative and possible future policy solutions. In most of the cases, participants were divided in small groups to elaborate solutions together.

Scenario workshops provided an interesting possibility for different inter-related actors to reflect on long term issues affecting their respective activities. The Portuguese research team outlined that the olive oil workshop that gathered participants involved both in extensive and intensive production modes, was a unique opportunity for actors that have rare opportunities to sit together to address common points.

The workshop outputs were gathered through the form of a workshop report. **Error! Reference source not found.** summarizes the stakeholders who participated in the various workshop by categories.

BE	Belgium	<b>Apple and pear, sugar beet</b>
FR1	France	Dairy (Finistère region)
FR2	France	Cereals (Ile de France region)
DE1	Germany	Oilseed rape (Wetterau region)
DE2	Germany	Aquaculture
GR1	Greece	Feta cheese
GR2	Greece	Fisheries
IT1	Italy	Wine (Tuscany region)
IT2	Italy	Fruit (Emilia Romagna region)
PL1	Poland	Apple
PL2	Poland	Wheat
PT1	Portugal	Beef (Montando region)
PT2	Portugal	Olive Oil (Montando region)
UK	UK, national workshop	Dairy (Somerset region) and Fisheries(Cornwall region)

**Table 1: Scenario workshop stakeholders by categories**

	BE	FR1	FR2	DE1	DE2	GR1	GR2	IT1	IT2	PL1	PL2	PT1	PT2	UK	EU	total
Farmers/ producers	1	6	3	1	3	2	1	2	2	2	6	3	2		1	35
Farmer Unions / Interbranch organisation	1		1	4	1			1					1	1	1	11
Cooperative				1				1							1	3
Processors / Stockholders / Industry	1		1			1								2	1	6
Extension services / Advisory services		4	1	1	3				2	5	2	1			2	21
Public administration		1		1	2	3	1		2				1	5	2	18
Local government	1	1	1					1							1	5
Political party	2															2
Bankers						1								1		2
Retailers						3	1									4
Chamber of commerce														1		1
Technical institutes / researchers		3	1		1	3	3			5	1	2	4	1	2	26
Civil society organisations NGO							2			1					2	3
Total	6	15	8	8	10	13	8	5	6	13	9	6	8	11	9	132

Sources: SUFISA Scenario workshop reports

Latvia dairy and wheat: 6 qualitative interviews and a discussion with 5 experts of agriculture in Latvia ; Serbia Raspberry and Wheat: no mention of participants

The number of participants by categories outlines the tendency of how some groups represented in the workshop exercise. Public administration, advisory groups and technical institutes are well represented. Indeed participating to research workshops is part of their prerogatives. Globally upstream agricultural activities, producers and farmers union members are well represented, accounting for 35% of all participants. Interbranch organizations and cooperative participants are more or less present depending on the location.

Processors and retailers seem the harder to reach considering their low representation, respectively 6 and 4 participants in all of the workshops, despite their powerful role within the food value chain. This could be explained firstly because of the small number of processors/retailers in some countries. They mostly belong to a very concentrated sphere with few actors. Moreover, given their dominant status within the value chain, processors and retailers have few incentives to share information or to participate to such workshops.

### *2.3 Scenario quantitative assessment*

Parallel to the scenario workshop exercise, a quantification of the four scenarios, based on the scenario narratives and on the stakeholder inputs gathered in the workshops was developed. A modelling tool simulating the functioning of the European food system (SUFISAm) was elaborated in order to translate individual strategies identified in WP4 into quantitative parameters. Within the model, hypotheses are made regarding the evolution of production systems: in term of yields, share of the organic production and organization of livestock and crop systems. Production potential is then faced with European population food needs depending on the evolution of diets and demographic growth and to feed and industrial (particularly biofuel) needs. At the end the export capacities and import needs of the EU is determined to give insights on the place occupied by EU in the rest of the world.

The SUFISAm model is based on the TYFAM model presented in Poux and Aubert (2018). In this model the European Union of 28 constitutes the unit of analysis. It is seen as a “black box”, without direct considerations regarding its functioning or its internal heterogeneity, with two implications. First, only flows between Europe and the rest of the world are considered. Second, all reasoning is based on average values for the EU-28, whether for production (yields) or for consumption (diets). This “black box” constitutes the “European farm”, which we consider as a set of production systems that is coherent and organized (at the logistic, economic and political levels). Although this approach may appear contrary to the workshop exercise that aims to reveal regional specificities, we believe it offers an interesting input considering overall feasibility.

Following this approach, SUFISAm is organised around five compartments which are connected systemically:

- demand for food, which is the result of individual eating habits and a given level of population growth in Europe by 2030, and is covered by both European production and imported products; Two representative diets are set up to represent the development of alternative diets with increasing plant protein consumption.
- crop production, resulting from a certain European land use for conventional and organic systems (distributed between plant based food, concentrates and biofuels ; forage and other crops) and the associated yields;
- livestock production, fed by a fraction of crop production, some of which may compete with human food (for example cereals), while the rest does not (grasslands and co-products);

- production vs needs compartment that give insights on the export potential and import needs of European agriculture.
- finally, the nitrogen flows associated with the functioning of and interactions between the crop and livestock production compartments, which largely determine the level of soil fertility. The analysis of these flows takes into account the different types of inputs (synthetic nitrogen, animal feed imports, symbiotic fixation, transfers by manure) and exports (livestock and crop production)

The model is based on a quantitative retrospective analysis of the European farm from 2000 to 2015 in order to identify recent evolution trends.

Three main sources of data were used to inform different aspects of the model. For plant products and their uses, associated land use, and animal products, we combined the Eurostat and FAOSTAT data. The import-export data for each product category was also obtained from these two databases. In order to make the model easy to manipulate, we grouped plant products into 14 categories and animal products into six major categories (milk, beef, etc.), within which we distinguish between herd structures. For food consumption the FAO “Food balance sheets” provide a record of food uses for each commodity in kg/person/year, for all 28 European Union Member States, from 2000 to 2010.

Moreover EU Agricultural outlook for markets and income report was also analysed in order to complete the quantitative retrospective analysis (EC 2015). This report corresponds to the average trend agricultural markets are expected to follow in a given macroeconomic environment where policies remain unchanged. Thus it offers interesting views on the expected evolutions of the agricultural markets that are deemed plausible today.

Based on the retrospective analysis a trend based configuration was built for 2030 before adjusting it to the scenarios.

In the trend based configuration total agricultural land use in the EU continues its decline (Figure 5). In line with this trend, the area of main cereals, permanent grassland and permanent crops are set to further decrease in the period to 2030. The amount of land used for other arable crops is stabilizing, while land used for oilseeds is increasing slightly. Although overall agricultural land use is declining, yield increases enable for an overall increase in production. EU cereals production is expecting to grow to 330 million t in 2030.

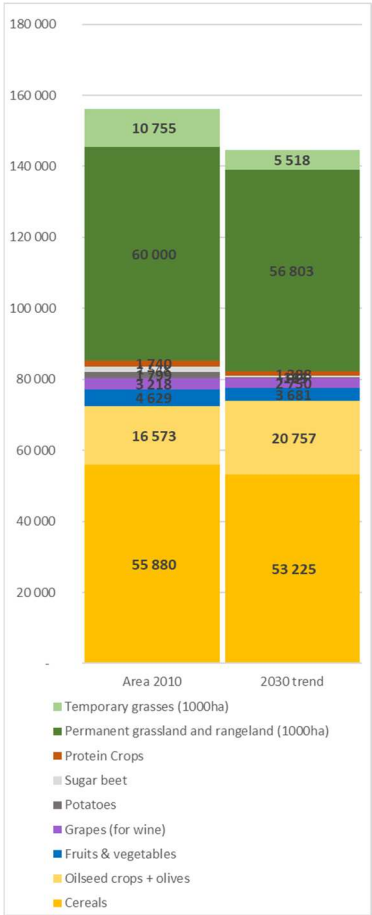


Figure 5: Changes in crop production trends (sources: SUFISAm)

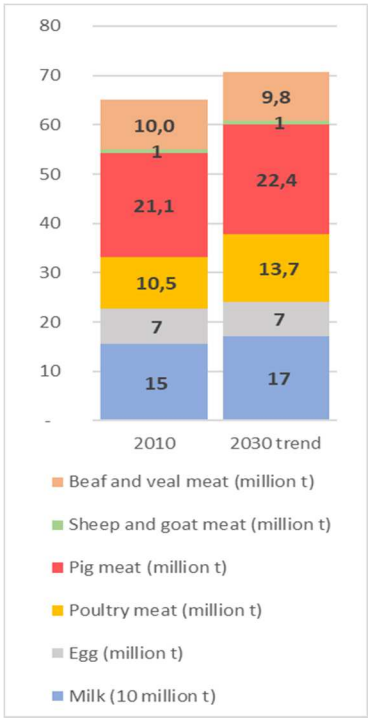


Figure 6: Evolution of livestock production trends (sources: SUFISAm)

In the trend based configuration, livestock production slightly increase between 2010 and 2030 despite a global herd reduction (Figure 6). Milk production reach 170 million t, driven by a milk yield increase to 8240 kg/cow. Poultry is the only production for which animal number expand significantly from 6.1 to 7.2 billion head resulting in an important increase in poultry meat production.

