



WP 2: Comparative Report

Deliverable 2.3



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List of abbreviations

CAP:	Common Agricultural Policy
CFP:	Common Fisheries Policy
CSP:	Conditions-Strategies-Performances
DPO:	Dairy Producer Organisation
EU:	European Union
FLAG:	Fisheries Local Action Group
GDP:	Gross Domestic Product
IA:	Institutional Arrangements
IPO:	Intended Performance Outcomes
PDO:	Protected Destination of Origin
PGI:	Protected Geographical Indication
PO:	Producer Organisation
RAS:	Recirculation Aquaculture Systems
VBT:	Verbond van Belgische Tuinbouwveilingen (Association of Belgian Horticultural Auctions)

Executive summary

This study aims to move beyond generalised contextualisation of Conditions, Strategies, Performance by investigating the nature and complexity of market imperfections, policy requirements and their implications for the sustainability and resilience of specific commodity sectors and regions across Europe. To achieve this aim, the work moved from region-specific commodity analysis to comparative cross-regional analysis. The region-specific commodity-level analysis covered 22 regions in 11 countries. Within each region a key commodity was selected for study from one of seven commodity groups: arable, dairy, fruits, meat, fisheries, aquaculture and wine/olives (other). Deliverable 2.3 synthesises and compares these results based on the national reports (deliverable 2.2) and findings from the cross-regional producer survey (deliverable 2.4), as well as the CSP inventory.

Conditions-Strategies-Performances (CSP) provides a heuristic framework for the comparative report. *Conditions* are the external (sector specific) and internal (farm specific) factors that a producer within a given commodity chain has to cope with. *Strategies* are actions that allow producers to respond to and manage internal and external conditions. *Performances* are understood in terms of a general analysis of perceived likely outcomes of particular strategies. The focus then is to identify and understand how the conditions and strategies impact on the performance of farms, fisheries or aquaculture businesses, including their longer-term sustainability. There is increased awareness of new market regulatory dynamics and their potential impact, especially recognition that less intervention increases agricultural sectors susceptibility to changes in international markets. With less policy intervention producers are more exposed to market instability and increased price volatility. New strategies are needed to help farmers and fishers.

The report presents qualitative and quantitative analysis of producer strategies and their capacity to respond to and manage market and regulatory issues. These data examine and compare strategies within sectors and across regions to manage uncertainty. The analysis presents a *producer perspective* of the issues which means assessing how different farmers/fishers in different sub-regional contexts respond to conditions/factors and the specificity of current institutional arrangements in which they are embedded. We start by classifying the case studies in terms of ‘intensiveness/extensiveness’ of the production system and the level of integration of each commodity studied in the global market. There is a dominance of ‘Globally integrated’/‘Intensive’ commodity case studies, but a cluster of commodities are ‘Locally integrated’/‘Extensive’, including three inshore fisheries case studies (UK, Italy and Greece), extensive beef production, traditional carp farming, feta cheese in Greece and some Portuguese olive oil production. The key CSP findings are summarised below.

Regulatory, market and socio-economic conditions

Issues linked to the Common Agricultural Policy (CAP) and the Common Fisheries Policy (CFP) are the most commonly referenced **regulatory and policy conditions**. The CAP is, firstly, important in terms of providing subsidies, which vary very considerably between sectors. For example, subsidies are critical to ensuring that the Montado system of farming in Portugal continues (providing more than 60% of farm income) and yet of minimal importance to fruit producers. Environmental regulations are another important aspect that affect all sectors to some degree or other. The political decision by the EU in 2012 to impose an embargo on selling agricultural products to Russia has also had a significant impact on a

number of sectors. For example, it has affected the market for dairy and fruit products, in that Russia was a key market outlet. The CFP is of critical importance to all fisheries within the EU. It sets the overarching conditions, including the total catches that are available as well as recently instigating a set of landing obligations. Regulation is understood as being necessary, but it does reduce the flexibility for individual fishers. There is also concern that through being delivered centrally from Brussels, it often fails to appropriately address local issues. In addition to the overarching conditions highlighted above, many of the case studies illustrate issues related to national institutional quality and competence. This can be linked to institutional instability (Serbia, Greece, Portugal), government intervention (wheat in Latvia; apples in Poland), unclear or excessive bureaucracy (aquaculture and wine in Italy), or a lack of public support for production or research (wheat in Poland; arable crops in Germany; beef in Portugal). A final policy issue relates to Brexit, particularly in relation to the UK, but also more broadly.

Market conditions dominate producer thinking and discourse. Low price levels, coupled with market volatility, is the most frequently cited condition amongst producers. To some extent this impacts producers across all sectors and countries, although it is most pronounced in those that are reliant on global markets. Volatility is particularly strong in the dairy and arable crops sectors, mainly because of their links with international markets and competition (e.g. wheat and dairy in France; wheat in Serbia; wheat and dairy in Latvia; dairy in the UK, Denmark and Greece). Removal of the milk quotas in 2015 effectively liberalised the market, opening it up to global competition and leading to growing instability in prices. Low prices can also be associated with the oversupply of products (such as milk and apples on the global market). Developing new markets / market access is something producers in a number of sectors are trying to do. This may be due to low prices, a shrinkage in domestic demand or because of restricted access to a hitherto important market (such as Russia). There are also concerns about increasing competition from neighbouring countries (for example, the aquaculture sectors in both Germany and Italy are concerned about cheaper imports; wheat producers in France are concerned about competition from Black Sea countries and Eastern European countries which have a higher protein content and lower prices than equivalent French grain; or in Serbia where wheat producers are able to compete with former Yugoslavian countries, but not with Hungarian and Ukrainian producers; or Belgian apple growers concerns about cheaper imports from Poland). Production costs are increasing in almost all the case studies, especially variable costs such as agro-chemicals, energy/fuel and transport (e.g. sugar beet in Belgium; fisheries in Italy and the UK; dairy in France; fisheries and dairy in Greece; aquaculture and rapeseed in Germany; wheat and apples in Poland), but also fixed costs (e.g. dairy in Denmark). Furthermore, in most cases production costs are rising at a faster rate than the prices received for the products sold. There are often asymmetric power relations within supply chains and consequently asymmetric price transmission. This means that most producers are 'price takers', especially when they are selling into global chains, at the mercy of the market.

In terms of **socio-economic conditions**, the financial crisis of 2007/2008 constrains access to finance and capital for many producers (e.g. dairy and poultry in Denmark; beef and olives in Portugal; fisheries in Italy; wheat and raspberries in Serbia; fruit growers in Italy; wheat and dairy in Latvia; aquaculture and rapeseed in Germany). In the Danish dairy case, in particular, access to credit is increasingly difficult to achieve in that agriculture is now seen as a 'bad risk'. In many of the case studies it is also clear that there is a constant process of land concentration, resulting in a lower number of larger farms. A lack of access to finance and capital (including land) is also adversely impacting generational succession and the ability of young/new entrants to come into farming/fishing. In turn, this is linked to rural depopulation,

which was highlighted as a growing and serious problem in a number of the case studies (e.g. wine in Italy; fruit in Serbia; meat in Portugal; dairy in Greece), and to a lack of suitably qualified labour. Technology and innovation are also important issues. In some case studies a process of modernization is under way: for example, the use of precision farming in Poland, more research and development in wheat in Latvia and olive oil in Portugal, the development of new seeds in sugar beet in Belgium, new fruit tree cultivars in Italy and Belgium, and new types of gear to limit unwanted catches in UK fisheries.

In summary, *it is clear that although market issues dominate, they do not operate in isolation from either regulatory issues or the socio-economic context.* Not only can market issues be triggered by changes in regulations, but market adjustments can take over the empty spaces left by deregulation, therefore self-regulating the supply chain.

Comparing strategies and supply chain arrangements

Competitiveness, viability and risk management

Competitiveness, viability and risk management strategies were deployed at the farm-level, as follows.

- **Reducing production costs** is one of the dominant farm level strategies across the different commodities, particularly in the case of dairy farming. French cereal producers also strive to minimise production costs, although evidence suggests that despite sustained and concerted efforts to do so, successes were variable. Efforts to reduce production costs in the Danish poultry sector have centred around reducing the cost paid for fodder. Whilst these efforts are making a difference to financial performance and resilience at the individual farm level, farmers were aware that decreasing costs will not necessarily address the underlying structural causes impacting the industry.
- **Intensification, specialisation, upscaling and changing crop focus** is a popular farm level strategy. Like efforts to reduce production costs, *intensification and upscaling* are particularly evident in dairy farming where low and volatile milk prices put an intense pressure on producers. Although a popular strategy deployed at the individual farm level, at the aggregate level this has amounted to significant structural change. There were also clear efforts to upscale and intensify production amongst producers in the case of Belgium sugar beet, although producers were acutely aware that producing more would actually flood the market and lower the price.
- There was evidence that some producers were undergoing **extensification, downsizing or even abandonment of their farms**. Again, this was largely associated with dairy farmers.
- **Abandonment of the farming business** is the ultimate and last resort; this is evident in the UK and Denmark, for example, where dairy farmers are heavily indebted and are unable to continue. The economic crisis – particularly in Italy and Greece – has also put pressure on fishers.
- Evidence of **planning for succession** was limited, emerging in the Portuguese and Danish meat examples only.
- **Flexibility in production and marketing** is an important strategy. This took many forms. For example, in rapeseed production in Germany (Wetterau), farmers were focusing efforts on better engagement with the public, including ways of self-marketing.
- **Technological innovation** is a common strategy across many of the cases, but particularly evident in arable cases. This is likely to reflect the fact that arable farming lends itself to certain types of technology.

- **Diversifying income sources – both on and off farm** – is another key strategy deployed across the commodity types. Although not as prevalent as other strategies (e.g. reducing production costs), where diversification is occurring it has become vitally important to the producers undertaking it. The main rationale is to reduce vulnerability by no longer relying on one production activity.
- **Financial management, including liquidity and loans**, is evident amongst dairy farmers, particularly those in Denmark where farmers relied heavily on loans and credit to sustain their businesses. **Insurance instruments** were more associated with arable farms than any other type.

Markets, contracts and supply chain arrangements

The main market arrangements for the seven commodity groups are summarised below.

- Markets vary across the cases, with some commodities and regions (e.g. dairy and poultry, Denmark) dominated by a few powerful actors and other markets more fragmented (e.g. pears and fisheries, Italy). We classify markets at two levels: the *type of sales channel* (individual (e.g. direct to retailer/processor) or collective sales (e.g. sell through co-operative)) and the *type of market* (bulk commodity market or differentiated quality-orientated market). The SUFISA case studies are more orientated towards commodity markets (e.g. the three largest case study clusters (arable crops, dairy and fruits) all mostly supply commodity markets), but we have several cases that target quality and niche markets (e.g. small-scale fisheries and aquaculture).
- A producer survey, which surveyed a total of 2299 farms across the case study regions /commodity groups, examined the variety of commercial outlets for farmers' products. Overall, individual **sales** were more frequent than sales through collective organizations. This is particularly pronounced for some commodity examples (wine, poultry, feta), with dairy and olives favouring collective sales as their main market.
- We can also see the importance of **modular markets** as an institutional arrangement and mechanism for supply chain coordination. In other words, producers in individual or collective arrangements are making and supplying food products to a customer's given product specification.

Three themes were significant in terms of **market orientation**:

- The first theme concerns the role of **quality standards and certification**. Quality standards and certifications are employed in different ways. For instance, organic certification is important, particularly in the dairy sector, where farmers in the UK and Denmark have differentiated themselves from the mainstream conventional dairy market. Labels of origin have helped to differentiate products. Voluntary standards are important to help producers access new markets e.g. raspberry producers in Serbia have used international certification to improve the homogeneity of their product and to comply with non-tariff sanitary and phyto-sanitary measures.
- The second theme is **market segmentation**. A lack of competitiveness on international markets limits opportunities for some producers e.g. feta, Greece; inshore fisheries, the UK. Market segmentation has been adopted to improve market access. Local direct sales and sales to local restaurants and schools have worked in some cases e.g. fisheries in the UK, as well as new market opportunities for quality products in the wine and fisheries cases in Italy via strategies of territorialisation, quality branding and integration with short food chains.

- **Adding value** is the third theme. This strategy is essential in some cases e.g. inshore fisheries in the UK and Italy (Tuscany); olive production in Portugal; raspberries in Serbia. In Serbia developing a fresh fruit, rather than simply frozen fruit, market is important, because the former has the potential for greater value added. For the fishing examples, for instance, there is a necessity to add value in order to remain viable.

In terms of strategies, it is important to examine **sales channel arrangements**, which can be different in type and duration, and agreements can also contain different characteristics or rules.

- Data from the producer survey give a useful overview of arrangements in each commodity group. The most prevalent type of agreement is a **formal agreement** that is signed before the delivery of a product and is limited in duration to a single delivery e.g. a contract that can be legally enforced. However, each commodity group displays significant differences in how arrangements are configured.
- The most prevalent arrangements in the fruits, beef and olive groups are rules of membership to a collective organization, while informal agreements of short duration are frequent in the feta cheese and wine commodity groups.
- Each agreement can also contain specific attributes or rules, which indicate more or less vertical coordination in the supply chain. The provision of logistical services by the buyer is a common attribute across all commodity groups, concerning about 63% of the sales recorded in the survey, and particularly notable in the milk, feta cheese and poultry cases.
- Other services such as managerial or credit assistance occur in specific sectors, such as dairy, arable and poultry. How prices are calculated is a critical element of sales channel agreements, directly affecting the profitability of producers.
- In the survey the most prevalent price basis were variable prices, depending on the quality delivered and on the market price at the moment of delivery. Producers are paid after delivery.

Contracts are important instruments of supply chain governance. There are examples of production contracts with individual buyers (e.g. apples, Poland) and producer organisations (e.g. rapeseed, Germany; sugar beet, Belgium). Commodity sectors (notably dairy and sugar beet) that reduced intervention measures (i.e. quota) are now using production contracts as instruments of self-regulation to manage production volumes on markets. **Production contracts** are particularly noted in the **dairy** cluster as an instrument for farmers and processors to adopt to market conditions. Different contracts are emerging: e.g. some private dairies in the UK use *A and B pricing* (they are designed to discourage overproduction beyond the agreed volume) and in France some dairy farms are encouraged to decrease production. The other strategy is **market data and futures contracts (i.e. hedging)**. This was evident in the UK dairy sector. Some argued farmers can, and should, use market information to their advantage.

Co-operatives and **producer organisations** are seen as an important means to help improve the market power and income stability of individual producers. The SUFISA data support this view to some extent but there are contextual factors to consider. For instance, there is a culture of co-operation in some regions and sectors (e.g. dairy in Denmark and France; small-scale traditional olive oil production in Portugal; wheat in France and Latvia; wine in Italy; aquaculture in Germany); in contrast, co-operation 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 organised (e.g. fisheries in Greece and the UK; wheat in Serbia and

Poland; poultry in Denmark; apples in Poland; raspberries in Serbia). There are good examples of co-operative arrangements, promising examples and debates emerging in specific commodity clusters, as described below.