Animal systems productivity is defined under a set of parameters that are displayed in the table below (Error! Reference source not found.).

**Table 2: Animal system parameters (source: SUFISAm)**

	2010	2030 trend
<b>Dairy cattle</b>		
Milk/cow (kg)	6700	8240
Number of calves/cow	0,9	0,9
Age first lactation (years)	2	2
Number of years of production	3	3
Restock rate	0,33	0,33
meat/cull cow, heifer or male (t)	0,30	0,32
<b>Meat cattle</b>		
Number of finished animals/cow	0,9	0,9
Available meat/finished animal (t)	0,24	0,24
<b>Pigs</b>		
Number of fattened pigs/sow	18	20
Net carcasse weight/pigs	0,095	0,1
Yield carcasses	0,9	0,9
Total edible meat produced/sow	1,539	1,8
<b>Poultry</b>		
Eadible meat per chicken (kg)	1,7	1,9
Amount of eggs/hen (t/year)	0,02	0,02
<b>Sheep and goat</b>		
Meat/ewe (kg)	16	16

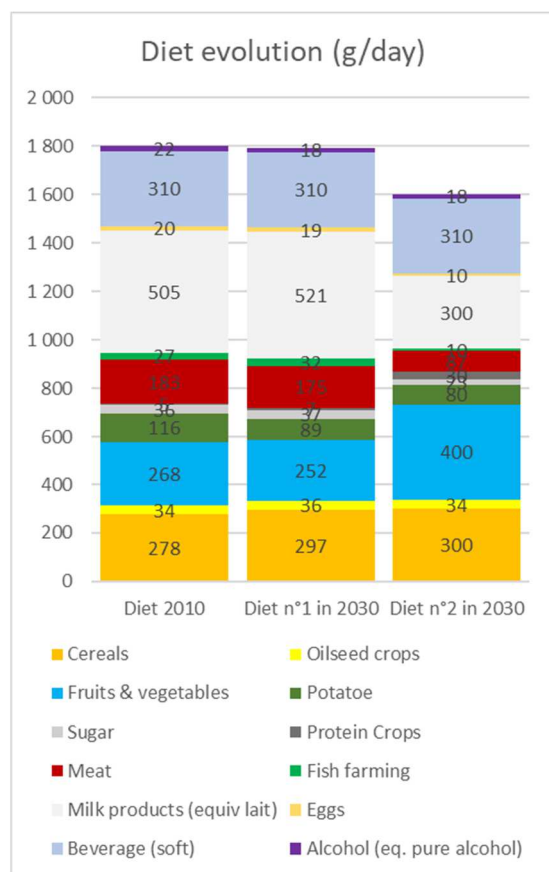
In the trend based configuration the main diet referred to as diet n°1 below follows the current trend (see Figure 6) . Diets across the EU converge towards calorie-dense processed food, with increased sugar and cereals intakes. Alternatively another diet (diet n°2) is set up following a strong reduction in the demand for animal proteins replaced by an increasing consumption of plant-based proteins. This diet is based on the TYFA scenario with sustainable diets reflecting the nutritional recommendations from the World Health Organization (Poux & Aubert, 2018).

The percentage of population under diet n°1 and diet n°2 are then adjusted considering the scenario hypothesis.

This average approach does not reflect the different specificities at the regional level and within populations. However, it provides a framework for analyzing future challenges for food consumption needs in 2030.

Finally the balance between the production capacities and the global needs (food, feed and biofuels) are analyzed to give insights on the export potential and the importation need of each scenario.

Drivers of change described in the scenario narrative and outlined during the scenario workshops are detailed for each variable of SUFISAm and then applied to the trend value. See for example below for the international competition scenario.



**Figure 7: Diet evolutions (sources: SUFISAm)**

**Table 3: International competition scenario drivers of change ()**

Drivers	International competition narrative	Quantitative application
Diet	The majority of consumers in the EU favour convenience and low prices over environmental criteria, with not so much consideration for health and environmental issues. Diets across the EU converge towards calorific processed food and higher meat consumption, with the increase in pork and poultry consumption compensating for the decrease in that of bovine meat.	96% of the population follow a conventional diet with high meat and sugar consumption
Organic vs conventional	Market share of organic products in the EU is about 4%	4% of UAA in organic production
Cereal production	Competitive specialization in cereal production in Europe	2030 Cereal production= 2030 trend + area decrease in Protein crops + area decrease in Fruit and vegetables
Protein crops	The logic of specialization entails a growing pressure on global markets, especially for protein based crops cultivated on tropical forest areas. This is likely to increase the amount of “embodied deforestation” imported to the European market.	European soy production = 0, not competitive in global market
High value added products	The EU is a global export leader of high value added specialty products, notably wine and other alcoholic beverage, as well as cured meat and cheese.	Vineyard UAA stop decreasing in 2015
Yield	Technology development in the agricultural sector is primarily driven by the private sector and oriented towards productivity gains through yield increases	Yield higher than the 2030 trend
Rotation	Simplification. productivity oriented	
Pasture lands	Specialisation and continuous intensification of animal breedings agriculture	Pasture lands surface decreased by 9% in 2030
Livestock	Decreasing cattle production	2030 livestock herd follow decreasing trend.

Sources: TYFAM

### 3 Building pathways: strategies, policy recommendation and final impacts

The aim of the scenario workshops was to explore the potential impacts of each narrative on producers under a variety of contexts, in order to identify solutions (public policies and collective strategies) to favour positive impacts and limit negative impacts on their overall economic viability. In essence, this means to answer the following two questions: If farmers and fishers are faced with changes in their business environment as described in narrative X, which strategies can they apply in order to run an economically viable business? What policy and institutional changes could foster the full deployment of such strategies in order to increase producer resilience?

In the following part we try to build “change pathways” for producers combining impacts and their respective strategies with associated institutional and policy recommendations. Moreover the specificity of case studies and local contexts within narratives are discussed in dedicated boxes.

A detailed table indicating the number of time strategies and solutions were discussed in each case study workshop was firstly set up (see **Error! Reference source not found.**).

**Table 4 : Most quoted strategies by scenario (source: SUFISA Scenario workshop reports)**

Strategies	Scenarios (quote number)				Total
	Competition	Europeanization	Ecologization	Dualization	
<b>Individual strategies</b>	50	30	25	29	
Upstream segmentation managed by and for farmers (standards, label)	6	13	13	12	44
Technological innovation	7	5	2	4	18
Intensification, specialization and upscaling	8	5	1	3	17
Reducing production costs	8	3	1	1	13
Diversification on farm: for example new crop rotation system	4	1	6	2	13
Marketing and promotional activities	3	1	1	4	9
Mitigating volatility: Insurance schemes and Future markets	8				8
Diversification to non-farming practices: Tourism, leisure...	2	2	1	1	6
Substitution production method (drops production that is not competitive)	2			2	4
<b>Supply chain arrangement</b>	25	22	25	18	
Develop interbranch organization and vertical coordination through contractualization	8	6	12	6	32
Strengthen producer organizations, horizontal cooperation	8	10	8	6	32
Direct sale, local supply chain	2	2	4	2	10
Improved transparency and traceability: for example with blockchain technology	1	4	1	1	7
Opening the agricultural sector to new financial actors	5			1	6
Concentration of group holding retailers	1			3	4
<b>Institutional / policies solutions</b>	21	38	38	20	
Increased environmental conditionality to strengthen environmental performances of farms	2	7	7	4	20
Nutrition and educational campaigns for healthy and safe consumption	1	3	7	4	15
Research and technology. Public-private research partnerships	3	5	2	5	15
Public support for training and advice	1	5	7	1	14
Provide an exit strategy for farmers : Early retirement systems and asset transmission tools	5	2	2	2	11
Social & fiscal norms harmonization in the agricultural sector to limit competition distortion between member states	2	4	3		9
Non-tariff barriers		5	2	2	9
Increase role of local government in food system development and management		1	4	1	6
More effective inspection systems	1	3	2		6
Active state policy to find new markets	2			1	3
National brand names	1	1	1		3
Green public procurment		1	2		3
Direct income support	1				1
<b>Total</b>	<b>92</b>	<b>89</b>	<b>89</b>	<b>68</b>	<b>338</b>

Firstly we observe that most of the strategies are not scenario-specific. Supply chain arrangement strategies, focusing on horizontal and vertical cooperation improvement, were widely stated as beneficial across the scenarios. They represent no regret options. Nonetheless strategy patterns for specific scenarios are emerging. For example policy solutions dominate in the Europeanization configuration, reflecting the need for intervention to protect highly segmented European production from cheap import.