- In the **fruit sector**, **producer organisations** have a strong presence. POs remain the main instrument of European policy for the sector. Two institutional arrangements are worth particular mention. The first is **O-pera**, an organisation that involves exclusively Italian fruit growers specialised in the cultivation of pears. It represents more than 1,000 pear growers, with the support of agronomists and technicians. Its aim is to aggregate diverse existing groups and to concentrate production and thereby improve both quality and negotiation power. The second is the **Association of Belgian Horticultural Auctions** (*Verbond van Belgische Tuinbouwveilingen* (VBT)), which has been working to increase access to new markets by putting pressure on the Flemish and EU governments to increase the speed of bilateral trade negotiations.
- There is significant discussion about farmer co-operation and strategies to improve farmers' bargaining power through co-operative governance and the development of producer organisations (POs) in the **dairy cluster**. Dairy co-operatives perform differently in specific national contexts. There are examples of failed co-operatives. In France small dairy co-operatives have been squeezed out by larger co-operatives; the trend in Denmark is the opposite. In France farmers expressed the view that co-operatives were becoming bigger and bigger, with farmers feeling they have no control anymore over co-operative governance. In the UK there has been limited uptake of the PO option, but those farmers participating in the Dairy Crest Direct DPO, the only one running in the UK, felt it was beneficial.
- There are interesting examples of collective action in the **arable crops cluster** e.g. strengthening the *sugar beet syndicate* via the Farmers' Union was seen as an effective response to generate additional income in Belgium; the '*protein plan*' in France is a collective action that incentivises increased protein content and as a consequence enable farmers to compete with Black Sea and Eastern European producers. In Poland, producer groups provided wheat farmers with a better bargaining position in relation to both the retailers and the purchasers of their product.
- **Small-scale fishers** are inherently individualistic (i.e. competitive with one another). However, some minor examples of cooperation are starting to happen, with the aim of increasing profitability. This is both vertically and horizontally. There are examples in Cornwall and in Kavala, Greece.

Informal arrangements are also evident, often as a combination of formal relationships (via contracts, for example) and informal relations (trust-based relationships, usually formed as a result of long-term repeated interactions).

Political support, and social and environmental sustainability

- The comparative report also covers strategies associated with political support, as well as social and environmental sustainability. Access to those in power to make decisions – **lobby access** – is mentioned in a number of cases. In the French wheat case, producers were identified as developing collective level strategies that included lobbying policymakers in order to defend their interests. However, the **fragmentation** of a number of the sectors creates problems in relation to accessing and influencing decision-makers, which is often addressed through the **development of co-**

operatives or producer groups. There are calls made in a number of the case studies for greater **transparency and participation** in the policy-making process. There are also growing concerns across a range of the case studies that co-operatives are getting so large (which may give them greater lobby and marketing power) that they are losing sight of the interests of their individual producers (e.g. in Belgium fruit; and French, Latvian and Greek dairy producers).

- **Training, advice and investment in research and development** is important to some extent across all sectors. This includes improvements to infrastructure, **improving educational standards** in rural areas, enabling high quality production (including organic production), providing advice in terms of insurance and access to credit, developing a public warehouse system (for the wheat producers), increased investment in their technical and advisory services, and the development of new varieties (in the raspberry case study). **Collaborative learning** was also mentioned as being important in a number of case studies, particularly in terms of improving the efficiency of the systems involved and to help producers add value to their products.
- **Subsidies and grants** are also important to some of the sectors studied. This is most obviously the case with the Montado meat system in Portugal, where commonly up to 60% of the total net farm income is from **CAP subsidies**, leading to concerns about how the sector would cope if subsidies were to be reduced. **Grants** are identified as particularly important in both Latvia and Serbia.
- Government support for the **development of markets** has been identified in a number of the case studies as being important. In the German oilseed rape case study, for example, support has been provided for the development of a **regional marketing strategy**.

Engagement with **social and environmental sustainability** varied across the case studies. In the dairy cases, it was highlighted that there are a range of environmental regulations (such as nitrate vulnerable zones) which have resulted in considerable costs and restructuring (such as in the French example), as well as fundamental changes to policy targets (e.g. in the Denmark case study). In this respect, wider sustainability issues are not generally seen as a specific strategy, but rather as a **response to obligations**. However, amongst the fruit case studies (especially the Italian example) there are concerns about the amount of chemicals needed to reduce pest damage to crops, and the risk to the environment as a result. **Social and environmental sustainability** are particularly important in both the aquaculture and fisheries case studies. The fisheries studied within SUFISA are small-scale in terms of contribution to GDP but are of considerable significance in **socio-economic terms** at a local level. In addition, fisheries are intrinsically dependent upon the environment for their continued existence. In the first instance this is in terms of marine stocks and the dangers of overfishing, but also in terms of eutrophication, habitat loss, biodiversity, pollution, global warming, acidification and extreme weather. The latter three items are global issues, but many of the issues are being addressed / need to be addressed through the CFP.

Combinations of conditions of strategies

CSP inventory data are examined to identify trends in terms of favoured strategies in response to given conditions across the sectors. What this shows is that often **market orientation** is an answer to many conditions. This strategy is used to cope with issues of market access, problems on the demand side, price levels and volatility and regulation and policy. This strategy is the most frequently mentioned for all sectors except for the arable crops and the meat sector, which predominantly rely on **collective arrangements**. Furthermore, **contractualisation** is also used as a way to control volatility. This strategy

is most applied in the fruit sector. **Environmental issues** are only mentioned within the fish sector with no other strategies directly targeting them.

Intended performance outcomes

A set of ten factors were drawn from the case study reports to map the intended performance outcomes (IPOs) of the strategies employed by primary producers in response to the conditions they face in their business operations. The key findings are as follows:

- It is clear that the performance of the agricultural and fisheries sectors studied are very much driven by their ability to adapt and transform (resilience), but also the need to create economic value to stabilize and enhance their business incomes. This is apparent from the trends in intended performances observed across sectors, wherein ‘enhanced farm / business resilience’ (223), ‘greater financial stability’ (220) and ‘greater profitability’ (208) score highest as IPOs across most sectors. In those sectors where this is not the case (e.g. fruits and aquaculture), the focus is more on improved market access (131) and added value (131), which also score relatively highly across all sectors.
- **Enhanced farm / business resilience** as a performance outcome relates to the adaptability of businesses and sectors in the face of regulatory, market and societal pressures and changes. **Greater financial stability** links notably with the issue of price volatility and income; while **greater profitability** is linked with controlling costs, income and price levels.
- **Added value** and **improved market access** are often associated with discourses concerning differentiation and entrepreneurship, and the ability / inclination to add value to the raw material in some way.
- **Strengthened** (or a current lack of) **negotiation power** is certainly an issue to some extent for most primary producers; however, for many producers (such as fruit growers and dairy farmers) it is the norm to sell through collectives and hence it was not often mentioned as an IPO. Having said that, it is clear that power (or a lack of it) can be a critical factor in determining the ongoing viability of a primary producer’s business.
- **Increased productivity** as an intended outcome was seldom mentioned except where it helped in coping with soaring land prices, or where technological innovations allowed for higher rates of production with lower inputs. In this respect, it was discussed more as a strategy to reduce costs and increase income rather than as an outcome pursued *per se*.
- With the exception of the fisheries sector and Montado beef in Portugal, **social benefits** were scored quite low, discussed principally in relation to issues of succession and the ever-increasing average age of both farmers and fishers. While some sectors (or at least some actors within sectors) were intent on enabling younger people to enter their sector, others were more fatalistic (or at least lacked concern) about the issue of succession.
- Similarly, **environmental benefits** were generally not a priority across sectors, again with the exception of fisheries and Montado beef and traditional olive oil in Portugal. The environmental benefits were defined mainly in terms of the benefits (or risks) of environmental degradation on their own businesses, rather than the benefits of their businesses on the environment.

The liberalisation of commodity markets is proving challenging for the majority of farmers. We can see how agricultural commodities are becoming more exposed to markets and the different ways how farmers are adapting, some of it constrained by structural issues. The Russian embargo on EU products

emerged as a common factor that caused reorientation to other markets and prompted farmers and governments to take action to alleviate negative effects. Farmers often think about issues linked to price and respond at a farm-level (which may help them but not the wider sector). From the SUFISA data a key difference across the sectors is between farmers that consider their farms as businesses versus farmers that consider their farms as a lifestyle choice. We also see the rise of modular arrangements and the evolution of contracts and institutional arrangements, from production contracts to cooperative arrangements (well established but evolving), to franchising and mechanisms such as quality labels. Collaborative approaches are important, but not all sectors or commodities trust these forms of institutional arrangement. Contractualisation and to a lesser extent insurance have important roles, especially production contracts, which have been around for some time but are evolving with new tools to better monitor markets.

1. Introduction

This report constitutes deliverable 2.3 of the SUFISA (Sustainable finance for sustainable agriculture and fisheries) project. Work-package 2 sought to move beyond generalised contextualisation of Conditions-Strategies-Performances (CSP) by investigating the nature and complexity of market imperfections, policy requirements and their implications for the sustainability and resilience of specific commodity sectors and regions across Europe.

To achieve this aim, the work moved from region-specific commodity analysis to comparative cross-regional analysis. The region-specific commodity-level analysis covered 22 regions in 11 countries. Within each region a key commodity was selected for study from one of seven commodity groups: arable, dairy, fruits, meat, fisheries, aquaculture and wine/olives (other). Draft national reports (deliverable 2.1) were written that summarised key regulatory, market and socio-economic issues for the two commodities studied within each country. This was based on media analysis, desk research and stakeholder interviews. Final national reports (deliverable 2.2) were written that included results from producer focus groups, a producer survey and a participatory workshop with key stakeholders. These data discussed market and regulatory conditions and the strategies emerging to manage regulatory and market issues, as well as issues related to the performance and the future sustainability of producer enterprises and the sector generally (see section 3 for further details).

Deliverable 2.3 synthesises and compares these results based on the national reports (deliverable 2.2) and findings from the cross-regional producer survey (deliverable 2.4), as well as the CSP inventory. More specifically, this report will:

- Summarise key market and regulatory conditions at a cross-regional level;
- Identify key drivers influencing the future performance of farmers and fishers;
- Compare differences between commodities and regions;
- Develop a cross-regional inventory summarising CSP issues for commodities/regions; and
- Summarise key producer survey findings.

The rest of the report is structured as follows. Section 2 explains the CSP approach adopted for the SUFISA project, which was designed to examine institutional arrangements, as conceptually defined for the project, within selected commodity chains from a producer perspective. It also situates this work in relation to findings from the *Improving Market Outcomes* report (Veerman et al., 2016). Section 3 provides further details about commodity group selection, summarises key methodological issues and the approach developed to enable commodity and regional comparisons. Section 4 introduces the seven commodity groups studied in terms of regional context and structural and organisational change at a producer and value-chain level. Sections 5-7 provides a synthesis of results, listing and comparing key CSP issues across the commodity groups and regions. Section 8 concludes the report and relates the findings to relevant debates about agricultural markets.

2. Concept and approach

Conditions-Strategies-Performances (CSP) provides a heuristic framework for this comparative report. The three terms and their relation to one another can be understood as follows. *Conditions* are the external (sector specific) and internal (farm specific) factors that a producer within a given commodity chain has to cope with. For the purposes of this report, this means understanding the conditions farmers and fishers face at different levels (global, national, regional, local, firm, individual). Porter's (1990) multidimensional framework (i.e., factor (input) conditions, regulatory (government) conditions, demand (output) conditions and conditions related to finance and risk management) provided a useful reference point for this analysis. *Strategies* are actions that allow producers to respond to and manage internal and external conditions; they are multi-level, involving producer and/or more collective arrangements, for example, and can be on-farm and off-farm in orientation. Several inventories of strategies already exist in the literature (e.g. "adaptation", "survival", "adjustment" and "development" strategies). This extends such categorisations of strategy group by better understanding the strategies emerging, particularly in relation to market and regulatory conditions. *Performances* are framed in terms of a general analysis of perceived likely outcomes of particular strategies.

The focus then is to identify and understand the conditions and associated strategies impact on the performance of farms, fisheries or aquaculture businesses, including their longer-term sustainability. There is increased awareness of new market regulatory dynamics and their potential impact, especially recognition that less intervention increases agricultural sectors' susceptibility to changes in international markets. The *Improving Market Outcomes* report (Veerman et al., 2016) recognises, for example, that agriculture is fraught with uncertainty, that agricultural production has limited flexibility, and that the CAP has become more market-orientated i.e. less management of markets, as epitomised by the phasing out of milk quota. With less policy intervention producers are more exposed to market instability and increased price volatility. The Veerman et al. report makes a series of recommendations in terms of the types of market-orientated agricultural policy tools that should be developed as mechanisms to help farmers manage market uncertainty (*ibid.*, 13-47), as follows:

- *Increase market transparency* (for better market data).
- *Risk management tools* (e.g. insurance schemes, futures markets).
- *Futures markets* (potentially important risk management tool).
- *Unfair trading practices* (recommends that EU level framework legislation be introduced).
- *Contractualisation* (to better address competitive pressures and societal demands).
- *Producer co-operation* (collective action via Producer Organisations (POs), inter-branch organisations, etc.).
- *Access to finance* (need more measures to facilitate access to finance, including targeted financial instruments).

The above recommendations provide a useful reference point for the comparative analysis. The themes highlighted (e.g. contractualisation, futures markets), as well as the emergence of horizontal structures and associational contracts (cf. Grandori, 2015), are important, especially given SUFISA's interest in sustainable finance for sustainable agriculture and fisheries and more specifically how economic performance can trigger sustainable practices in the sector (Bonjean and Mathijs, 2016).

The analysis of market and producer conditions and producer strategies emerging to respond to them is conceptualised in terms of '*institutional arrangements*' (IAs) (Bonjean and Mathijs, 2016). For SUFISA, IAs can be formal (contract, written agreement, law, etc.) or informal (norms, trust, reputation, etc.) arrangements; they incorporate the network of relationships leading to the production and delivery of agricultural and fish products and combine market arrangements (which may involve vertical and/or horizontal coordination between actors) with public requirements and incentives e.g. subsidy requirements, cross-compliance, food safety laws. Horizontal co-ordination involves collaboration among farmers at the same level of the supply chain. Vertical co-ordination involves collaboration between farmers and other supply chain actors up or downstream of the farm. Vertical coordination is how products move through the supply chain and can be characterised by contracting, product differentiation and supply chain relationships.

Gereffi et al. (2005) identified five different arrangements:

- *markets* (e.g. spot markets);
- *modular* (the producer makes products to a customer's specification);
- *relational* (transactions are complex and knowledge must be exchanged between buyers and sellers with mutual dependence);
- *captive* (switching costs are high so suppliers are 'captive'); and
- *hierarchy* (i.e. vertical integration).

The key attributes for the five arrangements can be further distilled as follows (table 1).