In the following section we first develop a change narrative combining the scenarios' impacts and solutions. Then a table summarizing the most discussed strategies within a scenario is presented. Prevailing strategies outlined by stakeholders are then detailed. Finally specificities of case studies and contexts emphasized during the scenario workshops are listed in boxes. Thus the next part of the report summarizes the different strategies linked to each of the scenarios and their respective impacts on European producers activities. The specificity of case study contexts is also outlined. As an introduction, a pathway narrative is developed for each scenario.

### *3.1 Scenario 1: Intensification and economies of scale in a context of liberalization and global competition*

#### *3.1.1 Main components of the scenario*

This scenario draws on the “International competition” narrative. In this scenario, the growing competition to which producers are exposed leads to the intensification / concentration / specialization of most farms and fisheries in order to foster economies of scales and reduce production costs. Emphasis is given to competitive specialization: on the one hand commoditized production, and, on the other, high value added specialty products, notably wine and other alcoholic beverages, as well as cured meat and cheese where EU is a global export leader.

Labour is increasingly replaced or made easier by technological solutions, such as automated driving. The market has become very efficient but there is a very high competition among farms; many small and medium-sized farms have left the agricultural production sector thanks to early retirement scheme generalization in the EU or transition to leisure and tourism activities. Given the increasing size of production structures and the progressive substitution of labour by capital, remaining farms face increased investment needs that they meet through the recourse to private investors.

The consolidation of processors has increased the dependence of farms to their buyers. Food value chains are dominated by intermediaries (international buyers and export managers) with a very low bargaining power for both retailers and producers.

Producers cope with increasing market and climatic risks through the development of insurance schemes supported at the European level (beyond the agreement reached recently under the Omnibus regulation) covering both turnover and crop yield.

The national state follows active policies to find new markets and set up support measures for sub-sectors that have a comparative advantage at the global level. The regulation for agricultural production remains relatively high and complex compared to non-EU competitors (e.g. Nitrate Directive, use of chemical plant protection products, GMO etc.). This condition for European farmers has not changed despite the more open markets, Nevertheless, there is less bureaucracy with a marginal weight of product standards lower than in previous years (i.e. less stringent rules for labelling and fewer controls).

### 3.1.2 Relevant strategies and policy recommendations

In 2030, under this scenario, global markets are totally liberalized either through bi- or multilateral agreements. In this context, as is outlined in the following table, stakeholders within the workshops have favoured solutions that focus on competitiveness through economies of scale and reducing production costs, and optimal volatility management. Most of the strategies take place at individual level, except for the strengthening of horizontal and vertical coordination that is emphasized in all the scenarios.

**Table 5: Most quoted strategies within the Competition scenario**

Most quoted strategies within the competition scenario	Quote number
Intensification, specialization and upscaling	8
Reducing production costs	8
Mitigating volatility: Insurance schemes and Future markets	8
Develop interbranch organization and vertical coordination through contractualization	8
Strengthen producer organizations, horizontal cooperation	8
Technological innovation	7
Upstream segmentation managed by and for farmers (standards, label)	6
Opening the agricultural sector to new financial actors	5
Provide an exit strategy for farmers : Early retirement systems and asset transmission tools	5

Source: SUFISA Scenario Workshop report

To face increased competition, one of the dominant farm level strategies across the different commodities consists to gain in competitiveness by **reducing production costs**.

Given the current low milk price, it was a particularly evident strategy in the dairy farming cases. In Denmark, France (Finistère) and the UK (Somerset) dairy farmers are trying to reduce key cost components including herd replacement costs, feed and forage costs, labour costs and power/machinery costs. In some cases cost reduction was applied to the labour factor, in particular with the example of Polish apple producers in the Małopolska region who opt to hire Ukrainian workers as an alternative to more expensive Polish labour. Reducing the cost paid for inputs is also a popular strategy in this scenario, particularly fodder. Reducing costs is nonetheless not addressing the underlying structural changes impacting the producer, as outlined in the SUFISA comparative report (Maye *et al.*, 2018).

As well as reducing production costs, **intensification, specialization and upscaling** of the production was also outlined as a good strategy under such a scenario. In the Tuscany wine case study, stakeholders stressed that under this scenario, the main strategy would be the increasing specialization of remaining wineries in order to obtain greater economies of scale and increasing their competitiveness. Belgian sugar beet producers also evoked the need to gain in economies of scale to compete on the global market. In the Latvian workshops it was mentioned that the search for higher profits would force farmers to expand their operation. Moreover the possibility to hire consultants able to finetune their farming practices was emphasized. In order to achieve productivity increases, participants of the Greek cheese case study workshop stressed the need for the provision of production support financed by public authorities. In order to achieve strong value chains, public incentives are necessary and could take the form of tax reliefs for participants in specific value chains.

With the process of farm concentration, stakeholders outlined that most of the small farms will likely **abandon farming**. The vacated farmland will be taken over by bigger farms or alternatively hobby farms could be developed. For the German oilseed rape case, the development of new on-farm leisure activities like horse farming were taken as an example. Reorientation toward **tourism** could also be a key strategy for local, extensive production: the transition toward a forestry (specialized and mono-functional) system was mentioned in the case of extensive beef production in the Montando region in Portugal. In order to provide an exit strategy for farmers, stakeholders also mentioned the role of **early retirement schemes** that are already in place in some Member States. UK dairy workshop participants proposed an exit strategy for farmers who can't manage the concentration process advising the state to pay farmers what they were earning for the next 10 years if they stop farming. For now only France and Ireland have adopted a program by the Commission concerning the implementation of the accompanying measure under the reform of the Common Agricultural Policy for Community aid for early-retirement from farming (Allaire & Daucé, 1996).

In an environment marked by global competition, European farms would need to become more competitive. Investment in land, material and new technologies would enable producers to gain in productivity and in efficiency. However, access to credit remains a restraining factor for producers, as banks regard potential loans to farmers and many other, especially smaller, rural businesses, as risky. **Opening up to new investors** is needed to facilitate primary sector modernization. New tools are developing in the European context with the objective to attract private sector support (and financing) for public policy objectives through a wider spectrum of financial tools for policy delivery. They may take the form of equity or quasi-equity investments, loans or guarantees, or other risk-sharing instruments and, may, where appropriate, be combined with grants.

Stakeholders also refer to the role that **technology** could play to enhance producers' sustainability in an open market context. In line with the scenario description, technology development in the agricultural sector would be primarily driven by the private sector and oriented towards productivity gains through yield increases. Agrochemical and agricultural equipment companies would lead and provide the lion share of investments in research and development in the agri-food sector, focusing their efforts on areas where there is the highest potential for short- to medium-term return on investment. Stakeholders detailed the example of research on agri-food biotech to improve organoleptic flavour for the case of Tuscan wine, or innovations for new varieties such as coloured apples in the Polish apple case, with the introduction of GMOs leading to lowering the production price and increasing the production quantity.

New financial tools such as **futures markets** were cited as a good way to control price volatility in some case studies, especially for Belgium sugar beet. Properly functioning futures markets need some specific conditions however: the futures market needs good, up to date information, to accurately respond to changes in production conditions and market conditions. Another strategy outlined in the Greek Feta cheese case studies, would include **contract-based livestock farming**, in collaboration with banks and retailers/supermarkets in order to ensure access to the market.

#### CONTEXTS SPECIFICITIES

Case studies classified as **'Locally integrated'/'Extensive'** ( inshore fisheries case studies in UK and Greece and extensive beef production in Portugal, traditional carp farming in Germany, feta cheese in Greece and some Portuguese olive oil production), **would particularly suffer from a shift toward a totally liberalized market.** For example the integrated and complex nature of the Montado silvo-pastoral beef production system would hardly be recognized if competitiveness prevails. For Greek cheese workshop stakeholders, the EU market is the priority and opening to third markets is seen as detrimental to EU market consolidation considering unfair competition with third countries. A global competition scenario is not really relevant to small-scale, inshore fisheries in general and certainly not the Cornwall inshore fishing sector in particular. This is mainly a matter of scale in that the quantities of fish caught by the inshore sector in Cornwall are very small, necessitating that their market outlets both now and into the future need to focus on adding value through developing niche marketing opportunities.

This scenario was considered the **least probable for the wine sector** in Tuscany: a drastic decline in consumption of quality wine is not considered possible especially for quality wine, and the actors can hardly imagine a future with less regulation, since the current state is hyper-regulated.

Stakeholders mentioned that the International competition scenario is **mostly about arable farming.** For perishable products this scenario is not relevant, since regardless of the economic specificities of the scenario it will never be possible to sell perishable products on the international market.