1. Market linkages:
 - Can persist over time with repeated transactions
 - The costs of switching to new partners are low for both parties
2. Modular value chains:
 - Products are made to a customer's specifications
 - Suppliers take full responsibility for competencies surrounding process technology and use generic machinery
 - The farmer produces customised products for buyers
3. Relational value chains:
 - Complex interactions between buyers and sellers, often creating mutual dependence and high levels of asset specificity
 - Role of spatial proximity in supporting those linkages, as well as trust and reputation
4. Captive value chains:
 - Small suppliers are transactionally dependent on much larger buyers and they face significant switching costs
 - High degree of monitoring and control by lead firms
5. Hierarchy
 - Vertical integration
 - Managerial control, flowing from managers to subordinates, or from headquarters to subsidiaries and affiliates

Table 1 Governance arrangements for supply chains (adapted from Gereffi et al., 2005)

Governance type	Complexity of Transactions	Ability to codify transactions	Capabilities in the supply-base	Degree of explicit coordination and power asymmetry
Market	-	+	+	--
Modular	+	+	+	-
Relational	+	-	+	++
Captive	+	+	-	+
Hierarchy	+	-	-	++

The comparative report presents qualitative and quantitative analysis of producer strategies and their capacity to respond to and manage market and regulatory issues. These data examine and compare strategies within sectors and across regions to deal with external conditions. The analysis presents a *producer perspective* of the issues which means assessing how different farmers/fishers in different sub-regional contexts respond to both external and internal conditions/factors and the specificity of institutional arrangements in which they are embedded. The producer-level is an entry point for the analysis, although it also involves analysis of other associated stakeholder groups (farm advisors, regulators, etc.). This is important to understand interdependencies in relation to CSP issues, food chain governance and institutional arrangements (cf. Martino et al., 2017).

3. Case study selection and comparative methodology

The commodity groups studied in WP2 are summarised in table 2; this table also shows how the case studies covered a range of target groups. The analysis covers 11 countries: Belgium, Denmark, France, Germany, Greece, Italy, Latvia, Poland, Portugal, Serbia and the UK. The 22 commodity-level case studies examine different primary producers, including young farmers and fishers, new entrants, small/family enterprises, and producers with high capital requirements. In terms of case study selection, each partner was asked initially to nominate four potential case studies relevant to their country/regions and from there two were selected per country, once all were grouped and clustered. Some partners were asked to adapt their preference to improve commodity coverage.

The process undertaken to select regions, commodities and target groups is described in a separate paper (see also d2.1). In summary, the case studies were selected and structured as follows:

- The commodities were clustered into 6 groups, reflecting the key varieties of products in the EU. These include: arable crops, dairy, fruits, meat, fisheries and aquaculture (see table 2). These groups also enabled comparability across the EU regions.
- In order to avoid excluding key EU sectors, two further products were included (even though only suggested by one partner in each case): wine in Italy and olives in Portugal. The inclusion of these two products was important as they represent key high quality export sectors for the EU.

Table 2 Commodity clusters for comparative analysis

	Sectors	Commodity	Country (Partner), Region, Preference	Young farmers	New Entrants	Small/family	Subsistence	Capital intensive
1	Arable crops	Wheat	POLAND (UJ), NUTS2, 2	Y		Y		
			SERBIA (BEL), NUTS2, 1			Y		Y
			LATVIA (BSC), NUTS2, 1	Y	Y	Y	Y	Y
		Cereals	FRANCE (IDDRI), NUTS 1&2, 1					Y
		Sugarbeet	BELGIUM (KUL), NUTS2, 1					
2	Dairy	Milk	GERMANY (HNE), NUTS3, 1	Y				Y
			LATVIA (BSC), NUTS2, 1	Y	Y	Y	Y	Y
			UK (UoG), NUTS2, 1	Y	Y	Y		Y
			FRANCE (IDDRI), NUTS3, 3	Y	Y			Y
			DENMARK (AU), NUTS2, 3					Y
3	Fruits	Feta	GREECE (AUA), NUTS2, 3			Y		
		Apple	POLAND (UJ), NUTS2, 1	Y		Y		Y
		Raspberries	SERBIA (BEL), NUTS 3, 1			Y		
		Pear	ITALY (UNIBO), NUTS2,1	Y	Y			Y
4	Meat	Apple and pear	BELGIUM (KUL), NUTS2, 1	Y	Y	Y	Y	Y
		Beef	PORTUGAL (UdE), NUTS2, 1	Y	Y			Y
		Poltry	DENMARK (AU), NUTS 2, 1					Y
5	Fisheries	Fisheries	GREECE (AUA), NUTS2&2, 1			Y		
			UK (UoG), NUTS2&2, 2			Y		Y
			Satellite CS from UNIP1_IT			Y		
6	Aquaculture	Trout, Carp, Other	GERMANY (HNE), NUTS 1					
		Marine aquaculture	Satellite CS from UNIP1_IT					
		Mussels	Satellite CS from UNIBO_IT					Y
7	Other	Wine	ITALY (UNIP1), NUTS2, 1			Y	Y	Y
		Olive	PORTUGAL (UdE), NUTS3, 3			Y		

In order to fulfil the project's obligations of conducting a minimum of two aquaculture case studies two smaller-scale 'satellite' case studies were conducted in Italy (in addition to the full aquaculture case study in Germany). Satellite aquaculture case studies were designed as follows:

- They were in addition to the 22 main case studies.
- Satellite case studies ran in parallel with the other case studies assigned to partners, but were much smaller in terms of time allocated and the range of data collected.

A facilitator (highlighted in colour in table 2) was identified for each product sector, to help co-ordinate data collection and analysis. Partners in commodity clusters worked closely together to ensure comparability and to enable a consistency of approach for the analysis of CSP.

For the purposes of this report, the methodology can be divided up in terms of region-specific (i.e. work completed for each of the national reports) and comparative cross-regional analysis.

The **region-specific analysis** contained the following elements:

- Analysis of regulatory and market conditions.* All partners conducted a desk-based analysis of market conditions and regulations for case regions / commodities. This was supplemented with 10-15 expert interviews per case study region.

- *Focus Groups and Workshop.* All partners conducted a series of focus groups (up to 2-3 per region; 4-6 in total) with producers and farm management advisors, regulators and finance experts, and food chain actors, plus a participatory stakeholder workshop per region.
- *Producer survey.* A total of 2,299 farmers have been surveyed across 11 EU Member States. The survey provided a farm-level assessment of supply chain arrangements (e.g. contracts and membership into collective organisations), their characteristics, their perceived sustainability and their role in dealing with agricultural challenges.
- *National Case Study Report.* Partners wrote national reports that summarised key CSP issues and differences in the two regions / commodities. WP2 national reports were written in three iterations, as key tasks were completed (draft 1 summarised regulatory and market conditions, as well as a media analysis chapter (drawn from WP1 data); draft 2 added qualitative data from the focus groups and participatory stakeholder workshop; the final version of the National Case Study report added analysis of the producer survey findings).
- *CSP Inventory (one per commodity).* Data in the national report was used to populate a CSP inventory for each of the commodities studied.

The **comparative analysis** comprised the following elements:

- *Commodity reports.* The comparative report is based mostly on data contained in the 11 national reports. Given the range of data contained in each national report, a first stage in the analysis was to write a commodity report for each of the seven commodity sectors. Each report summarised the issues for each commodity group, comparing the findings from across the regions in terms of market and regulatory conditions, farm-level strategies and key drivers influencing future performance. A draft of the report was sent to all partners involved in the commodity cluster who provided detailed comments and edits. The commodity reports were then finalised. The seven commodity reports are in appendix 1 and provide a rich analysis of the issues at a commodity level. The main body of the comparative report has used the findings in these reports to develop a more general-level thematic analysis of CSP across the commodity groups/regions, in combination with CSP inventory data and key findings from the producer survey.
- *EU-level analysis of producer survey data.* A report summarising the main findings from the producer survey at an EU-level has been prepared. The key findings feed into this report, providing a quantitative analysis of CSP and IA across the regions, to complement and triangulate the qualitative observations reported in the report.
- *CSP Inventory data.* This is an important output from WP2 (comprising national inventories and one cross-comparative inventory). Partners populated their national inventory when the second draft of the national case study report was drafted. Summary data has been extracted from the comparative inventory (Access database) and an interim paper prepared to provide initial analysis of CSP across the regions (Bundhoo et al., 2018). In the comparative report key summary tables are presented.

4. Overview of the commodity groups

This section provides an overview of the seven commodity groups, introducing the regions studied and highlighting significant contextual issues in terms of understanding CSP dynamics e.g. patterns of structural change and organisational governance at the farm and supply chain level.

a. Arable crops

Table 3 summarises the key contextual issues for the five arable case studies, namely Belgium (Flanders), France (Ile-de-France), Germany (Wetterau), Latvia (NUTS II), Poland (Opolskie region) and Serbia. The arable commodity case studies include sugar beet production in Belgium (Flanders), cereal farming in Ile-de-France, oilseed rape in the Wetteraukreis region of Germany and wheat in Latvia, Poland (Opolskie region) and Serbia. The commodities are well-established across the aforementioned countries. They face many of the same challenges, including pest resistance, climatic conditions, and the increasing cost of inputs. Increasingly, the trend towards market liberalisation has exposed arable commodities to the global market which is intensifying existing patterns of restructuring.

Table 3 Contextual factors – arable

Country	Region	Commodity	Farm structural change	Value chain org.	Context
Belgium	Flanders	Sugar beet	Steady decline in farm numbers Abolition of quota	Exposure to global market	Exposure to market Cost of production increasing (not reflected in final product price)
France	Ile-de-France	Cereals	Affluent farming region Large homogenous farm structure	'Protein plan' aimed at increasing value of wheat on global markets	Global competition Cost of inputs Climatic events
Germany	Wetterau	Oilseed rape	Oilseed rape has long been the dominant in crop rotation	Highly dependent on the strength of the international market	Renewable energy policy
Latvia	NUTS II	Wheat	Medium/large-scale specialised grain farms with intensive methods of cultivation	Price influenced by the price levels in the world stock market	Wheat price declining
Poland	Opolskie		Two thirds of the region is arable land	Threatened by the import of grains from other countries	Wheat price declining
Serbia			Small farms (<2 ha) dominate 2 types of producers (1) individual producers, i.e. family agricultural holdings, and (2) companies	Successful orientation towards the global market	Weak implementation of the agro-technical measures and a low irrigation rate Fluctuations in wheat yields Wheat price declining

The patterns of restructuring per case are as follows. In Belgium, the number of sugar beet producers has declined steadily over the last decade. Following the abolition of quota, Belgium farmers have been under pressure to compete on the global market. Exposure to the global market, in combination with the increasing cost of production, means that sugar beet farming in Belgium is declining. Cereal farming dominates Ile-de-France. Characterised by large homogenous farms, it has been particularly vulnerable to recent climatic events, which have exacerbated pest resistance issues. Cereal farming in the region has faced increasing competition from Black Sea countries. Farmers grow oilseed rape in many regions throughout Germany. Oilseed rape has long been the dominant crop in crop rotation (compared to sugar beet) in Wetterau, owing to renewable energy policy and the limiting nature of the sugar beet quota. In the Wetterau region, arable farms currently cultivate rapeseed on around 10-15% of their fields. Wheat production is significant in Latvian, Polish and Serbian agriculture in terms of the number of farms, cultivated area, export volume and total farm income. Polish wheat producers feel threatened by the import of grains from other sources such as the Czech Republic and the Ukraine. Although the Latvian wheat sector has managed to successfully orientate towards the global market it is now limited by an insufficient capacity of pre-processing, storage and the logistics of grain and the limited availability of land. In Serbia, small farms (<2 ha) dominate in terms of farm size patterns, owing to historical processes and the legal framework relating to the way land is divided.

b. Dairy

The key contextual issues for the dairy case studies, namely Latvia, Denmark (South Denmark), France (Finistère), the UK (Somerset) and Greece, are summarised in Table 4. The first four cases examine milk production on dairy farms. In Latvia dairy farms are highly fragmented and the sector is dominated by small farms (avg. herd size of 8.4 cows). Producers have a weak position in the value chain. There has been a reduction in the number of dairy farms and an increase in the average herd size – but they are still very small compared to some other European countries. By comparison, Danish dairy production is undergoing significant structural development that has resulted in a general increase in the number of cows per farm. The value chain is comprised of 28 dairies, of which Arla is the largest. Danish farming is in a significant financial crisis, which is reflected in an unusually high rate of bankruptcies among farmers. France is the second largest European dairy producer, representing about 20% of European production. Dairy farming in France has also experienced significant restructuring. In the Finistère district, the total number of farms has decreased by 2.9% per year from 2000 to 2010 (-32 % in 10 years). Dairy production systems in the region still rely largely on grass for their feeding strategy, but there are disparities between more ‘intensive’ (70% of farms in Brittany) and ‘autonomous’ production systems. The pattern of structural change on UK dairy farms is also towards fewer, larger farms. The milk market, particularly for liquid milk, is dominated by supermarkets through which as much as 80% of milk produced is sold. In contrast, the Greek case study explored sheep and goat milk production for feta cheese. Sheep and goat milk production accounts for 60% of total milk production in Greece. Farms are small and fragmented meaning farmers cannot achieve economies of scale. Most infrastructure and equipment is poor and outdated. Unclear land use and ownership arrangements complicate things further. Protected Destination of Origin (PDO) products, including feta which is the most important, plays a significant role in the industry, particularly following the Greek sovereign debt crisis and associated austerity measures.

Table 4 Contextual factors – dairy

Country	Region	Commodity	Farm structural change	Value chain org.	Context
Latvia	NUTS2	Liquid milk	Fragmentation and polarisation; some consolidation	Small dairy processors who are fragmented and large processors; duality / polarisation.	Post-Soviet transition; milk crisis
Denmark,	Southern Denmark		Concentration and intensification Organic dairy	Major structural development; Arla dominates	Financial crisis in Danish farming
France	Finistère		Concentration and intensification; 'alternative' models have developed.	Dominated by major industrial players Organic value chain emerging and niche markets (local and regional)	Milk crisis
The UK	Somerset		Concentration and intensification	Dominated by supermarkets / large processors	Milk crisis; Brexit
Greece	Thessaly	Feta	Fragmented Cannot achieve economies of scale	Fragmented PDO (Feta)	Financial crisis Land use rules

In summary, there is a high level of farm-level and value chain structural change evident across the four dairy (liquid milk) case study areas, with a trend towards concentration and intensification in Denmark, France and the UK; the structure is more fragmented in Latvia. The context is a period of 'crisis', in some cases specific to milk but also, especially in Denmark and the UK, linked to wider financial and political issues. The milk price crisis has severely impacted the sector. The Greek case study faces different difficulties, rooted in the broader economic crisis.

c. Fruits

The four fruit case studies examined include pears in the Emilia-Romagna region, Italy, apples and pears in Flanders, Belgium, apples in the Małopolska region, Poland and the NUTS 3 regions of Sumadija and West Serbia, Serbia. Table 5 summarises the contextual factors for the fruit case studies. The Emilia-Romagna region of Italy is predominantly rural and where pear orchards have been grown since 1600. A total of 82% of the farms are individual enterprises, with 15% being run by companies. The market for pears produced in this region is somewhat old-fashioned in terms of the varieties grown. Apple and pear production are treated jointly in the case study of Belgium (Flanders). The production process is considered to be nearly identical, with 61% of farms producing both apples and pears. Over the period 2001-2012, the number of Flemish top fruit/orchard production farms decreased by 43%, however, unlike the decline of pear orchards in Emilia-Romagna in Italy, acreages have remained stable, thereby indicating concentration. The production of Polish apples is 10 times that of Belgium. In the Małopolska region of Poland, 83% of farms are smaller than 5 ha and only 3.1% occupy more than 15 ha. Małopolska is one of three regions where fruit and vegetable production dominate (Świętokrzyskie and Mazowieckie regions: Sandomierz and Grójec areas respectively). Both regions are more connected to the global

system of apple production. Meanwhile, agriculture in Serbia is characterised by a transition to a market economy and improvement of business strategies, in line with EU legislation and practice. For the raspberry sector, farms of 0.5 ha dominate the structure. Raspberry production entails significant levels of seasonal labour, which requires training as well as ensuring adequate availability. Like pear orchards in Emilia-Romagna, raspberry production follows traditional practices. Fruit production is one of the key sub-sectors of Serbian economic development. Most raspberry production in Serbia is part of the mainstream supply chain, with the largest number of key relationships belonging to intermediaries.