Although a popular strategy across many of the different commodities, **reducing production costs was not mentioned in any of the aquaculture or fishing cases.**

### 3.2 *Value chain coordination and national/transnational public support, focusing on the European market*

#### 3.2.1 *Main components of the scenario*

This scenario draws on the Europeanization narrative. In 2030, very strong European standards set out the framework for both trade and production. European agricultural production is effectively protected and recognizable and ensures a quite high-quality level respecting higher sustainability and ethical standards. At the same time, EU consumers show a high willingness to pay for healthy food as well as for food communicating a low impact on the environment and society.

Because of the increasing stringency on environmental and sanitary rules, producers limit the use of inputs and new genetically modified crops. Crop systems are more diversified with the development of protein crops in order to face internal feed needs.

The development of technology is dominated by private research and by the search for higher productivity and higher competitiveness under the new regulation constraints linked to the increased demand for safe products. The research and innovation system is dominated by the three biggest players in agritech, but they tend to invest less in the European market as new regulation constraints make it less attractive than it used to be the case. Agritech companies continue however to play a key role in the European agricultural system (both European and from abroad). Research and innovation is focused on precision agriculture and big data based solutions (satellite data, private data...). Block chain technology is also developed to guarantee transparency and traceability along the supply chain.

The high standards of the European Union and non-tariff barriers protect EU farmers from cheap imports; nevertheless, the competition between European farmers is increasing. The first pillar of the CAP is reduced between 2021 and 2027. In addition, the direct payments are matched between the countries, and social and fiscal standards harmonized between European countries. Eastern European farmers, especially, benefit from the adjustment despite increasing wages and lower productivity. Overall, the competitiveness of farms is challenged. But the adjusted CAP includes improved risk management tools and the promotion of comprehensive marketing structures as well as increased environmental conditionality. Interbranch organizations are supported by the EU in order to promote best practices and market transparency.

### 3.2.2 Relevant strategies and policy recommendation

Under a configuration where producers are focusing on European market with high public norms in Europe and the proliferation of non-tariff rules with high level demands of food safety; workshops participants favoured strategies that deal with improving the market power and income stability of individual producers by improving value chain coordination, marketing and public support.

**Table 6: Most quoted Strategies within the Europeanization scenario**

Most quoted strategies within the Europeanization scenario	Quote number
Upstream segmentation managed by and for farmers (standards, label)	13
Strengthen producer organizations, horizontal cooperation	10
Increased environmental conditionality to strengthen environmental performances of farms	7
Develop interbranch organization and vertical coordination through contractualization	6
Intensification, specialization and upscaling	5
Technological innovation	5
Research and technology. Public-private research partnerships	5
Public support for training and advice	5
Non-tariff barriers	5
Social & fiscal norms harmonization in the agricultural sector to limit competition distortion between member states	4
Improved transparency and traceability: for example with block chain technology	4

Source: SUFISA Scenario Workshop report

During the workshops, stakeholders widely outline that a Europeanization scenario would imply tougher competition between EU countries, included for products that are highly differentiated. Market transparency between European producers would be essential in this configuration.

**Vertical cooperation** within value chains could help to increase producers' visibility. Interbranch organizations provide a means of allowing dialogue between actors in the supply chain, and in

promoting best practices and market transparency. Fixing price within the value chain with the help of interbranch organizations on the basis of effective production costs, could also be a mean to limit price volatility negative impacts. In the UK dairy case, digitalization and **block chain** was cited as a good mean to guarantee transparency and traceability and to ensure market information is transferred along the supply chain.

To avoid further concentration of the retail sector in a closed European market context, **producer organizations** were cited as an important strategy. Asymmetry in market forces between producers and downstream actors could be tackled by increased cooperation between producers. In the case of the Montado case study, compulsory membership of producers to breeders associations was cited as a mean to defend quality-based trade-marks.

Nevertheless a limit to producer organization was mentioned within the Belgium case study: stakeholders stated that when prices are high, farmers see opportunities to increase their revenue in specific sales channels, and tend to leave cooperatives.

In the Europeanization scenario, high public norms and the proliferation of non-tariff rules set the tone for domestic production and trade dynamics. The markets for European agricultural production are mainly located in Europe, where consumers demand high levels of food safety. At the farm level, the increasing stringency of environmental and sanitary rules – in particular those pertaining to maximal residual limits of pesticide, water quality, and GHG emission – will lead farmers to invest massively in precision agriculture to limit the use of inputs and reduce the recourse to GMO-based animal feed. As outlined by UK stakeholders in the dairy scenario workshop: higher costs would require higher pricing or appropriate financial support. This could be done by public-private financial instruments or, alternatively (or complementary to) by public subsidies orientated towards the provision of public goods. Lowering the environmental impact at farm and landscape level would be managed by **increased environmental conditionality of public support**, to strengthen the environmental performance of farms : increase targeted payments for eco-friendly agricultural practices, which can take different forms depending on the application context. For example, EU funds targeted system-oriented agro-environmental practices in the case of beef production in the Montado region in Portugal.

Taking measure at the European level through the CAP conditional payment scheme seems appropriate. Indeed for some countries like Latvia stakeholders were expressing the belief that Europe level regulations could have a much stronger effect on local farmers than local regulatory interventions. Mainly because it seemed it was not expected that local level government would uptake sustainability and environment among its key priorities.

### **CONTEXT SPECIFICITIES**

For **regions where the production area is not limited to EU territory**, specific EU regulations would have to be completed: in the case of Kavala and Northern Greece in general, the fish stocks in the Aegean sea are jointly managed. Thus any introduction of restrictions such as fishing quotas, even if deemed necessary would not be possible, if only as unilateral for the EU (in that case the Greek) fleet, due to political issues with the neighbouring non-member states.

**Access to international market is needed when domestic markets do not match production.**

A Polish apple producer stated that the Polish consumer was not wealthy enough to be able to afford ecological apples. Wine production relies also on export, stakeholders in the Tuscan wine workshop outlined that it would be difficult to combine greater control at European level with higher standards, and at the same time opportunity for extra EU outlets.

There is a **culture of cooperation** in some regions and sectors (e.g. small-scale traditional olive oil production in Portugal; wheat in France and Latvia; wine in Italy; aquaculture in Germany); in contrast, cooperation is more difficult to achieve in other cases because of a distrust in co-operation and/or it is not traditionally how supply chains are organized (e.g. fisheries in Greece and the UK; wheat in Serbia and Poland; apples in Poland; raspberries in Serbia)

**EU goal of socially demanded animal welfare standards** with a high degree of self-sufficiency would benefit to regional production of animal protein such as aquaculture stated stakeholders in the German aquaculture workshop.

## **3.3 Extensification and upstream segmentation, the ecologization pathway**

### *3.3.1 Main components of the scenario*

This scenario draws on the Ecologisation narrative. In 2030, under such a scenario, European consumers are extremely aware about the safety and the environmental impacts of food products. Nutrition and educational campaigns successfully promote sustainable consumption.

A systemic and multifunctional approach of agricultural production prevails. Producers limit the use of inputs, fertilization is provided locally through integrated crop-livestock farming system at the farm or territorial level. Trends towards the greater specialization of production systems slow down and a relative despecialization even occurs.

A high level of food security is also ensured due to strict regulations that focus on the production of food. The CAP reform provided the central impetus. In the 2021-2027 funding period the first pillar is greatly reduced. The budget is now used to fund environmental services, which became mandatory. In the current funding period (2028-2034), farms are obliged to implement a minimum standard of sustainable production at a very high level. Additional measures to increase the level of sustainability, or ecosystem service provision and the provision of public goods, are reimbursed. This allows farmers to restructure their production and offers compensation for income losses due to sustainable

production. The state's initiatives to promote organic farming, which have been running for almost 15 years, have been expanded. Public subsidies are also dedicated to knowledge transfer and advices to support farmers in the agroecological transition process.

Local governments play an important role to open up an additional sales channel for the farmers and increased regional added value for example trough the distribution of local produce through public procurement.

A balanced research system, between public and private research, ensures adequate provision of technologies and practices to address Sustainable Development Goals (SDGs) as well as to improve knowledge exchange and mutual learning

### 3.3.2 Relevant strategies and policy recommendations

In a configuration where the focus is on safety and environmental impacts of food products, with smaller and less commodified supply chains, product valorization strategies were at the centre of most workshop discussions.

**Table 1: Most quoted strategies within the Ecologization scenario**

Most quoted strategies within the Ecologization scenario	Quote number
Upstream segmentation managed by and for farmers (standards, label)	13
Develop interbranch organization and vertical coordination through contractualization	12
Strengthen producer organizations, horizontal cooperation	8
Increased environmental conditionality to strengthen environmental performances of farms	7
Nutrition and educational campaigns (fight imbalanced nutrition) Subsidies to household for healthy and safety consumption	7
Public support for training and advices	7
Diversification on farm: for example on farm transformation activities, new crop rotation system	6
Direct sale, local supply chain	4
Increase role of local government in food systems development and management	4

Source: SUFISA Scenario Workshop report

In order to face rising power of downstream supply chain actors that favour commodity driven competition between producers, strategies of **upstream segmentation** could be favoured. Product differentiation is based on a set of specifications managed by the producers; Organic labelization is a good example. Stakeholders within the Tuscany wine workshop also stated the possibility to develop new products like low alcohol wine.

As outlined in the Greek cheese workshop report co-operation among famers is a prerequisite to ensure the identity of the products by investing on quality. A need for greater cooperation was also emphasized amongst UK fishermen, that may well include having a processor or marketer on shore who can help them to achieve the added value that will be needed. It was recognized that there are one or two initiatives already that are managing to do this.

Moreover stakeholders outlined the **systemic approach** needed in the scenario. For example, in the German rape seed case study farmers pointed out that arable production will have to be seen, even more than in the past, as a system, not only rapeseed production has to be considered but also the crop rotation system in general. Stakeholders within the fruit sector in the Emilia Romagna region case study (Italy) emphasized the need for investments in farm multifunctionality in the ecologization context.

As in the Europeanization scenario, **increasing targeted payments for eco-friendly agricultural practices** was seen as an important factor in most of the workshops like the Serbian case where stakeholders discussed the introduction of agro-ecological conditions in the system of state subsidies. In the German rapeseed case study stakeholders mentioned that compensation for the ecologicalization of oilseed rape cultivation was considered a precondition for this scenario.

In the ecologization configuration, European producers will focus on production that will best meet the expectations of specific consumers groups. Setting up **appropriate selling channels** to reach specific consumers would be crucial. Within the UK Somerset dairy case study, farmers said that they would look for different options to supply local village shops or markets. Farmers could add value to their dairy products and sell to local supply chains, with greater scope for negotiating with potential markets. Moreover, farmers could downsize their dairy herd numbers and use more of their own land to produce vegetable-based protein for local supply chains. Diversified locally sold local products represent a mean to increase producer resilience. Direct sales rather than selling through traders was also seen as enabling considerable added value to be achieved for Cornish fishermen. However, this was recognized as being very difficult for many fishermen, not least because their primary focus and interest is on catching fish, rather than selling fish.

**Local transformation process** development could also open up additional sales channels for the farmers and increase regional added value. For example, German rapeseed farmers pointed to the possibility to build a separate oil mill in Wetterau region for oilseed rape.

The important role of the public sphere was repeated by fruit producers from the Italian Emilia Romagna region who stand for distribution of local products through **public procurement**, for example in schools and hospitals.

Additional need for labour force was cited as one of the most important challenges within the ecologization scenario. **Planning for succession** and policy support would be crucial to ensure that sufficient workforce would be available (on the contrary to the actual negative trend in agricultural jobs). First, inter-generational continuation could be supported. Stakeholders cited public support for apprenticeships as an important issue. **Ease new entrant establishment** installation conditions was also raised as a beneficial policy measure: in the UK fish case study in the Cornish region it was suggested that county councils could own fishing boats that they rented out to aspiring fisherman, in much the same way that county councils historically have owned small farms.

Addressing the multifunctional impacts of agroecological agricultural production represent a complex issue. Stakeholders outlined the need for public support to **promote appropriate training and knowledge transfer**. Arrangements could be found to enable a better cooperation between producers and experts. It is the case for some initiatives to develop environmentally responsible fishing in Greece with co-management processes that include vertical co-ordination between fishermen, environmental NGOs, research institutes, intermediaries and retailers, local fishing authorities and members of the value chain. Stakeholders in the French cereal workshop also pointed out the role of producer organizations and institutes (such as the local CIVAM in France) that are able to provide their members with technical advice, machinery and labour.

Finally, stakeholders emphasized the role that authorities could play at the local level in the development and management of food chains. French cereal producers in Ile de France region drew attention on new territorial food projects involving farmers, local communities, cooperatives and consumers called PAT (Projet Alimentaire Territorial). In this case the strategy consists in **increasing the role of local governments**, towards territorially managed food systems.

### **CONTEXT SPECIFICITIES**

Stakeholders outlined that **foreign markets would remain a stronger motivator than local markets for some countries** like Latvia. Two completely different institutional arrangements exist in the country – one, supporting large and technically advanced farms, and the other, supporting a broad range of smaller farms operating in niches.

For the German rape seed case study stakeholders, the cultivation of oilseed rape certified as organic was considered impossible in the Wetterau Region, due to climatic and plant health conditions. The only possibility would be to re-orientate the agricultural focus towards animal husbandry and to grow organic rapeseed for feeding. The **debate about organic rapeseed production** coincided with doubts about the potential of short food supply chains. Regionally produced high quality products were considered to be a niche market, with only a few farms being able to benefit from this potential as other uses (e.g. biofuels) result in a larger demand for oilseed rape.

German aquaculture stakeholders mentioned the **environmental benefits of aquaculture**, recirculation aquaculture systems (RAS) that are both environmentally and animal friendly. Under the ecologization scenario, the development of fish could be fostered as an alternative to meat production.

UK fisheries stakeholders emphasized that **a sound environmental and ecological base is critical to an economically viable and sustainable fishing industry**, especially for small-scale fishers.

## **3.4 Adaptation to retailer hegemony and the role of local public government in a context of Dualization**

### **3.4.1 Main components of the scenario**

This scenario draws on the High market segmentation narrative. In 2030, the agricultural sector is characterized by full market liberalization. The slowdown of demand mostly affects the cheapest segments of production. Thus, within the market, both commoditized and high-quality production continue to coexist. Consumption is increasingly regionalized, the differentiation of production undergoes a considerable increase, the types of quality products increase, the origin is increasingly connected to the environment and to historical and cultural factors linked to the different terroir. Each producer seeks its own market segment to represent its uniqueness and its regional key characteristics.

European producers are also competing with each other on the single market. Farming systems are diverse with big holdings in Eastern European countries producing with low labour costs, whereas producers from old Member States focus more on producing quality food. Intensified farming system which focus to produce commodity product for export markets are cohabiting with smaller diversified systems. Large farms are competing on both market segments, developing diversified production in order to be more resilient

Sustainability plays a crucial role as a differentiating factor. In contrast to the previous ecologization scenario, it is not implemented through legal regulations. Standards are mostly defined by individual food companies, which use their respective criteria as a means of differentiating their products from their competitors. Farmers are thus faced with the challenge of having to meet the criteria of the company that is buying their product. However, while they have to pay for the accreditation themselves, once their products reach the requisite quality the companies involved offer acceptance guarantees.

#### 3.4.2 Relevant strategies and policy recommendations

Under such a narrative, workshop participants outline solutions that both address differentiation and intensification.

**Table 8: Most quoted strategies within the Dualization scenario**

Most quoted strategies within the Dualization scenario	Quote number
Upstream segmentation managed by and for farmers (standards, label)	12
Develop interbranch organization and vertical coordination through contractualization	6
Strengthen producer organizations, horizontal cooperation	6
Research and technology. Public-private research partnerships	5
Increased environmental conditionality to strengthen environmental performances of farms	4
Nutrition and educational campaigns (fight imbalanced nutrition) Subsidies to household for healthy and safety consumption	4
Technological innovation	4
Marketing and promotional activities	4
Intensification, specialization and upscaling	3
Concentration of group holding retailers	3

Source: SUFISA Scenario Workshop report

In 2030, under this configuration, the European market for agricultural products is highly segmented. Retailers offer a great variety of products from low-quality, discount food to high-quality, certified products that they sell for a higher price, sometimes within the same store or via specialized subsidiaries. The retail sector has a dominant position within the food chain.

The central role played by retailers was discussed in many case studies. In the Tuscan wine workshops, stakeholders explored the hypothesis of investments from large retailers in the territory (acquisition of old companies through vertical integration). The actors believe that a greater role for large retailers is possible, and many empirical data and analyses confirm this trend, especially in markets such as the United States where there is a high concentration of a few retail companies.

Given the strong presence and high number of labels, an important amount of producers would have to adapt their practices to the requirements of more or less heavy certification processes. Strong level of coordination between authorities at different levels for the standardization and specifications along the food chain may be needed.

In the Latvia workshop, stakeholders elicited that Dualization could be a model that emerges from the two-tier agricultural system already being in place in Latvia. In this context diversification would be a mean to mitigate price volatility on global commodity markets. It has been suggested that the farmers operating in large conventional farms could be trying to stabilize their income flow by establishing organic farms. The same farmers would be supplying both the conventional and organic niche markets.

In the Belgian workshop stakeholders also evoked the possibility to **organize producers in clubs to keep the supply artificially low** in order to face price volatility.