Table 5 Contextual factors – fruits

Country	Region	Commodity	Farm structural change	Value chain org.	Context
Italy	Emilia-Romagna	Pears	Declining in number of farms and acreage Old-fashioned	Success with new markets Supply chain is highly fragmented Greater organisation is required	Traditional practices Ageing population & succession issues
Belgium	Flanders	Apples & pears	Number of farms declining but acreages have remained stable Characterised by oversupply	Dominance of co-operatives Emphasis on new markets	Farmers have difficulty accessing credit Ageing population & succession issues
Poland	Małopolska	Apples	Dominance of small farms	Producer groups are facilitating access to large-scale retailers and subsequently European-wide purchasers	Importance of local knowledge Not as connected to the global system of apple production as other apple producing regions
Serbia	Sumadija and West Serbia (NUTS 3)	Raspberry	Considered a key sector in terms of Serbian's development: receives strategic treatment from Government	Farmers dependent on few exporting companies Lack of any producer organisations Market chains are underdeveloped Scope for co-operatives?	Reliance on seasonal, skilled labour Importance of traditional practices Transition to a market economy and harmonisation with EU legislation and practice

In summary, the fruit production sectors examined in Italy and Belgium are of marginal significance to the agricultural economies of these two countries. On the other hand, apples and raspberries in Poland and Serbia, respectively, are both of significant importance to the countries concerned.

d. Meat

The meat case studies include the poultry sector in Central Denmark, and beef farming in central Alentejo, Portugal. The key contextual factors for these cases are summarised in Table 6.

Table 6 Contextual factors – meat

Country	Region	Commodity	Farm structural change	Value chain org.	Context
Portugal	Central Alentejo	Beef	Traditional system is largely unchanged Dominated by large family estates Concentration of the sector (more cows, less farms/farmers)	Emergence of new markets owing to new infrastructure	Highly marginal rural region Reliant on CAP subsidies Importance of tradition and heritage Depopulation and environmental degradation are issues
Denmark	Central Denmark	Poultry	Intensification – productivist discourse Stable structure Export as main focus	Highly coordinated Industrial concentration: small number of actors (which are private companies) Highly specialised	Industrial farming is dominant Farming contributes little to GDP

The Danish poultry sector is relatively stable in terms of numbers, with the industry producing around 125 million birds per annum, which are slaughtered by two major slaughterhouses. Production is organised under an industrial agricultural production model, with large-scale, modern production facilities (a typical chicken house would house between 20,000 and 40,000 birds). In contrast, beef production in Alentejo region is extensive, within a multifunctional silvo-pastoral land-use system; the Montado. Despite the system's extensive and traditional nature, the number of cattle has increased by 2.76 per cent between 1999 and 2009. However, this contrasts with the number of beef farmers, which has decreased by 9.31 per cent over the same period (i.e. a gradual concentration of production).

In terms of supply chain organisation, more than half of poultry produced in Denmark is exported. The Danish poultry market is highly integrated into globalised value chains. The Danish supply chain specialises in the production of fresh poultry products. The poultry value chain is composed of a small collection of specialised actors. All chickens are produced by a single company, and there are only two

major, privately owned slaughterhouses. Only a small number of companies produce the fodder for the chickens. In contrast, extensive beef in Portugal has only recently become an exportable commodity, following the development of infrastructure (Sines Harbour and Port). This has meant a range of new markets have become open to beef producers; including the Middle East and North Africa. Alentejo is characterised by the dominance of large family estates.

e. Fisheries

The fisheries group includes a satellite case study on the fishery sector in Tuscany, Italy; purse seine and small-scale fishers operating in Kavala and its neighbouring ports, in Greece (small pelagic fish in Northern Greece); and the Cornwall inshore fisheries sector in the UK. Table 7 summarises their key contextual factors.

In 2012, fishing activity in Tuscany represented 8% of total Italian landings. The Tuscan fleet is mainly engaged in small-scale fisheries and is extremely heterogeneous in terms of structure and size. The economic crisis, coupled with poor infrastructure, has increased production costs, which has led (together with EU incentives for the decommissioning of vessels) to a continuous decrease in the fishing fleet and in the number of fishermen in Italy. At the same time, increasing marine tourism has decreased the number of mooring facilities and the attendant infrastructure for fishers. The Greek fishing fleet is characterised by a large number of fishing vessels (15,385 in 2015). Decommissioning schemes have reduced both employment and vessels across all types of vessel, although inshore fisheries have retained 75% of total employment. Overall, fishing represents less than 3% of Greek GDP, yet it can be important in employment terms at a local level. It is estimated that 65% of stocks are overfished. More than 5000 vessels over the last 20 years have been decommissioned. Those that remain have in many cases been modernised. The issue of international waters is important in Greece, whereby they have not adopted an Exclusive Economic Zone. As such, their territorial waters are limited to 6 nm.

In 2014, there were an estimated 11,845 fishers in the UK, down 12% since 2004. In 2014, fishing accounted for 4.1 per cent of gross value added for the agriculture, hunting, forestry and fishing sector. The case study focuses on inshore boats which are less than 10 m long. Cornwall represents one of the areas where inshore fishing remains a key part of the rural community. Tourism is the most important industry in Cornwall, representing about 25% of the county's GDP. The presence of a fishing industry is an important part of the tourism appeal of Cornish coastal towns. As such, the continuation of the fishing industry within Cornwall is important to the county's future prosperity. The Cornish fishing industry employs approximately 3,300 people, based on 900 active fishermen, plus an estimated 2.75 jobs on shore for every fisherman. When tourist jobs created as the direct result of fishing are also considered, the multiplier is 4:1. This is also the case in Tuscany, where pesca-tourism is becoming increasingly important. Any discussions about the future of fishing in the UK inevitably involve looking at what the Brexit negotiations will result in.

In summary, the small-scale fishing fleets of the EU are enormously diverse and heterogeneous. Small-scale fishers make a small contribution to the overall economy, but can be locally significant.

Table 7 Contextual factors – fishing

Country	Region	Commodity	Farm structural change	Value chain org.	Context
Italy	Tuscany	Fishing	Small-scale fisheries Fragmented geographically Decrease in the fishing fleet and in the number of fishermen	Opportunities around increasing marine tourism	Economic crisis Poor infrastructure
Greece	Kavala (and neighbouring ports)	Purse seine and small-scale fishers	Decommissioning schemes	Links between fishing and tourism are not important	Overfishing Competition in international waters Lack of skilled labour
UK	Cornwall	Small-scale (inshore) fishers	Decrease in number of fishers Fishers opting to work alone Increasingly important to tourism and culture	Strong links between fishing and tourism	Importance of tourism (25% of Cornwall's GDP)

f. Aquaculture

The key contextual issues for the aquaculture case studies, include carp farming and recirculation aquaculture systems (RAS) in Germany, and aquafarming and mussel production in Tuscany, are summarised in table 8. Aquaculture in Germany has stagnated. It accounts for 3% total fish production in Germany. The German case study examined carp farms in the north of Bavaria (Franconia) and the adoption of RAS in Northern Germany. Carp farms are small, family owned and operate systems that have a low level of intensity (in terms of production), owing to their heritage. In contrast, RAS was introduced as a 'high-tech' approach to aquaculture. RAS requires technical expertise, significant investment and compliance with legal requirements. Numbers of such farms therefore remain low. In contrast, aquaculture has undergone recent growth in Italy, where the emphasis is shifting from traditional fishing practices to aquaculture. In Italy, aquaculture represents 48% of fish production making Italy one of the main aquaculture producing countries in the EU. The current trend is towards increased production of marine species both on land and at sea (molluscs and finfish). Growth in the sector is linked to improved seed production techniques and the application of new farming technologies. In the Tuscany case, declining numbers of enterprises have been counterbalanced by the consolidation of bigger aquaculture companies. In contrast, the industry has seen expansion in new areas in the Emilia-Romagna region. Recent growth in the sector has prompted concern over the environmental credentials of aquaculture and associated facilities.

Table 8 Contextual factors – aquaculture

Country	Study region	Farm structural change	Value chain org.	Context
Germany	Bavaria , Franconia (carp farming)	Concentration in few specifically suited regions	Small family run fish farms are dominant Importance of tradition and low level of intensity	Stagnation of industry
	Northern Germany (RAS)	Numbers of RAS farms remain low (linked to investment required)	‘High-tech’ approach to aquaculture	Policy efforts to increase aquaculture production using RAS
Italy	Tuscany (aquafarming of saltwater populations and mariculture)	<ul style="list-style-type: none"> Declining numbers of active aquaculture enterprises; Consolidation amongst the bigger aquaculture companies; and Expansion of mariculture activities 	Markets are built around quality and environmental sustainability in order to compete on international markets	Fisheries crisis – decline in traditional fishing
	Emilia-Romagna (mussel production)	Rapidly developing, owing to technology development Expansion in new areas	Commercial marketing difficult because producers lack skills Supply chain is fragmented	Mussel production is helping mitigate the fisheries crisis in the region

In summary, the trajectories of the aquaculture sector across the German and Italian case studies are very different. Stagnation of the sector in Germany is in contrast to the rapid development of Italian aquaculture. Although the overall picture of aquaculture in Italy is a positive one, it differs across the satellite case studies.

g. Wine and olives

The final case study cluster includes wine from Italy and olives from Portugal respectively. The Italy case study examined wine in Tuscany (central Italy), whilst the Portuguese study considered olive oil production in both intensive and super-intensive farming systems of (Central and Southern) Alentejo. Both commodities have experienced significant changes and challenges; broadly, the Tuscan wine sector is one of the regional success stories against the context of national decline, and intensive and super-intensive olive oil production has largely replaced extensive rain-fed production systems in Alentejo. Table 9 summarises the key contextual issues for these sectors. The Tuscan sector is characterised by vertically integrated producer businesses. This is opposed to the cooperative model, which is more common in other regions of Italy e.g. Emilia-Romagna. Unlike wine production in Tuscany, olive oil production in Alentejo has matched the overall trend in Portugal. Changes in the region have been marked by intensification and super-intensification of olives and olive oil production, which coexist alongside extensive, smaller and more traditional family run properties.

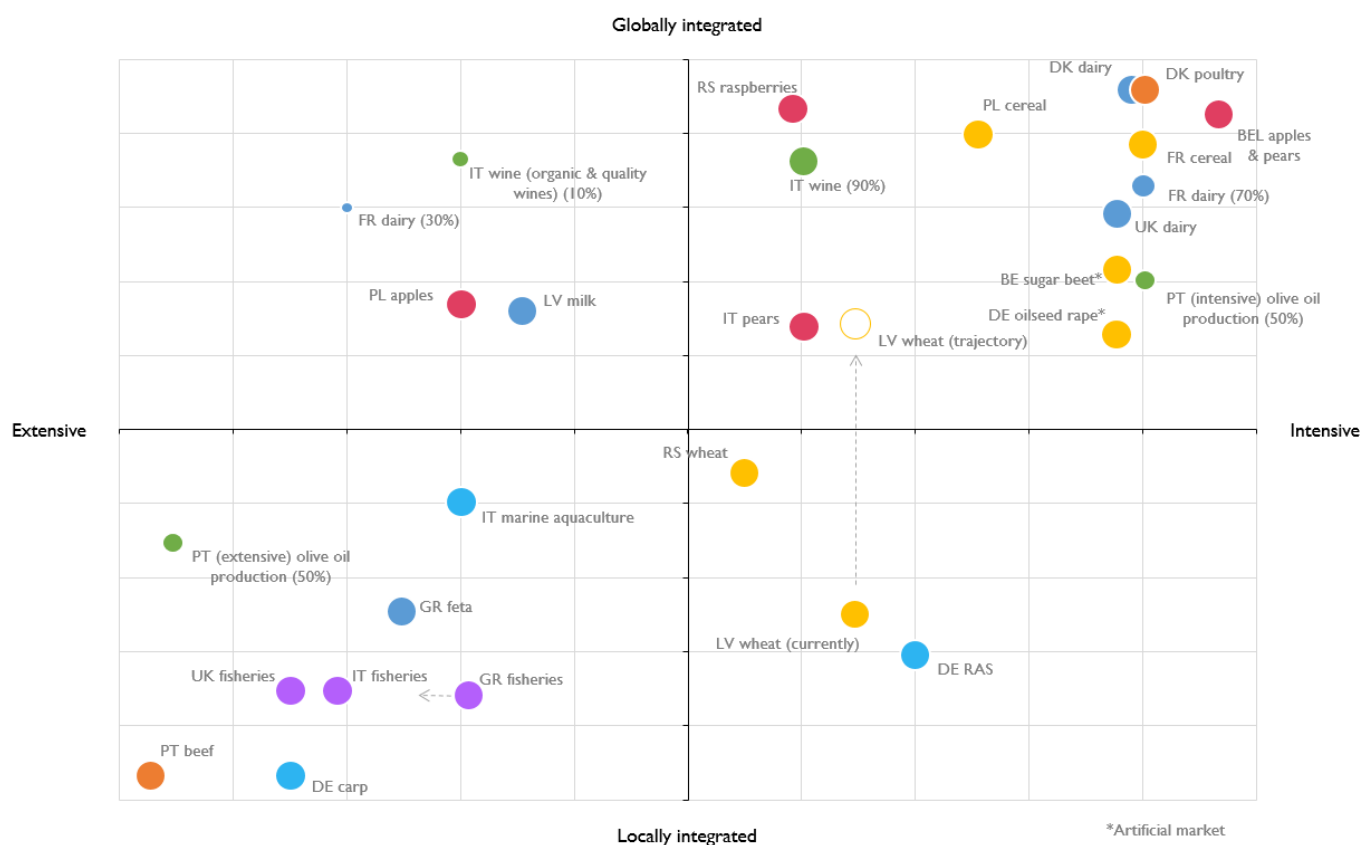
Table 9 Contextual factors – wine and olives

Country	Region	Commodity	Farm structural change	Value chain org.	Context
Italy	Central Italy	Wine	Regional success story against context of national decline	Specialised and highly diversified production systems Global reputation Able to export Vertically integrated sector	National decline in wine sector Depopulation of territories
Portugal	Central and Southern Alentejo	Olive oil	Period of transition owing to water availability Water and irrigation policies authorized surface area of 30,000ha of new intensive and super-intensive olive groves Two tiered structure: (1) intensive/super-intensive vs (2) extensive and small	Different according to type Intensive/super-intensive: vertically integrated Extensive and small: co-operatives play a strong role, work with others	Uncertainty around climate change Depopulation of territories

h. Clustering case study commodities in terms of production and global integration

The above socio-economic context is important to situate the cross-level analysis presented in sections 5-7. To summarise the contextual analysis so far presented, we can classify the case studies in terms of the ‘intensiveness/extensiveness’ of the production system and the level of integration of each commodity into the global market (Figure 1; see Appendix 2 for further notes to explain the position of each commodity). This provides a first level of comparative analysis in terms of commonalities/differences by comparing production systems relative to global market orientation. The majority of commodities are in the ‘Globally integrated’/‘Intensive’ cell in the matrix. A lesser but significant cluster of commodities are in the ‘Locally integrated’/‘Extensive’ cell of the matrix, including all three inshore fisheries case studies (UK, Italy and Greece), extensive beef production, traditional carp farming, feta cheese in Greece and some Portuguese olive oil production. The main pattern in the case studies surveyed then is ‘bulk commodities’ that are integrated into global markets, but we have heterogeneity in the sample, including extensive/locally integrated markets and globally integrated/extensive examples (e.g. Polish apples). We have examples too (e.g. dairy in France) where the general trend is intensive production but there is a shift by a minority of farmers towards less intensive production (in this case to reduce costs). Note also the bifurcation of intensive/extensive production systems in the olive oil case in Portugal. In Sections 5-7 we examine respectively the Conditions, Strategies and Performance outcomes across the different commodity groups.