Coexistence of segmented forms of agriculture would be possible with an appropriate support to smaller farms. Moreover, as outlined in the Latvian workshop, the group of smaller farms would on its own incorporate a great diversity of various farms – small traditional farms operating in short food supply chains and regional markets, subsistence farms supplying products to extended families, narrowly specialized farms offering exclusive and innovative products. These farms would aim to provide high quality local, biological, local and traditional products. However, the way how they would do it would be quite diverse. In some cases, this would mean to be integrated into the supply chains connecting local producers with well-off consumers while in the other instances farmers would rather be aiming at offering an alternative to the existing conventional supply chains.

A strong level of coordination and partnership between local authorities and private sector would help to finance and develop infrastructures adapted to the less dominant models. A dualization of public subsidy schemes was proposed in the French dairy workshop.

Alternative sale channels were mentioned in several case studies as a mean to sell niche products. In the German aquaculture case study producers explored the use of online marketing and shipping to extend the range of their customer base.

Disparities in access to quality food was seen as an important issue in several workshops. In this context, stakeholders claim for nutrition and educational campaigns piloted by the public sector. In the Tuscany wine case and in the French dairy workshops, stakeholders also evoked direct intervention on consumption practices through subsidies to households for healthy and safe consumption.

#### **CONTEXT SPECIFICITIES**

Some stakeholders claimed that **market segmentation would not be possible on a local scale** where the production is directed either toward quality or commodity products. For example for oilseed rape production in the German Wetterau region, a dual strategy of rapeseed production for both the price-sensitive segment and the high-quality segment was considered very unlikely by the stakeholders. The overall potential for developing alternative markets for large quantities of rapeseed oil was considered to be limited. Despite the niche for regionally and/or sustainably produced rapeseed applications, the demand for large quantities of rapeseeds for bio-fuels is hard to replace

### **3.5 Cross-cutting strategies**

Cross-cutting or no-regret solutions, that were widely cited across the workshops, could be identified. These are solutions that were considered as beneficial regardless of the evolution of the food system. We will examine two of the main cross-cutting solutions at the core of the SUFISA project, namely vertical cooperation through Inter Branch Organizations (IBO) and horizontal cooperation with the development of Producer Organizations (PO). We will examine what is the status of these solutions

regarding public policies in Europe at the moment to analyze under which circumstances they could be effectively further promoted and implemented.

It is now widely acknowledged that (European) food supply chains are characterized by a severe imbalance of bargaining power. Asymmetry in market forces between producers and downstream actors could be tackled by increased cooperation between producers (Fałkowski & Ciaian, 2016). To face difficulties farmers might engage in various degrees of joint activities such as joint planning of production, joint procurement of inputs, joint storage or distribution, and joint marketing and selling in order to reach a larger scale on the markets (DG COMP 2016)

POs are defined as groups of farmers and growers, which have been formed by the initiatives of the producers and are controlled by them, reflecting a horizontal integration at the production level. They have to be a legal entity or part of a legal entity. They could for example take the form of an agricultural cooperative.

Producer organizations have multiple expected gains: strengthen producer bargaining power vis-à-vis potential buyers and input suppliers; reduce the hold-up risks imposed by a buyer; farmers may gain market access to marketing channels where previously they did not get access to (e.g. delivering to supermarkets); specific investments would be available, in particular in assets or services for which the fixed costs are high as by pooling their output they are able to reduce the average fixed cost associated with the investment.

The European Commission offers a legal framework for producer and inter branch organizations. The Common Market Organization (CMO) Regulation contains rules on the recognition of producer organizations, associations of producer organizations and interbranch organizations. This regulation, the basic act for agricultural markets, frames the special status of the agricultural sector with regard to competition rules set out in the Treaty on the Functioning of the European Union (TFEU).

For some of their recognized activities, producer organizations and interbranch organizations are granted derogations from the application of the Treaty's competition provisions. At the origin producer organizations were recognized in the CMO for a specific sector. For example, dairy producer organizations were allowed to carry out joint sales on behalf of their farmer- members.

The OMNIBUS regulation applied since January 2018, extends this PO prerogative to all the agricultural sectors. Now POs which have been recognized by the Member State in which they are located are for example allowed to conduct collective sales negotiations.

Nevertheless the development of PO is still limited and unequal across member states for various reasons. The marginal role played by cooperatives in some countries (and especially in the New Member States) has an important social background: the low level of self-organization and networking is not only a barrier to cooperative development but represents a persisting societal characteristic with far broader implications (Bijman *et al.*, 2012)

Despite the expected gains from producer organizations outline above, there is still no consensus on who (private or public actors) should support promoting cooperation between farmers and what incentives should be provided to achieve this goal in the most efficient way (Fałkowski & Ciaian, 2016).

Some policy enablers could nonetheless be listed, based on the literature review on factors supporting the development of producer organizations led by Jan Fałkowski and Pavel Ciaian, for the Commission's Joint Research Center (Fałkowski & Ciaian, 2016), and on the contributions received during the scenario workshops:

- Providing technical assistance and supporting the dissemination of information about the benefits of producer organizations through for example networking and linkages among existent producer organizations and farmers to exchange experiences, challenges and knowledge.
- Formalization of producer organizations through public recognition and policy support might be conducive to sustained cooperation among farmers and to ensure cooperation on the long run with external parties.
- The establishment of an effective external (third party) enforcement mechanism that could be used by producer organizations to disincentivise free riding and dishonest behaviour of their members. This could include either supporting the existent external enforcement mechanism (e.g. court) or promoting the establishment of out-of-court resolution mechanisms. For example, to prevent farmers to leave cooperatives unilaterally when they see opportunities to increase their revenue in specific sales channels.

#### **4 Quantitative assessment**

A quantitative analysis of the four scenarios is proposed in order to explore the potential consequences of each scenario on the overall supply-demand equilibrium of agricultural products at the EU level. To do so, individual strategies, as described above from a qualitative perspective, were translated into quantitative parameters describing the overall agronomic performances of production systems.

In the Competition scenario farming systems follow a trend toward further intensification, concentration and specialization. Crop rotations are simplified and productivity oriented. This enables substantial productivity gains and yield increases, from an average of 5.5 t/ha in 2015 to an average of 6.2 t/ha in 2030 for cereals production. In this configuration cereal production could reach 371 million t by 2030.

In all the other scenarios, cereal areas decline. Other crops are introduced for example in the case of the Europeanization scenario with the development of European protein crops to face internal needs. Because of the increasing stringency on environmental and sanitary rules, producers limit the use of inputs and new genetically modified crops. Crop systems are more diversified with the development of protein crops. In this scenario the level of protein deficit decreases due to more stringent non-tariff barriers regarding deforestation risky commodities, and in particular soybeans the acreage of which is multiplied by 3 in the period.

In the Ecologization scenario, as pointed out in the German oilseed workshop, arable production will have to be seen, even more than in the past, as a system. Producers limit the use of inputs, fertilization is provided locally through integrated crop-livestock farming system at the farm or territorial level. Farming systems are slightly despecialized with a decrease of cereal cultivated area to the benefit of fruit and vegetables, oilseed crops (including soya) and protein crops acreage. Rotations are more complex with the introduction of legumes and cover crops. Protein crops cultivated area is multiplied by 4 between 2015 and 2030 to face the projected shift away from animal protein towards plant proteins.

In the dualization configuration, European producers are competing with each other on the single market. Farming systems are diverse with big holdings in Eastern European countries that are producing with low labour costs, whereas producers from old Member States focus more on producing quality food. Intensified farming systems which focus to produce commodity products for export markets coexist with smaller diversified systems. Large farms are also competing in both market

segments, developing diversified production in order to be more resilient. In this context organic farming increases to reach 15% of the European utilized agricultural area.

Oilseed crops area are increasing in all the scenarios following different drivers. In the competition and dualization scenarios, biofuel development based on oilseed crops plays an important role. In the Europeanization and Ecologization scenarios, oilseed crops (including soya) growth is mainly driven by the development of domestic soybean production.

Pasture land area widely decreases, following the intensification of livestock systems. In the competition scenario, permanent grassland and rangeland area decrease by 9% between 2015 and 2030. In the Ecologization scenario permanent grassland area reduction is limited to 2% in order to develop grazing livestock.