Figure 1 SUFISA case studies: intensive/extensive production and level of global integration



5. Comparing market, regulatory and socio-economic conditions across the commodity groups

This section of the comparative report highlights the key regulatory, market and socio-economic conditions that have emerged from the individual national reports. It builds on the work conducted as part of deliverable 2.1 (see table 10), as well as the results of the CSP inventory (see table 11). The focus is on the key issues identified, rather than seeking to enumerate every condition that has been mentioned. Should the reader require more detail about the conditions relating to a particular commodity, they should reference the individual commodity reports, available from appendix 1.

By collecting and categorising the key issues that have emerged from each national report, it is clear that the market conditions faced by primary producers tend to dominate over regulatory and socio-economic conditions. This emerges both in terms of the number of market issues listed by partners, as well as by the larger number of case studies/commodities affected by market issues. Having said that, it is important to acknowledge that while helpful to differentiate conditions according to these categories, there is considerable overlap between them, with each of the different categories influencing each other to a greater or lesser extent. This section of the report begins by outlining the key regulatory conditions faced by primary producers (in that these very often set the context for market and socio-economic conditions), followed by market and socio-economic conditions.

Table 10 Key conditions identified in D 2.1

	Belgium		Italy				UK		France		Latvia		Portugal		Denmark		Greece		Germany		Poland		Serbia			
	Apple	Sugarbeet	Wine	Pear	Aquaculture	Fisheries	Mussels	Fisheries	Dairy	Cereals	Dairy	Dairy	Wheat	Beef	Olive	Dairy	Poultry	Fisheries	Dairy	Aquaculture	Repsesed	Wheat	Apple	Wheat	Raspberries	Total
Market issues																										
Demand			X	X				X				X	X	X	X		X	X		X	X		X	X		13
Market access		X	X	X		X	X	X		X		X	X	X	X			X	X	X		X				15
Price levels/volatility	X	X				X		X	X	X	X	X	X			X	X		X	X	X			X	X	16
Financial issues	X		X			X		X	X	X		X	X	X	X	X	X	X		X	X	X	X	X		18
Quality standards and certification		X	X		X	X		X	X			X	X	X		X	X	X	X	X	X			X	X	17
Market differentiation	X	X					X	X							X	X	X		X	X	X				X	12
Supply chain/Production contracts		X	X	X		X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	21
Producers Organizations/Cooperatives	X	X	X	X			X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	22
Land price and land availability		X	X		X					X		X	X			X			X		X	X	X		X	12
Labour issues		X	X			X	X		X			X	X				X	X		X			X		X	12
Storage		X										X									X			X		4
Production and marketing costs		X	X			X		X			X					X		X	X	X	X	X	X			12
Diversification	X	X	X	X		X		X		X		X							X	X	X			X		11
Market risks	X	X	X	X	X	X		X	X	X		X	X	X				X		X	X	X	X			17
Regulatory and policy issues																										
Institutional competence/quality					X							X		X	X			X	X	X		X	X	X	X	11
CAP		X	X					X	X	X	X			X	X	X			X		X	X	X			13
Production regulation		X	X			X		X			X								X			X	X			8
Environmental regulations		X	X	X	X			X	X			X	X			X		X		X	X					12
Animal health									X											X						2
Trade barriers				X				X				X								X	X		X			6
CFP							X												X							2
Other socio-economic issues																										
Recruitment and succession			X			X		X	X	X	X	X		X	X	X			X	X						12
Climate change/Environmental		X	X			X		X		X	X	X	X	X	X		X	X		X	X	X		X		16
Technology/Innovation		X				X		X		X		X	X		X		X		X	X	X	X	X		X	14
Education						X	X		X			X	X					X	X			X	X	X	X	11

Table 11 Key conditions identified in the CSP inventory

	All	PL, LV, RS, DK, BEL, FR	DK, LV, FR, UK, GR	PL, RS, IT, BEL	PR, DK	IT, UK, GR	DE, IT
Condition		Arable	Dairy	Fruits	Meat	Fisheries	Aquaculture
Price levels / volatility	98	37	28	8	2	12	8
Market access	84	15	16	26	3	15	56
Factor access	76	15	17	13	2	21	24
Regulation and policy	54	7	8	18	3	23	-
Demand	48	4	12	23	5	12	4
Ecological / environmental	43	13	6	3	2	15	4
Socio-demographic	29	8	7	3	3	3	4
Technological	13	1	6	8	-	-	-

i. Regulatory conditions

Issues linked to the Common Agricultural Policy (CAP) and the Common Fisheries Policy (CFP) are the most commonly referenced regulatory and policy conditions. The CAP is, firstly, important in terms of providing **subsidies**, which vary very considerably between sectors. For example, subsidies are critical to ensuring that the Montado system of farming in Portugal continues (providing more than 60% of farm income) and yet of minimal importance to most fruit producers. In the dairy sector, the decision in 1984 to impose **milk quotas** was highly influential, as was the decision in 2015 to remove them. The latter has resulted in dairy producers being more exposed to the world market for milk (effectively liberalising the market for milk), leading to greatly increased volatility and downward pressure on prices. Similarly, the abolition of **sugarbeet quotas** in 2017 is likely to have a dramatic effect on producers' decisions as to whether to continue growing this crop, although its full implications have yet to be felt. **Environmental regulations** are another important aspect that affect all sectors to some degree or other. For example,

in terms of nitrate sensitive areas and the requirement for dairy producers to have larger collection tanks for the slurry they produce, this necessitates greater infrastructural investment on their farms and reduces flexibility. It is also important to fruit producers, particularly in terms of the pesticides they are able to use to control a variety of pests that attack their crops. Likewise, fisheries are affected by a wide range of both national and EU-level environmental regulations. **Animal welfare/animal health** issues are another area where the EU legislation influences production processes, for example, in terms of cattle movement restrictions and antibiotic residue regulations in the UK, stringent animal welfare regulation in relation to aquaculture in Germany. The EU also provides the overarching context in terms of **defining** what is meant by **quality** for many products: wine and olive oil, for example, in terms of its purity as well as its place of origin (e.g. PGI or PDO status). Within the fruit sector, the establishment of the Common Market Organisation in 1972 has been key to the way in which fruit is marketed by outlining **marketing standards**. There are concerns that the CAP, in setting overarching standards and policies, sometimes fails to account for local level specificities, such as being able to acknowledge the complexities and multifunctionality of the Montado meat production system in Portugal; similarly, the CFP in relation to local-level fishing contexts.

Less directly, the CAP has been critical to determining Serbian agricultural policy, as Serbia seeks to **harmonise** its agricultural infrastructure and management, to be able to fully access the EU common market in due course. Subsidies paid to Latvian farmers since they have joined the EU have had the effect of **increasing land values** and hence enabled greater investment into the infrastructure of farms. Conversely, it is anticipated that land values will fall in the UK post-Brexit, on the expectation that production subsidies will decrease or disappear. The political decision by the EU in 2012 to impose an **embargo on selling agricultural products to Russia** has also had a significant impact on a number of sectors. For example, it has affected the market for dairy products, in that Russia was a key market outlet. Similarly, it exacerbated the European oversupply of apples, putting pressure on the producers of a number of countries, most notably Belgium and Poland. In the latter case, it subsequently led to a Polish governmental response which adversely affected the small-scale, traditional producers in the case study region examined.

The CFP is of critical importance to all fisheries within the EU. It sets the overarching conditions, including the **total catches** that are available as well as recently instigating a set of **landing obligations**. Regulation is understood as being necessary, but it does reduce the flexibility for individual fishers. There is also concern that through being delivered centrally from Brussels, it often fails to appropriately address local issues. The CFP has also been instrumental in decreasing the size of the fishing fleet across the EU, through a series of **decommissioning schemes**.

In addition to the overarching conditions highlighted above, the case studies illustrate issues related to **national institutional quality and competence**. This can be linked to institutional instability (Serbia, Greece, Portugal), government intervention (wheat in Latvia; apples in Poland), unclear or excessive bureaucracy (aquaculture and wine in Italy), or a lack of public support for production or research (wheat in Poland; agriculture in Germany; beef in Portugal). There is also frustration in the aquaculture sector in Germany that there are three different levels of government involved (national, regional and local), which is creating confusion and leading to contradictions.

A final policy issue relates to **Brexit**, most particularly in relation to the UK, but also more broadly. At the time of writing, there are still so many unknowns, but there is little doubt that it will have profound implications. The UK will almost certainly leave both the CFP and the CAP. The key question is, what will be the replacement policies? Continued access to the EU common market is a key issue of debate. Amongst the case studies, this is most pertinent in relation to fisheries, where more than 80% of the fish caught are sold into the EU market. There will also need to be agreement about regulation harmonisation / equivalence and so on. This uncertainty is unsettling for UK producers, not least in terms of planning for the future.

ii. Market conditions

Low price levels, coupled with market volatility, is the most frequently cited condition amongst producers. To some extent this impacts producers across all sectors and countries, although it is most pronounced in those that are reliant on global markets. Volatility is particularly strong in the dairy and arable crops sectors, mainly because of their links with international markets and competition (e.g. wheat and dairy in France; wheat in Serbia; wheat and dairy in Latvia; dairy in the UK, Denmark and Greece). As mentioned above, removal of the milk quotas in 2015 effectively liberalised the market, opening it up to global competition and leading to growing instability in prices. Instability and low prices are putting intense pressure on many producers, in terms of their ongoing economic viability. In this sense, farm incomes are increasingly determined by global markets and their associated uncertainty; likewise, global demands are increasingly dictating market qualities. **Low prices** can also be associated with the **oversupply** of products (such as milk and apples on the global market). In some cases, it is a **lack of demand in the domestic market** that is putting pressure on producer viability (e.g. wine and pears in Italy; fisheries in the UK and Greece; dairy in Latvia; apples in Poland). In Italy and Belgium, for example, demand for 'home grown' apples has weakened, not least because the older varieties that are often grown are no longer to the modern consumer's taste. A decreasing domestic demand is sometimes linked to changing consumption attitudes (wine in Italy; poultry in Denmark; wheat in Serbia), to the bad image of intensive production systems in terms of their animal welfare implications (aquaculture in Germany), or to the lower purchasing power of consumers, in part due to the financial crisis (olives in Portugal, wine in Italy, fish in Italy and Greece), or in the UK that fish is not part of UK culinary culture (unlike France or Spain, for example). A **lack of consumer knowledge** and the need to educate consumers about the products they are buying was highlighted in a number of cases (e.g. German aquaculture; UK fish; Serbian raspberries; Portugal olive oil; Italy mussels).

Developing new markets / market access is something producers in a number of sectors are trying to do. This may be due to low prices, a shrinkage in demand – whether domestic or international - or because of restricted access to a hitherto important market (such as Russia). This is particularly the case in the fruit sector, where the Russian blockade hit especially hard. However, developing markets for fruit beyond the EU is problematic, principally due to phytosanitary barriers which in practice tend to be more about protectionism (most notably in the US and China). It can also be difficult to change production regimes, which may have had considerable investment, for example, in terms of high levels of investment in dairy infrastructure, or having planted an orchard (which has a 15 to 25-year cycle). There are also concerns about **increasing competition** from neighbouring countries (for example, the aquaculture sectors in both Germany and Italy are concerned about cheaper imports; wheat producers in France are concerned about competition from Black Sea countries and Eastern European countries

which have a higher protein content and lower prices than equivalent French grain; or in Serbia where wheat producers are able to compete with former Yugoslavian countries, but not with Hungarian and Ukrainian producers; or Belgian apple growers concerns about cheaper imports from Poland).

Production costs are increasing in almost all the case studies, especially variable costs such as agro-chemicals, energy/fuel and transport (e.g. sugar beet in Belgium; fisheries in Italy and the UK; dairy in France; fisheries and dairy in Greece; aquaculture and rapeseed in Germany; wheat and apples in Poland), but also fixed costs (e.g. dairy in Denmark). Furthermore, in most cases production costs are rising at a faster rate than the prices received for the products sold.

Some of the case studies examined involve large-scale industrial producers, who are geared up to trade on international markets (e.g. arable in France; dairy and poultry producers in Denmark; and some dairy farmers in the UK). However, more usually the **producers are fragmented**, relatively small-scale and lacking a coordinated voice (as will be discussed in the strategies section, below, this is notwithstanding that in many cases producers are part of co-operatives). This fragmentation has a number of implications. Key amongst these is that the producers lack market power in relation to much larger processors and retailers; in other words, there are often **asymmetric power relations** within supply chains and consequently **asymmetric price transmission** occurs. This means that most producers are 'price takers', especially when they are selling into global chains, at the mercy of the market. Fragmentation also impacts on the **infrastructure** available (e.g. Italian and Greek fisheries; German aquaculture; Serbian and Polish fruit producers), as well as the sectors' **ability to influence policy**. This latter point was raised in a number of contexts (e.g. olive oil and Montado meat in Portugal; fruit in Italy), but most notably in the case of small-scale fisheries in the UK in relation to the Brexit negotiations.

iii. Socio-economic conditions

The **financial crisis** of 2007/2008 constrains **access to finance and capital** for many producers (e.g. dairy and poultry in Denmark; beef in Portugal; fisheries in Italy; wheat and raspberries in Serbia; fruit growers in Italy; wheat and dairy in Latvia; aquaculture and rapeseed in Germany). In the Danish dairy case, in particular, access to credit is increasingly difficult to achieve in that agriculture is now seen as a 'bad risk'. In many of the case studies it also is clear that there is a constant process of **land concentration**, resulting in a lower number of larger farms. This is leading to increased land prices, often limiting land purchases to existing farmers looking to expand (e.g. sugar beet in Belgium; wheat in France and Latvia; rapeseed in Germany; wheat and apples in Poland). Land acquisition by foreign investors is an issue affecting three case studies: dairy in Latvia and Denmark and olive oil in Portugal. Moreover, energy crops are competing for land in the wheat case study in Latvia and dairy in Denmark, as well as being an issue with oil seed rape in Germany.

A lack of access to finance and capital (including land) is also adversely impacting **generational succession** and the ability of young/new entrants to come into farming/fishing. This was mentioned in all the reports. In most of the case studies, the average age of producers (whether fishers or farmers) is rising inexorably to 60 and beyond (Serbia is the exception in this regard, especially raspberry growers). In turn, this is linked to **rural depopulation**, which was highlighted as a growing and serious problem in a number of the case studies (e.g. wine in Italy; fruit in Serbia; meat in Portugal; dairy in Greece), and to a **lack of suitably qualified labour**. Work in agriculture and fishing requires specific knowledge and

experience, but in many EU countries urban jobs are increasing at the expenses of rural jobs. As a result, **low levels of education** amongst those in rural areas was an issue in eleven case studies, especially in terms of improving managerial skills (e.g. fisheries in Italy, dairy in the UK, wheat in Latvia, dairy in Greece, apples in Poland, wheat and raspberries in Serbia). A lack of training opportunities was also mentioned, especially where more technical skills are required, such as aquaculture in Germany.

Technology and innovation are also important issues. In some case studies a process of modernization is under way: for example, the use of precision farming in Poland, more R&D in wheat in Latvia and olive oil in Portugal, the development of new seeds in sugar beet in Belgium, new tree cultivars in Italy, Belgium and Portugal, and new types of gear to limit unwanted catches in fisheries in the UK. However, there is a sense in many of the case studies that more needs to be done to develop new varieties, differentiate products and increase marketing opportunities.

From the analysis it is clear that **although market issues dominate, they do not operate in isolation from either regulatory issues or the socio-economic context**. Not only can market issues be triggered by changes in regulations, but market adjustments can take over the empty spaces left by deregulation, therefore self-regulating the supply chain.

6. Comparing strategies and supply chain arrangements across commodity groups

i. Competitiveness, viability and risk management

Here we synthesise strategies deployed across the partner countries and commodity groups relating to competitiveness, viability and risk management which were deployed at the farm-level. Although the text in this section utilises the individual farm as a unit of analysis to organise the discussion of strategies emerging in response to external conditions, it is recognised that farm-level strategies are not discrete within themselves or in relation to other strategy groups discussed later i.e. they are not separate from collective, other food chain or territorial strategies at a practice level. We define farm-level strategies as strategies deployed by *individual* farmers and which they have control over.

Reducing production costs is one of the dominant farm level strategies across the different commodities, but particularly evident in the case of dairy farming. This is an unsurprising strategy given the impact of low milk price globally, which is often below the cost of production for farmers and can also be highly volatile. In South Denmark in particular, where dairy farmers were heavily indebted and producers are highly reliant on exports, farmers sought to decrease the cost of production by increasing efficiency and cutting costs/cancelling reinvestments. This was also the case in France (Finistère) and the UK (Somerset) where farmers are trying to reduce the key cost components including herd replacement costs, feed and forage costs, labour costs and power/machinery costs. The price of sheep and goat milk is less volatile than cow milk, but feta producers in Greece also sought to reduce costs of production in response to low milk prices. French cereal producers also strived to minimise production costs, although evidence suggests despite sustained and concerted efforts to do so, successes were variable. In the case of fruit production, reducing the cost of production took similar forms. For example, Polish apple producers in the Małopolska region have abandoned more traditional (and expensive) methods to reduce costs and are also opting to hire Ukrainian workers as an alternative to more expensive Polish labour. Efforts to reduce production costs in the Danish poultry sector have centred

around reducing the cost paid for fodder. Other producers are also being tactical about the timings of fodder purchase; some purchase fodder for the whole year, whilst others purchase small amounts at a single time. Whilst these efforts are making a difference to financial performance and resilience at the individual farm level, farmers were aware that decreasing costs will not address the underlying structural changes impacting the industry. Particularly in the case of dairy farming, increases in production puts further pressure on prices making these efforts futile. Although a popular strategy across many of the different commodities, it was not mentioned in any of the aquaculture or fishing cases.

As well as reducing production costs, **intensification, specialisation, upscaling and changing crop focus** was a popular farm level strategy. Like efforts to reduce production costs, *intensification and upscaling* were particularly evident in dairy farming where low and volatile milk prices put an intense pressure on producers. Although a popular strategy deployed at the individual farm level, at the aggregate level this has amounted to significant structural change. There were also clear efforts to upscale and intensify production amongst producers in the case of Belgium sugar beet, although producers were acutely aware that producing more would actually flood the market and lower the price. Choosing an alternative crop was a strategy used by Belgian sugar beet farmers, but the practicalities associated with this meant it was not widely undertaken. A move towards fewer larger farms was also accepted as both a common and necessary strategy in the case of wine in Tuscany, and cereals in Ile-de-France. Despite their extensive nature, both beef producers Montado and small olive oil producers in Central and Southern Alentejo are intensifying as a strategy. Whilst intensification in Montado has been promoted as 'sustainable intensification', there are concerns that such intensification is shifting the character, resilience and sustainability of the whole Montado system. The ability of extensive olive oil producers in Alentejo is limited by their ability to access resources, but where possible it is also prompting concerns over the environmental sustainability of olive oil production in the region. Danish poultry farmers and Polish apple producers have also shifted their product focus as a strategy to improve their resilience. In the case of Danish poultry, farmers are diversifying their businesses away from solely poultry. This typically involved developing arable enterprises to reduce their reliance on suppliers. Similarly, Polish farmers have diversified the types of apples they are growing to appeal to different markets and spread risk. Efforts to intensify, specialise, upscale and change product were not mentioned in either the aquaculture or fishing cases.

Although intensification was a key strategy across many of the commodities, there was also evidence that some producers were undergoing **extensification, downsizing or even abandonment of their farms**. Again, this was largely associated with dairy farmers. Although efforts to strengthen resilience were common to all producers, regardless of commodity type, the milk price crisis and volatility of milk price meant dairy farmers were under more pressure to develop farm level strategies to improve their resilience. In the Finistère district of France, pasture-based, extensive systems account for 10-30 per cent of all farms in the region and are deliberately adopted as a medium- to long-term strategy which frees them from the need for heavy investment over this period. Although intensification and extensification as strategies are categorised here as individual farm strategies, evidence from the French dairy case study suggests that the success of both strategies are reliant on farmers' embeddedness in social, political and territorial dynamics.

Abandonment of the farming business is the ultimate and last resort; this is evident in both the UK and Denmark, for example, where dairy farmers are heavily indebted and are unable to continue. In the UK,

a common strategy is to move away from dairy farming into another type of farming (typically beef cattle). The economic crisis – particularly in Italy and Greece – has also put pressure on fishers. In Kavala and neighbouring ports, Greek fishers have agreed to reduce landings to just one a day and to no longer fish on Saturdays. In the Italian case (Tuscany), the fishing fleet and the number of fishers have decreased, although this is in part the impact of increasing marine tourism which has decreased the number of mooring facilities and the attendant infrastructure for fishers.

Succession and the lack of a next generation was a significant issue that emerged across the case studies. However, evidence of **planning for succession** was limited, emerging in the Portuguese and Danish meat examples only. In Central Alentejo, Portugal it is well-known that profitability can only be achieved from holdings between 400 and 600 hectares, making it difficult for new entrants to access potentially profitable tracts of land. In response to this, local family farmers are accommodating young farmers on their farms; this is leading to a process of land property concentration. New entrants are also implementing their own strategies by moving away from beef farming and taking up more lucrative types of production e.g. olive or almond farming. In Central Denmark, succession on poultry farms is considered so unlikely that farmers are actively winding down their businesses prior to retirement to ensure their property is sellable.

Flexibility in production and marketing was a dominant strategy observed amongst producers in the case studies. This took many forms. For example, in rapeseed production in Germany (Wetterau), farmers were focusing efforts on better engagement with the public, including ways of self-marketing, e.g. social media (although the evidence suggests they had experienced little success so far). Dairy farmers in Denmark explained how they had attempted to adapt the internal organisation of the farm to manage market volatility. Similarly, fishers in Greece shifted to selling directly from vessels to achieve best prices where they could. Many inshore fishers in the UK also demonstrated flexibility in marketing; selling catches directly to London-based restaurants and developing personal relationships with head chefs. Moving to higher value, organic products was also a strategy evident in UK dairy and mussels in Emilia-Romagna, Italy, but it was stressed in many cases that this was a difficult undertaking. In fruit – particularly in the case of Serbian raspberries and Belgian apples and pears – producers demonstrated significant flexibility in terms of their production and marketing strategies. Raspberry producers were pressing hard to increase the quantities of fresh raspberries grown for the fresh market, whilst apple and pear producers were adapting/moving to alternative cultivars. Increasingly Belgian apple and pear producers in Flanders were utilising online sales platforms to sell stored produce. There was also evidence of production and marketing flexibility in the case of wine in Italy, where producers were increasingly required to exploit territoriality to market their products in a competitive market.

Technological innovation was a common strategy across the case studies, but particularly evident in arable cases and intensive olive oil production. This reflects the fact that arable farming lends itself to certain types of technology. In the Belgium sugar beet case, technological innovation is seen as the *main strategy* to increase output and counter the increasing cost of production; specifically, it has allowed sugar content to rise from 12 to 20 per cent between 1968 and 2017. Without such advances, sugar beet farming would not have remained profitable. Similarly, in Serbia use of IT and ‘Big Data’ are helping arable farmers increase quantities produced. Many Latvian wheat farmers have also been able to invest in machinery, owing to EU funding. Aquaculture practices are typically small-scale and traditional, with the exception of Recirculation Aquaculture Systems (RAS) in Germany. Whilst RAS is a powerful strategy

for increasing production, it requires a lot of technical expertise, the costs of production are high and they have to comply with a number of complex legal requirements; therefore, RAS enterprises were typically run by pioneers in the field of intensive fish production and the numbers are still very low. In response to their weak position relative to export companies, Serbian raspberry producers in Sumadija and West Serbia were increasingly investing in their own cold storage units. Technological innovation played a particularly key role in terms of pear producers in Italy, allowing producers to orientate varieties of pears grown to the market demand, but critically allowing them to manage pests.

Diversifying income sources – both on and off farm – is another key strategy deployed consistently across the commodity types. Although not as prevalent as other strategies (e.g. reducing production costs), where diversification was occurring it had become vitally important to the producers undertaking it. The main rationale is to reduce vulnerability by no longer relying on one production activity. Amongst Belgian sugar beet producers in Flanders, for example, generating additional income is a common strategy. Often farmers' wives have an additional job and in some cases, farmers may seek a second job themselves. Sugar beet farmers in Belgium are particularly dissatisfied that they cannot make a living from farming alone. In the cases of RAS and carp aquaculture, most producers gain the majority of their annual income from employment in other sectors. Diversification into tourism was a particularly important strategy in the case of Italian fishing where fishing- or pesca-tourism - is seen as a central opportunity to help ensure the ongoing viability of small-scale fishers' livelihoods. In Tuscany, for instance, 70 fishers were supported for carrying out fishing-tourism activity; the Fisheries Local Action Group "Coast of Tuscany" was also established in 2014 to support fisheries and aquaculture, including links with tourism. These activities allow fishermen to integrate and diversify their income as well as provide opportunity for new employment, releasing pressure on fish stocks. Off-farm diversification was also a key strategy for extensive, small olive oil producers in Portugal. We also see examples of crop variety diversification in apples in Belgium and pears in Italy.

Financial management, including working capital and loans, was evident amongst dairy farmers, particularly those in Denmark where farmers relied heavily on loans and credit to sustain their businesses. Danish dairy farmers have a significant income problem, with around 40 per cent of farmers operating in high debt and a deficit on their annual account. Another financial management strategy deployed was in the case of small pelagic fishers in Greece. In this case, family owned fishing businesses are typically unable to get a loan from the bank, so all purse seine vessels are under co-ownership (with a dealer) which is a viable strategy for those struggling to raise the capital. **Insurance instruments** were more associated with arable farms than any other type. In the case of cereals in Ile-de-France, insurance was used to protect against climatic risks, although this is viewed as a controversial option and is adopted by some and not by others. An insurance scheme was also offered to wheat farmers in Latvia but it is not a popular strategy and was only adopted by a small share of farmers.

ii. Markets, contracts and supply chain arrangements

The focus of analysis shifts now to examine market-related strategies that farmers and fishers in the seven commodity groups engage with, in terms of food chains or specific market arrangements that they are part of and sell into.

Market orientation

An important starting point is to review the **main markets** in each commodity sector and then to examine key themes associated with market orientation across the cases. Market arrangements vary across the cases, with some commodities and regions (e.g. dairy and poultry, Denmark) dominated by a few powerful actors and other markets more fragmented (e.g. pears and fisheries, Italy). Extending the analysis in Figure 1, we classify markets and supply chain arrangements at two levels: the *type of sales channel* (individual or collective sales) and the *type of market* (bulk commodity market or segmented quality-orientated market)¹. The distinction between commodity and segmented markets is in terms of the distinctiveness of products according to the method of production, the link to product and place, the knowledge and resources used, etc. Individual sales are direct sales from producer to retailer (e.g. supermarket contract, direct to processor, informal arrangements, such as direct to consumer) and collective sales are sales from farm to a co-operative, producer organisation or buying club (Maye et al., 2018). The SUFISA cases are plotted according to these two dimensions in Table 12. Overall, the case studies are more orientated towards commodity markets (e.g. the three largest case study clusters (arable crops, dairy and fruits) all mostly commodity markets), but we have several cases that target quality and niche markets (e.g. small-scale fisheries and aquaculture). Some commodity reports (e.g. dairy) distinguish between the main commodity market and quality markets (e.g. organic) but for the purpose of this table we document the *main* market channel per commodity.

Table 12 Classifying main sales channel and market-type for the SUFISA case studies

Individual sales	Arable crops: wheat, Serbia	Small-scale fisheries: the UK, Italy and Greece
	Dairy: France, the UK, Latvia	Dairy: Feta, Greece
	Meat: poultry, Denmark	Aquaculture: traditional carp farming, plus some RAS, Germany; mussels and marine aquaculture, Italy
	Fruit: apples and pears, Belgium; raspberries, Serbia	
	Intensive olive oil, Portugal	Wine, Italy
Collective sales	Arable crops: wheat France, Latvia and Poland; rapeseed, Germany; sugar beet, Belgium	Aquaculture: RAS, Germany
	Dairy: Denmark, France, the UK	Montado beef, Portugal
	Fruit: pears, Italy; apples, Poland; apples and pears, Belgium	Extensive olive oil, Portugal
	Commodity market	Segmented market

Results from the **producer survey** are helpful to introduce at this point to determine more concretely preference for sales to individual and collective channels (see Table 13). A total of 2299 farms were surveyed across the case study regions /commodity groups (see D2.4 – Producer Survey Report – for details). The producer survey explored a variety of possible commercial outlets for farmers’ products (fishers were excluded from the survey). Table 13 shows the variety and proportion of sales channels used by surveyed farmers. Overall, *individual sales were more frequent than collective sales*. This is an important finding and these sales are particularly pronounced for some commodity examples (wine,

¹ In reality, often the distinction between the two categories is not so clear cut, as there is a continuum between homogenous bulk commodities on the one hand and differentiated products on the other.

poultry, feta), with milk and olives favouring collective sales as their main market. Overall, despite the efforts to improve cooperation between farmers, one-to-one relationships between producers and buyers were the most frequent across all the sample. The distribution of cases by sale type also reflects the history of the sector/region in terms of co-operative legacy, as explained below.