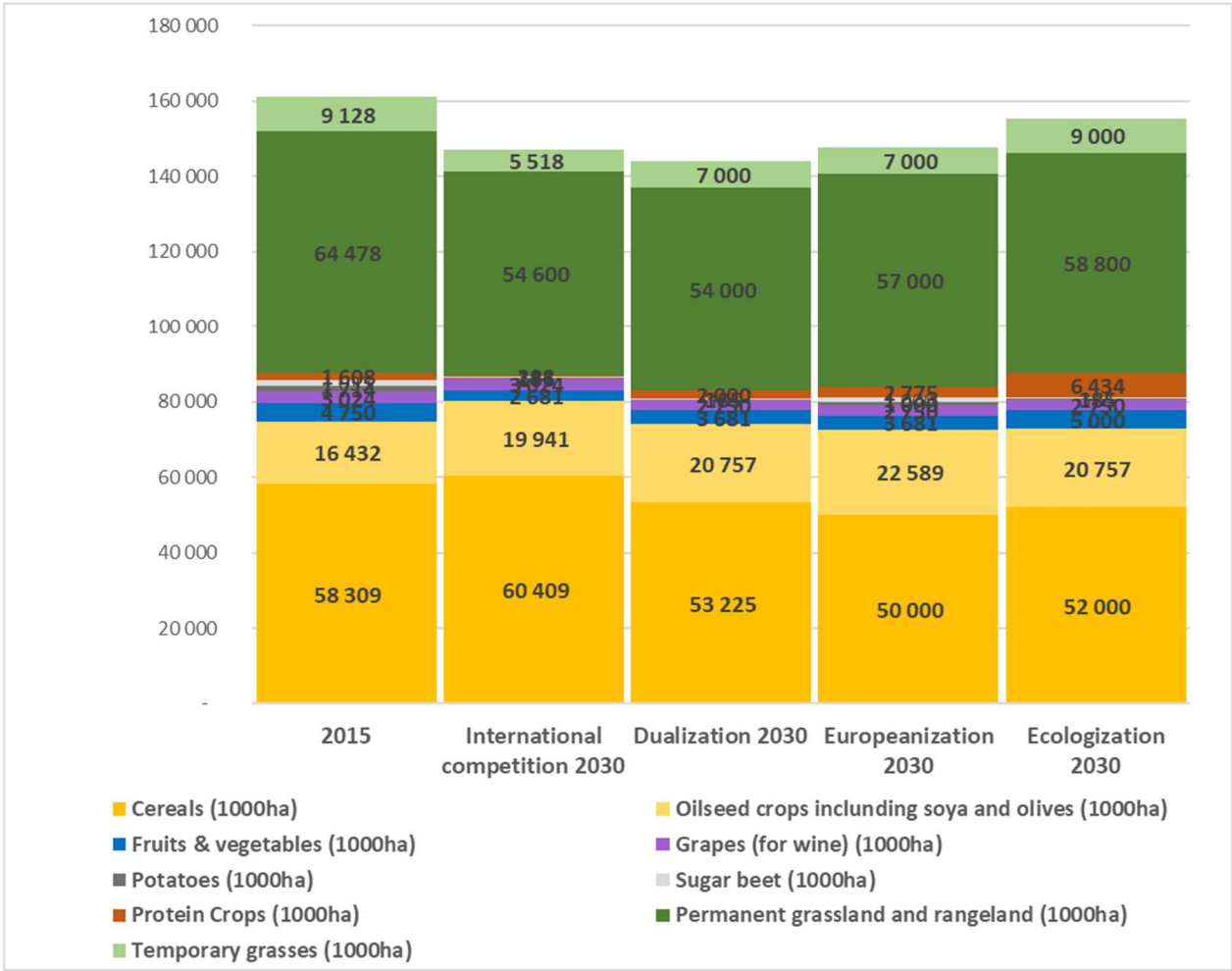


Figure 7: Land use in SUFISA scenarios (source: SUFISAm)

**Table 9 : Crop output in SUFISA scenarios**

	<b>2010</b>	<b>Competition 2030</b>	<b>Dualization 2030</b>	<b>Europeanization 2030</b>	<b>Ecologization 2030</b>
Cereals (M t)	262	371	319	305	310
Oilseed crops (M t)	35	55	44	50	52
Soya (M t)	2	0	12	12	2
Protein Crops (M t)	4	0	3	5	12
Fruits & vegetables (M t)	120	63	85	86	114
Grapes (for wine) (M t)	21	26	23	23	22
Potatoes (M t)	54	56	54	70	53
Sugar beet (M t)	111	127	125	151	123

Source: SUFISAm

Livestock numbers are decreasing across scenarios except for chickens that are expected to grow regardless of the context (Figure 8). Nevertheless animal yield increases mostly compensate for the decrease in animal numbers. As an example, average productivity of dairy cows rises from 6700 kg in 2010 to 8240 kg in 2030 in the competition configuration, enabling a European milk production of 174 million t. In this configuration the production of milk takes mostly place within intensive systems where dairy cows are productive for 3 years.

Milk production is decreasing in the Europeanization configuration, following a focus on internal European domestic food needs that lead to a decline of currently exported animal production. Despite a limited reduction of the dairy cow herd within the ecologization scenario, milk production is falling to 148.5 million t because of the development of more extensive systems with an average milk yield of 6500 kg/cow in 2030.

Pig meat production expands both in the competition and europeanization configurations following the intensification of pig production systems. The Dualization and Ecologization pathways favour more extensive production systems.

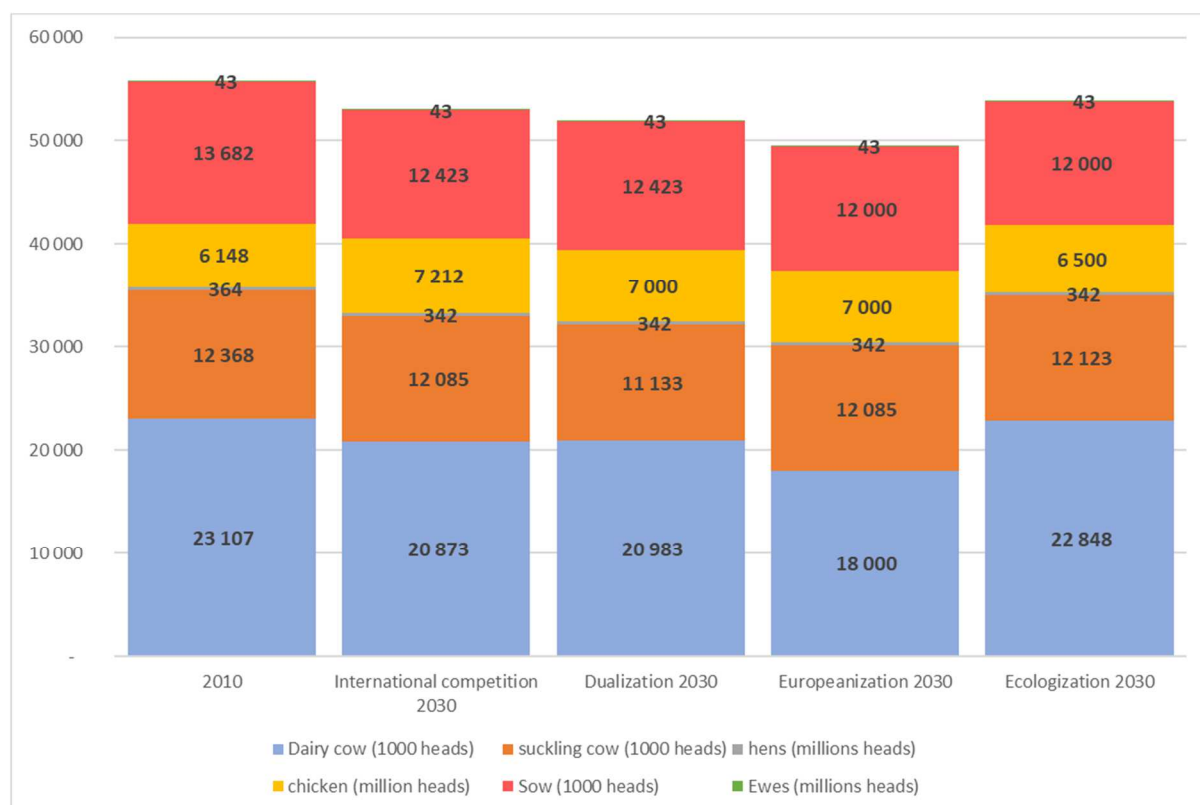


Figure 8: Livestock numbers in SUFISA scenarios (source: SUFISAm)

Table 10: Livestock production in SUFISA scenarios

	2010	Competition 2030	Dualization 2030	Europeanization 2030	Ecologization 2030
Milk (million t)	155	174,9	157,4	144,0	148,5
Egg (million t)	6,8	6,8	6,8	6,8	6,8
Poultry meat (million t)	10,5	13,7	13,3	13,3	12,4
Pig meat (million t)	21,1	24,6	22,4	23,8	19,4
Sheep and goat meat (million t)	1	0,7	0,7	0,7	0,7
Beef and veal meat (million t)	10,0	9,8	9,9	8,8	10,8

Source: SUFISAm

The demand for food was estimated based on the hypotheses made on food consumption behaviours in each narrative. Hypotheses were translated into typical diets and into an approximation of the share of European consumers that would follow each envisioned diet (see Figure 9 & 11)

Across the scenarios, most of the population follows the main trend diet referred as diet n°1 that converges towards calorie-dense processed food, with an increase in sugar and cereals intakes, especially in the Competition scenario where 96% of the European population follows diet n°1. In the Europeanization scenario the quest for convenience also increases the demand for functional, enhanced and enriched foods, as well as for food supplements.