Table 13 Collective and individual sales channels per commodity

	Arable	Milk	Fruits	Feta	Beef	Poultry	Wine	Olive	All Groups
% of products retained by the farm for self-consumption	14.1%	3.4%	3.5%	3.3%	25.0%	1.0%	31.0%	2.6%	8.9%
% collective sales	35.7%	60.1%	47.1%	16.2%	36.1%	0.0%	19.5%	76.9%	42.9%
Cooperative	26.9%	52.9%	35.6%	16.2%	0.0%	0.0%	0.9%	69.2%	33.5%
Producer organization (PO)	6.1%	4.0%	9.9%	0.0%	8.3%	0.0%	3.3%	2.6%	6.0%
Inter-branch organization (IBOs)	1.3%	2.5%	0.3%	0.0%	0.0%	0.0%	0.0%	2.6%	1.2%
Farmers' union and association	1.5%	0.0%	0.5%	0.0%	25.0%	0.0%	0.5%	0.0%	1.1%
Other collective	0.4%	1.0%	0.8%	0.0%	5.6%	0.0%	7.9%	2.6%	1.1%
% individual sales	61.0%	47.0%	52.4%	83.8%	63.9%	100.0%	77.1%	21.8%	58.1%
Local markets or final consumers	7.0%	0.7%	8.4%	0.0%	13.9%	0.0%	19.6%	2.5%	6.2%
Independent small shops or restaurants	0.9%	0.0%	2.3%	1.4%	0.0%	0.0%	26.6%	2.6%	2.3%
Processors/agri-food industry	27.0%	41.2%	4.6%	77.0%	2.8%	100.0%	3.3%	2.6%	26.8%
Supermarkets/retailers chains	13.2%	0.9%	2.3%	0.0%	13.9%	0.0%	3.0%	0.0%	6.2%
Traders/Wholesalers	9.5%	2.3%	29.2%	5.4%	5.6%	0.0%	18.5%	0.0%	13.1%
Exporters	2.9%	0.9%	2.8%	0.0%	11.1%	0.0%	21.7%	5.1%	3.4%
Other individual	0.6%	0.9%	2.4%	0.0%	11.1%	0.0%	0.3%	5.3%	1.3%
The main sale was to:									
Collectively organised	36.8%	59.4%	51.4%	16.9%	41.7%	2.5%	6.9%	79.0%	43.1%
Individually organised	63.2%	40.7%	48.6%	83.1%	58.3%	97.5%	93.1%	21.1%	56.9%

Data source: producer survey

Arable crops. The arable crops cases are well coordinated (vertically and/or horizontally); sales are mostly to bulk commodity markets; markets are susceptible to price volatility. Wheat producers in France and Latvia and rapeseed producers in Germany sell mostly via co-operatives; the latter then sell to trading companies or processors. Arrangements in the Belgium sugar beet case are vertically coordinated, with farmers selling via one sales channel. In Poland producers do not trust co-operatives and so are less inclined to sell to them but do sell to producer groups. Arrangements in Serbia are less well coordinated as a result of privatisation but sales are mostly to individual buyers.

Dairy. The dairy cases in the UK, France, Denmark and Latvia supply mainly to the commodity market; these channels are increasingly exposed to international market competition. Feta is a more segmented market (PDO label); sales are primarily associated with contracts with individual dairies, although concerns were expressed regarding the low export price for Feta. There is a strong history of cooperation in the dairy sector. Cooperative arrangements dominate in Denmark but other countries have different value chain structuration. UK and French producers supply co-operatives but the market also has individual private sales channels and a more diverse set of market agents (in France, for example, the split is even between cooperative and private dairies and most of the milk is sold undifferentiated, although there are emerging niche markets for organic milk and local, 'pasture milk'); Latvia has private

dairies. Organic milk constitutes a relatively small percentage of the total milk market but is a successful differentiation strategy for some farmers.

Fruit. The market arrangements are quite different for the four fruit cases, although all are mostly commodity-based markets and developing export markets is important. In Belgium the key trend is a shift to individual contract sales for apples and pears, thus reducing the importance and role of co-operative sales channels; in contrast, cooperative market arrangements are important for pear growers in Italy. Market arrangements are less well-structured in the Serbian and Polish fruit cases, largely because both sectors are made up of several small producers (i.e. market fragmentation).

Meat. The market orientation for the two meat cases is very different. The Danish poultry market is highly integrated, with power concentrated at the processing end of the value chain and symbolised by strong vertical coordination. Organic poultry is a more segmented market, but also individual sales-based. The Montado case in Portugal, by contrast, is an extensive production system; it is a highly differentiated quality beef product, with the traditional cow breed protected by a PDO label. Farmers are organised into a strong and well-established network of producer organisations.

Fish. The three fisheries cases (the fishery sector in Tuscany, Italy, purse seine and small-scale fishers operating in Kavala and its neighbouring ports, in Northern Greece, and the Cornwall inshore fisheries sector in the UK), are small-scale industries and highly fragmented from a market perspective. Retailing, especially to supermarkets, is only for very large-scale fisheries. Increasingly many are seeking alternatives, such as direct sales (this channel has the potential for the greatest profit margins), but better local infrastructure is needed. Small-scale fishermen are inherently not collaboration oriented, so arrangements tend to individual sales-based, despite some examples of co-operation. Much of the emphasis is on quota and the catchability of species but the key challenge is product marketability.

Aquaculture. The aquaculture cases supply segmented markets. For traditional carp pond producers in Germany, access to the fish market outside Franconia is difficult. Farmers depend on a few fish wholesalers; that said, cooperative institutional arrangements are evolving around carp production in Bavaria. There are different markets for fish farms using RAS in Northern Germany, including sales through a marketing union for Zander, sales to a co-operative, and a producer-processor enterprise. In Italy, marine aquaculture products are mostly sold fresh and as whole fish, especially to big retailers and wholesalers at regional and national level. Mussel farming in Emilia-Romagna is not organised in producer organisations which creates marketing problems. Tuscany producers are more collaborative and use environmental sustainability for marketing.

Wine and olive oil. The Tuscan wine producers benefit from the reputation of Tuscany as a tourist destination. The sector is increasingly characterised by greater concentration, with vertically coordinated chains operated/facilitated by fewer but larger distributors; this allows producers to be entirely in control of quality of the eventual product by having control *throughout* the supply chain. In the case of Alentejo's olive oil sector, the marketing strategies adopted depend on whether the farm is traditional-extensive, or intensive/super-intensive. Different producers adopt different and competing marketing strategies: intensive producers are independent and vertically integrated; co-operatives are more suitable for extensive producers; intensive olive oil producers target international markets.

We can further classify the main sales channels per commodity cluster according to the market arrangements identified by Gereffi et al. (2005) (see Table 14). This shows the importance of modular markets as an institutional arrangement and mechanism for supply chain coordination. In other words, producers in individual or collective arrangements are increasingly making and supplying food products to a customer's given product specification. Serbian raspberry growers, for example, to access the frozen market, selling mostly for export, have imposed standards. Relational markets between producers and co-operatives and processors, as well as forms of direct marketing, are also prominent (in these arrangements interactions are more intense and frequent). We still observe examples of market sales, especially in the fishing case studies. The 'hierarchical structure' of vertical integration, where everything is in one firm (Gereffi et al., 2005), is not evident in the cases.

Table 14 Comparing market arrangements for the commodity case studies (cf. Gereffi et al. 2005).

	Market	Modular	Relational	Captive	Hierarchy
Arable crops					
Sugar beet, Belgium		X			
Wheat, France	X	X			
Wheat, Latvia		X			
Wheat, Serbia	X	X			
Wheat, Poland	X	X			
Rapeseed, Germany	X	X			
Dairy					
Milk, UK		X	X		
Milk, Denmark		X			
Milk, France		X	X		
Milk, Latvia		X			
Feta, Greece			X		
Fruit					
Apple & pears, Belgium	X	X			
Apple, Poland	X	X			
Pears, Italy		X	X		
Raspberry, Serbia		X			
Meat					
Beef, Portugal		X	X	X	
Poultry, Denmark		X		X	
Fisheries					
Inshore fish, the UK	X		X		
Inshore fish, Greece	X				
Inshore fish, Italy	X		X		
Aquaculture					
Mussels, Italy	X				
Marine aqua, Italy			X		
RAS, Germany	X	X			
Carp farming, Germany		X	X		
Other					
Wine, Italy		X	X		
Olive oil, Portugal		X	X		

What we observe then are supply chain arrangements where producers have 'modular agreements' in food chains and in many cases relations are coordinated by different forms of contracting (cf. Grandori, 2015). In some cases, there is a resistance to vertical integration in the supply chain. In Belgium, for example, retail concentration is very high but stakeholders were not supportive of the idea of long-term vertical relationships with supermarkets as the solution, because of a lack of trust and concerns that

supermarkets would create strong competition between producers. That said, there is a lack of trust in co-operatives and some farmers are leaving them (see below) but they are still viewed as essential.

Having described the nature of the market for the seven commodity clusters, we examine now three themes that were significant in terms of market orientation. The first theme concerns the role of **quality standards and certification**. Quality standards and certifications are employed in different ways. For instance, organic certification is important, particularly in the dairy sector, where some farmers in the UK and Denmark have differentiated themselves from the mainstream conventional milk market (Thorsøe et al., 2018). Labels of origin have helped to differentiate products, as noted in the case of pears in Emilia-Romagna (PGI), wine and marine aquaculture ('Made in Tuscany'), carp in Bavaria (PGI label) and Montado beef. Voluntary standards are important as a strategy to help producers access new international markets e.g. raspberry producers in Serbia have used international certification to improve the homogeneity of their product and to comply with non-tariff sanitary and phyto-sanitary measures. Standards are also used to improve sustainability e.g. sugar beet, Belgium; aquaculture, Italy.

The second theme is **market segmentation**. A lack of competitiveness on international markets limits opportunities for producers e.g. feta, Greece; inshore fisheries, the UK. Market segmentation has been adopted to improve market access. Local direct sales and sales to local restaurants and schools have worked in some cases e.g. fisheries in the UK, as well as new market opportunities for quality products in the wine and fisheries cases in Italy via strategies of territorialisation, quality branding and integration with short chains and local-based networks. The development of fishing tourism has been particularly important in Italy. The idea of trying to develop a local story is considered important. In the oilseed rape case in Germany, farmers have adopted strategies for the financial compensation of environmentally friendly performances, e.g. cooperation with a local water supplier who compensated farmers for applying reduced nitrogen levels. Biomass energy was viewed as an alternative and potentially lucrative option for Polish wheat producers (in response to the threat from cheap grain imports). Another strategy focuses on better ways to communicate with the public, including ways of self-marketing. Organic production is notable in this regard e.g. the dairy cases in Latvia, Denmark and the UK and the development of an organic wheat market in France to access associated premiums.

Adding value is the third theme. This strategy is essential in some cases e.g. inshore fisheries in the UK and Italy (Tuscany); olive production in Portugal; raspberries in Serbia. In Serbia developing a fresh fruit, rather than simply frozen fruit, market is important, because the former has the potential for greater value added. For the fishing examples, for instance, there is a necessity to add value in order to remain viable. Fishers need to develop a greater sense of entrepreneurialism and to actively develop their own markets. For many fishers, selling their fish at harbour-side is all they really consider in terms of markets. Nevertheless, there is evidence that more and more fishers are seeking to access Cornwall's local markets, and to use social media to make direct contact with buyers and to cut out the middleman, with some now selling directly to buyers in London. In this respect, the catch of inshore fishers was recognised as having the potential to be of the very highest quality available, although this necessitates that the fishers involved look after their fish and develop a good relationship with the head chef or dealer (i.e. develop relational, personalised markets).

The nature of sales agreements and the role of contractualisation

Sales channel arrangements can be different in type and duration, and agreements can also contain different characteristics or rules. Data from the **producer survey** give a useful overview of arrangements in each commodity group. As we can see from Table 15, the most prevalent type of agreement is the **formal agreement** that is signed before the delivery of a product and is limited in duration to a single delivery e.g. a contract that can be legally enforced. However, each commodity group displays significant differences in how arrangements are configured, except for arable crops. In the case of milk and poultry, for example, the formal agreement has a duration of more than 5 years or 12-24 months, respectively. In dairy establishing a system of production is time consuming and milk is a perishable product that requires processing in a short time period, reflecting the need for fairly consistent arrangements. The most prevalent arrangements in the fruit, beef and olive groups are rules of membership to a collective organization (also called associational contracts), while informal agreements of short duration are frequent in the feta cheese and wine commodity groups.

Each agreement can also contain specific attributes or rules, which indicate more or less vertical coordination in the supply chain (see Table 16). The provision of logistical services by the buyer is a common attribute across all commodity groups, concerning 63% of sales, and are particularly notable in the dairy (milk and feta cheese) and poultry cases. Other services such as managerial or credit assistance occur in specific sectors, such as dairy, arable and poultry farming.

How prices are calculated is a critical element of sales channel agreements, directly affecting the profitability of producers. In the survey the most prevalent price basis were variable prices, depending on the quality delivered (about 69%) and on the market price at the moment of delivery (about 62%). Producers are mostly paid after delivery (for further details see also D2.4).

Contracts are important instruments of supply chain governance. There are examples of production contracts with individual buyers (e.g. apples, Poland) and with producer organisations (e.g. rapeseed, Germany; sugar beet, Belgium) (see also Maye et al., 2018). Commodity sectors (notably dairy and sugar beet) that reduced intervention measures (i.e. quota) are using production contracts as instruments of self-regulation to manage production volumes on markets. For example, sugar beet marketing in Belgium is regulated by *inter-professional agreements* between the refinery and the producer organisation. Contracts often require specific standards of production. In the wheat case in France, for example, *direct supply contracts* have been created between co-operatives and processors whereby specifications can be clearly demanded (i.e. modularity). **Production contracts** are particularly noted in the **dairy** cluster as an instrument for farmers and processors to adopt to market conditions. Different contracts are emerging: in the UK processors use *A and B pricing* (they are designed to discourage overproduction beyond the agreed volume) and in France some dairy farms are encouraged to decrease production. Other pricing mechanisms were also noted: cost of production plus (in the UK they are applied in supermarket-aligned contracts (10% of farmers)); formulaic or basket pricing (where dairy farmers are offered one price for their milk for a period (this is used by Arla, for example). Different arrangements have emerged to manage volatility e.g. Danish farmers expand production and French farmers adopt voluntary quota (Thorsøe et al., 2018). Processor strategies directly influence how farmer decision making is done and influenced.