In Dualization and Ecologization scenario a significant part of the population adopts diet n°2, illustrating stronger demand for high quality products with lesser impact on the environment. There is a shift in the demand for animal proteins progressively replaced by an increasing consumption of plant-

based proteins. The market share for organic and other certified high quality products reach more than 15% of the total market share in this two scenarios.

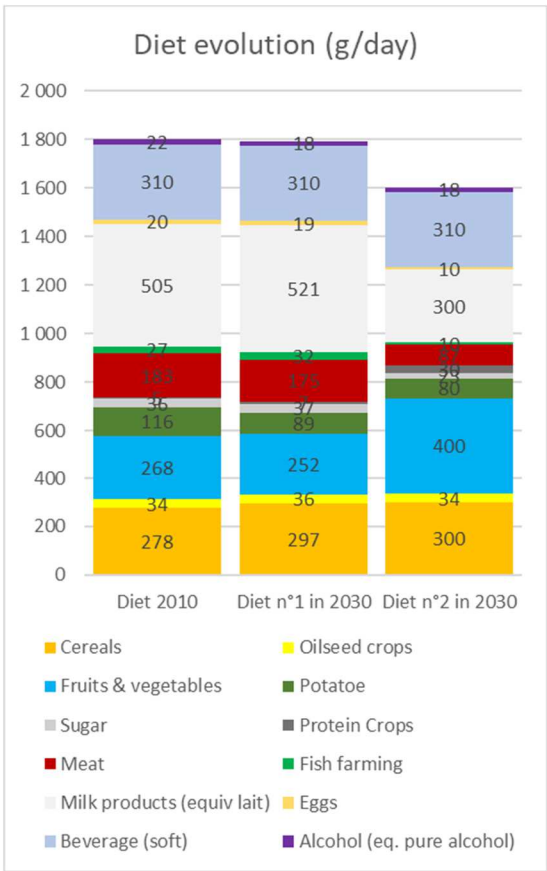


Figure 9: Average European diets by 2030 (source: SUFISAm)

Finally the balance between the production capacities and the global needs (food, feed and biofuels) are analyzed to give insights on the export potential and the import need of each scenario (

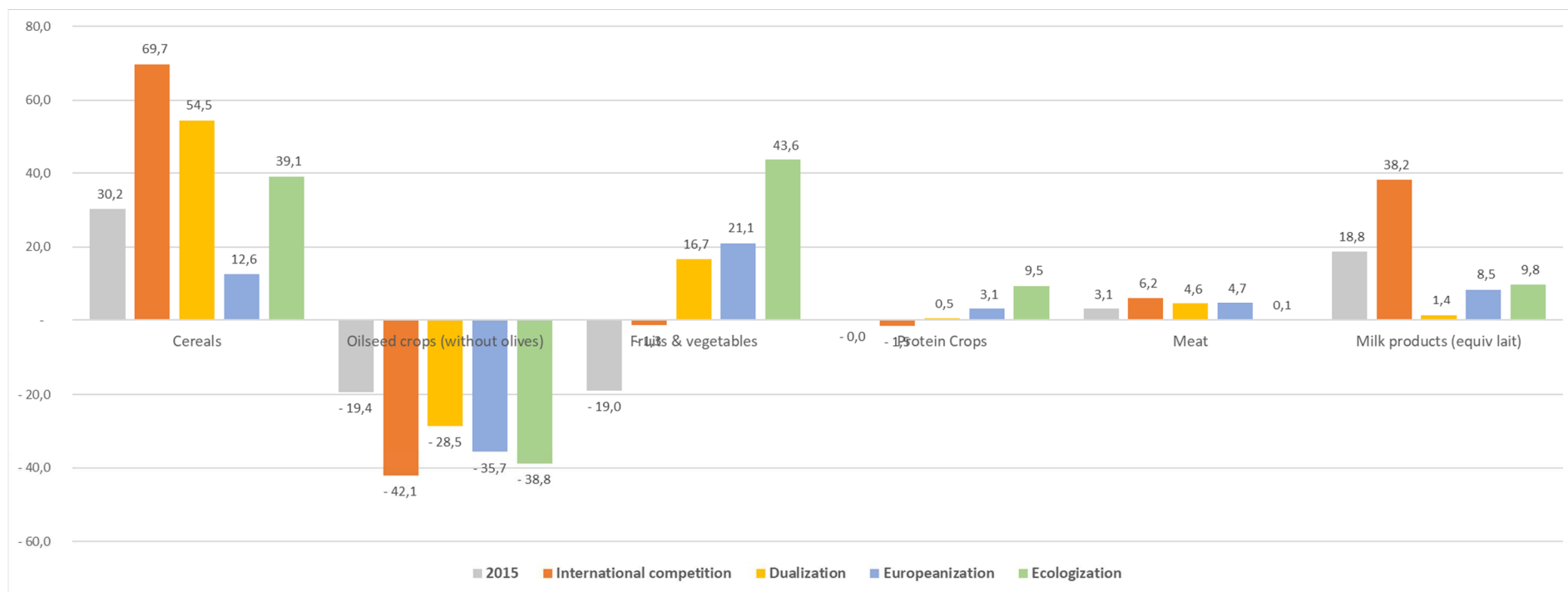
Figure 10).

Figure 10 compares the expected surplus (in volume) of SUFISA scenarios per main commodity groups, to the effective surplus in 2015 calculated with FAOstat data. First of all we observe that in 2030 most of the scenarios are producing enough to face European domestic needs and have a significant production surplus that could be exported on global markets. However, an important deficit remains for oilseed crops essentially due to the need for cakes for animal feed. Feed calculation in SUFISAm may have overestimated oilseed cake needs, nevertheless this result outlines that feed autonomy would remain an important challenge in Europe regardless of the pathway the EU farm will engage in. The Competition scenario which focuses on competitive products namely cereals and milk succeed to realize a significant surplus for these two products. In other scenarios cereals export potential remains, but milk surplus is limited, particularly in the dualization configuration. It could be noted that meat production surplus for extra European export would disappear in the ecologization configuration.

Table 11: share of population under diets n°1 and n°2

	% population under diet n°1	% population under diet n°2
Competition	96%	4%
Dualization	86%	14%
Europeanization	94%	6%
Ecologization	80%	20%

source: SUFISAm



**Figure 10: Potential surplus in millions t (source: SUFISAm)**

## Conclusions

The principal measures discussed by stakeholder in the scenarios focus on upstream segmentation and better cooperation within the food chain (both vertical and horizontal). As outlined in the last part of this report these solutions are not new. Nevertheless there is still no consensus on how they could be effectively implemented. The question of their roll out across different contexts remains open. Adequate instruments for their implementation still need to be further investigated.

The scenario workshop exercise gave insights on producers and food chains actor long term vision and expectations for the future of the European agricultural system. It offers an important insight to reflect upon in the context of CAP reform for the 2021-2027 funding period.

It is representative that increased direct income support was mentioned only one time (in the Belgium workshop report for sugar beet producers). It emphasizes that the future CAP should not systematically target increase in production volume, through the first pillar. On the contrary, most of the strategies discussed by stakeholders are linked to supply chain management and rural development. Capacity building was seen as a decisive aspect in all the workshops, that could not be addressed by subsidies for production. New financing schemes focusing on developing cooperation along the food chain would have to be found.

Finally, it appears that assessing sustainability through to the economic resilience of European producers doesn't address the multidimensionality of farming and fishing activities. Economic performance doesn't necessarily imply environmental preservation. The growing concerns on environmental issues was widely discussed by stakeholders. In this regard, Ecologization was outlined as the most favorable scenario for most of the case studies but it was also pointed out that it was one of the most difficult to achieve. Indeed this scenario implies systemic society changes, beyond the agricultural sector.

### Limits and way forward :

- The fact that workshop participants are widely dominated by research and upstream actors frame the solutions that emerge. The solutions discussed in this deliverable mostly respond to downstream production concerns. Thus we could ask ourselves about the strategies that would have been favoured by downstream actors especially retailers and processors that have mostly a dominant position within the chain.
- The evolution of consumption practices would have a fundamental impact in all the narratives regardless of the region and would need to be further investigated. Consumer financial capacity to purchase products would need to be taking into account. In some countries such as Poland and Latvia participants outlined that the vast majority of consumers are not able to afford the purchase of ecological products.
- The quantitative assessment framework would need to be improved to assess the various impacts on for example the environment.

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