Table 15 SCA types and duration by commodity group (percentage of farmers per group and all groups)

	Arable	Milk	Fruits	Feta	Beef	Poultry	Wine	Olive	All Groups
Type of agreement:									
Formal agreement before the sale	39.5%	55.0%	22.1%	42.5%	5.9%	100.0%	4.2%	17.7%	37.9%
Formal agreement at the point of sale	16.4%	4.1%	9.6%	0.7%	17.7%	0.0%	10.4%	5.9%	10.1%
Informal agreement before the sale	8.5%	6.2%	19.7%	49.3%	17.7%	0.0%	29.2%	5.9%	14.2%
Informal agreement at the point of sale	18.5%	1.9%	12.9%	7.5%	23.5%	0.0%	56.3%	8.8%	13.7%
Membership rules	7.9%	32.8%	35.7%	0.0%	35.3%	0.0%	0.0%	61.8%	20.8%
Two contracts	9.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.3%
Duration of the agreement:									
Only for this sale	50.4%	4.0%	32.0%	0.0%	61.8%	0.0%	50.5%	34.3%	29.9%
Less than 3 months	4.0%	1.4%	1.1%	1.4%	0.0%	0.0%	7.4%	2.9%	2.4%
3 to 6 months	11.4%	3.6%	3.7%	2.7%	11.8%	10.3%	1.1%	0.0%	6.2%
7 to 12 months	27.4%	19.3%	11.4%	71.6%	11.8%	7.7%	23.2%	11.4%	23.4%
13 to 24 months	3.5%	18.5%	4.6%	5.4%	0.0%	79.5%	5.3%	2.9%	9.0%
25 to 60 months	1.7%	9.4%	3.5%	0.7%	0.0%	0.0%	7.4%	2.9%	4.2%
More than 5 years	1.6%	43.8%	43.7%	18.2%	14.7%	2.6%	5.3%	45.7%	25.0%

Data source: producer survey.

Note: A significant proportion of farmers surveyed in the beef case in Portugal have multiple customers – here we consider only the main market channel.

Table 16 SCA attributes by commodity group

	Arable	Milk	Fruits	Feta	Beef	Poultry	Wine	Olive	All Groups
Exclusivity of sales	19.1%	65.2%	52.5%	53.7%	21.2%	100.0%	21.9%	57.6%	44.6%
Penalties on the farmer	26.8%	19.8%	21.5%	4.3%	9.7%	5.0%	7.3%	3.0%	20.0%
Safeguards against buyer failure	33.2%	43.0%	18.2%	3.7%	9.7%	0.0%	19.2%	25.8%	27.7%
Price premiums for higher quality	59.4%	82.4%	30.8%	20.3%	28.1%	92.5%	16.0%	51.5%	53.0%
Interests for delayed payments from the buyer	23.0%	6.1%	5.4%	2.1%	3.1%	0.0%	7.5%	9.1%	10.9%
Services (collection, storage, transport, handling, etc.)	56.5%	89.5%	47.3%	79.1%	45.5%	92.5%	24.1%	24.2%	63.0%
Managerial and technical assistance	28.8%	53.7%	20.8%	10.8%	42.4%	51.3%	7.7%	36.4%	31.8%
Credit assistance	18.4%	11.1%	10.2%	6.2%	12.1%	2.5%	11.7%	10.0%	12.7%
Special assets, technology and/or machinery	9.4%	6.3%	12.3%	30.6%	9.4%	0.0%	3.9%	15.2%	10.7%
Automatic extension of the agreement	8.0%	61.3%	15.8%	25.0%	12.5%	97.4%	11.0%	35.7%	27.4%

Data source: producer survey.

Most of the contract examples relate to the bulk commodity market, but there are a few examples where contracts are used for speciality products e.g. aquaculture producers selling to restaurants in Germany. The other strategic issue is the use of **market data and futures contracts (i.e. hedging)**. This was evident in the UK dairy sector. Some argued farmers should use market information to their advantage. Although these data are widely available, and can be used to improve farmers' bargaining power, a number of interview participants noted farmers' lack of engagement with such material.

Collective arrangements and co-operation

Co-operatives and **producer organisations** are an important means to help improve the market power and income stability of individual producers (Veerman et al., 2016). The SUFISA data support this view to some extent (Table 13) but there are contextual factors to consider. For instance, there is a culture of co-operation in some regions and sectors (e.g. dairy in Denmark and France; small-scale traditional olive oil production in Portugal; wheat in France and Latvia; wine in Italy; aquaculture in Germany); in contrast, co-operation is more difficult to achieve in other cases because of a distrust in co-operation and/or it is not traditionally how respective supply chains are organised e.g. fisheries in Greece and the UK; wheat in Serbia and Poland; poultry in Denmark; apples in Poland; raspberries in Serbia. In the case of pear production in Italy, co-operative arrangements constrain management decisions at the farm-level; in the wine case in Italy collective producer networks are becoming more important as mechanism to increase the bargaining power of wine producers at different scales e.g. Biodinamica Lucca. In Poland, co-operatives are critical for apple producers in allowing access to large supermarket chains and subsequently to overseas markets, in aggregating the outputs of large numbers of small-scale producers. Co-operatives have historically been important in Belgium too, although increasingly farmer trust in co-operatives has diminished. There is a feeling amongst many farmers that due to the merger of co-operatives, there are effectively only two very large co-operatives remaining and that the voices of individual producers are being lost. As such, more and more farmers are leaving fruit co-operatives in Flanders and signing direct individual contracts with traders or retailers. Co-operative membership is viewed as being too expensive and inefficient, with supermarkets perceived as offering better prices, although this is not confirmed by the survey. These arrangements are complicated by history e.g. in Serbia the co-operative model dominated the socialist era and is now less favoured.

There are different co-operative arrangements, promising examples and debates emerging in specific commodity clusters. In the **fruit sector**, **producer organisations** have a strong presence – they have been important since the establishment of the Common Market Organisation in 1972, particularly in terms of marketing producer output and matching production with demand. POs remain the main instrument of European policy for the sector. Developing new markets is very important because of the Russian embargo and the imposition of phytosanitary barriers (non-trade barriers), not to mention the dominant position of retailers in value chain. Policy support for fruit growers in both Italy and Belgium has been considerable. Two institutional arrangements are worth particular mention.

- The first is **O-pera**, an organisation that involves exclusively Italian fruit growers specialised in the cultivation of pears. It represents more than 1,000 pear fruit growers, with the support of agronomists and technicians. The aim is to aggregate diverse existing groups and to concentrate production and thereby improve both quality and negotiation power. Each O-

pera pear follows a precise path, from cultivation to packaging. There is a focus on developing new varieties which are more attractive to the consumer. The idea is to open up new markets and market opportunities.

- The second is the work of the **Association of Belgian Horticultural Auctions** (*Verbond van Belgische Tuinbouwveilingen* (VBT)), which has been working to increase access to new markets by putting pressure on the Flemish and EU governments to increase the speed of bilateral trade negotiations. VBT has also lobbied for financial support for those growers most deeply affected by the Russian boycott.

There was significant discussion about farmer co-operation and strategies to improve farmers' bargaining power through co-operative governance and the development of producer organisations (POs) in the **dairy cluster**. Dairy co-operatives perform differently in specific national contexts.

There are also examples of failed co-operatives. In France small dairy co-operatives have been squeezed out by larger co-operatives; the trend in Denmark is the opposite (for details see Thorsøe et al., 2018). In Latvia co-operation was identified as one of the main solutions to the crisis. It was argued that solutions should be approached at a sectoral level, giving preference to collective strategies. There was a commitment to co-operative models, even though farmers recognised that some had now become quite large and in some case expressed significant concerns about their governance. In Greece co-operatives were viewed by producers as part of a clientelistic system, that had created corruption and led to the detachment of producers from co-operatives. In France farmers expressed the view that co-operatives were becoming bigger and bigger, with farmers feeling they have no control anymore over co-operative governance; dairy farmers tended to feel "trapped" in their commercial relationship with dairies, be they co-operatives or private dairies. They felt they had weak bargaining power. Farmers suggested it would be useful to combine POs in one single regional federation for the western part of France to create better leverage and bargaining power. In the UK there has been limited uptake of the PO option, but farmers participating in the Dairy Crest Direct DPO, the only one running in the UK, felt it was beneficial. Farmers argued it was the next best thing to a co-operative; however, it was recognised that the scheme was rather cumbersome (at least as implemented). Moreover, although there is only one DPO, a number of milk pools set up by other dairies were effectively running as DPOs, but without the formalised governance structure.

There are interesting examples of collective action in the **arable crops cluster** e.g. strengthening the *sugar beet syndicate* via the Farmers' Union was seen as an effective response to generate additional income in Belgium; the '*protein plan*' in France is a collective action that incentivises increased protein content and as a consequence enable farmers to compete with Black Sea and Eastern European producers. In Poland, producer groups provided wheat farmers with a better bargaining position. However, whilst operating collectively within a producer group was commonplace in Polish arable farming, the future of producer groups is unknown, owing to the strength of individualistic values. Some Polish farmers have started to sell their wheat directly to a grain elevator. This has allowed farmers to be responsive to price and was considered an ideal channel for medium-size farms. The emergence of farm co-operatives in Latvian grain markets has meant that grain prices have become more transparent, and farmers feel that their voice is louder and better heard.

As noted earlier, **small-scale fishermen** are inherently individualistic. This was the case across all three case studies. Some minor examples of cooperation are starting to happen, with the aim of increasing profitability. This is both vertically and horizontally. There are some good examples in Cornwall and in Kavala, Greece. In Greece, fishermen in the focus groups stated that they are helpless and defenceless since the state dismissed their federations and the confederation of coastal fisheries. Now their interests are represented through the *Union of Coastal Fisheries Clubs*, but there are doubts that inshore fishers actually ever make use of this facility. By contrast, the *union of purse seiners and trawlers* is active in promoting their interests. For the last two years, purse seiners in Kavala (the whole fleet), have also been trying to get *MSC certification* for their catch of sardines and anchovy. This collective initiative has been received in a favourable manner by consumers and adequately promoted by the retailer. The Fisheries Local Action Groups (FLAG) in Tuscany and Cornwall have also played an important role, especially for local markets.

Informal arrangements

Informal arrangements are also evident, often as a combination of formal relationships (via contracts, for example) and informal relations (trust-based relationships, usually formed as a result of long-term repeated interactions). In dairy, for example, especially in the French case study, *collaborative learning* was important. For feta producers in Greece, for example, the prevailing arrangement is an individual transaction with a single dairy. The importance of informal arrangements was emphasised too in the three inshore fishing examples, particularly new direct sales arrangements.

iii. Political support, and social and environmental sustainability

This section of the comparative report covers the strategies associated with political support, as well as social and environmental sustainability. Access to those in power to make decisions – **lobby access** – is mentioned in a number of cases. In the French wheat case, producers were identified as developing collective level strategies that included lobbying policymakers in order to defend their interests. Nevertheless, despite their access to the power brokers in Paris, they still face a range of issues. There are also concerns that particular sectors are not given a high enough priority. In the Polish apple case, for example, despite the importance of the sector there is a need for a more coordinated state policy for the sector, including developing greater ‘economic patriotism’. Different policy-making levels, most notably in Germany, can also lead to a disconnect in policy aims and outcomes between the different levels.

The **fragmentation** of a number of the sectors creates problems in relation to accessing and influencing decision-makers, which is often addressed through the **development of co-operatives or producer groups**. In Latvia, for example, grain co-operatives, agricultural associations and NGOs are actively involved in policy dialogue and lobbying. To some extent this seems to work, although these groupings do not always represent all of those involved. This was particularly highlighted in the fisheries case studies, where larger fishers' voices are heard (e.g. trawler boats), but not those of the smaller fishers; similarly, the Latvian case study suggests that regulations tend to be made with the bigger farmers in mind. Partly as a response to this, there are calls made in a number of the case studies for greater **transparency and participation** in the policy-making process. There are also concerns across a range of the case studies that in some cases co-operatives are getting so large (which

may give them greater lobby and marketing power) that they are losing sight of the interests of their individual producers e.g. in Belgium fruit; and French, Latvian and Greek milk producers.

Training, advice and investment in research and development is likely to be important to some extent across all sectors, although was specifically mentioned in a number of case studies. In the Latvian wheat example, joining the EU was considered critical in terms of enabling finance, investment and subsidies into the sector. Similarly, investment in Serbia by the government is intent on enabling their producers in both the sectors covered (wheat and raspberries) to harmonise their standards for EU membership. This includes improvements to infrastructure, **improving educational standards** in rural areas, enabling high quality production (including organic production), providing support for insurance, credit support, developing a public warehouse system (for the wheat producers), increased investment in their technical and advisory services, and the development of new varieties (in the raspberry case study). **Collaborative learning** was also mentioned as being important in a number of cases (e.g. the French and UK dairy CS), particularly in terms of improving the efficiency of the systems involved and to help producers add value to their products.

In the Belgium apple and pear study, the focus is on **developing new cultivars** in order to respond to **changing consumer tastes**; whereas in the Italy fruit case study there are calls for more R&D money into the development of new pesticides to counter emerging threats. The aquaculture sector in both Germany (especially the RAS sector) and Italy has received notable technological support in order to aid its development, not least in terms of minimising its environmental impact. In France, growing concerns about competition from the Black Sea wheat producers in terms of protein content, has led to the development of a 'protein plan' that is intended to increase the competitiveness of French wheat growers in this case study area. In the Greek feta case, improved training, advice and technical support has been provided in order to improve product quality.

Subsidies are also important to some of the sectors studied. This is most obviously the case with the Montado meat system in Portugal, where commonly up to 60% of the total net farm income is from **CAP subsidies**, leading to concerns about how the sector would cope if subsidies were to be reduced. In relation to sugar beet production in Belgium, the minimum price of sugar beet (set by the EC) has been reducing since 2006, and the termination of the quota system in 2017 threatens this further. The amount of direct subsidy support received is contentious in some contexts, in that it has a distorting effect on land prices. There is also a concern that it should not be necessary to provide farmers with **subsidies** in order to guarantee their continuation in farming. In the French wheat case, producers are planning on the basis of a gradual reduction in the subsidies received. **Subsidies** are particularly important in both Latvia (as a result of access to the EU) and Serbia in anticipation of joining the EU. Wider government support for the development of the agricultural sectors in these two countries has been mentioned above, but grants have also been critical to the development of on-farm infrastructure in Serbia (including through a USAID Agribusiness Project (2007-2012), for example, and the setting up of producer groups in Poland. Funding through the EMFF has been important in terms of developing aquaculture in both Italy and Germany, made available through the EU because one of the aims of the CFP is to boost aquaculture across the EU. **Foreign direct investment** (by investors from Spain), coupled with governmental water and irrigation policies, has also been central to the development of intensive olive oil production in Portugal.

Government support for the **development of markets** has been identified in a number of the cases as being important. In the German oilseed rape case study, support has been provided for the development of a **regional marketing strategy**. In Latvia, there has been support for the development of a **local dairy brand**, linked with strategies intended to contribute to **territorial strategies**. In both the UK and Italy fisheries case studies there is an acknowledgement that although fisheries may make a tiny contribution to the overall GDP, they are nevertheless of great significance at a local level: in economic terms, but also cultural, social and environmental terms. As such, there is strong support through the FLAG in both places for the development of markets for their products. Key to this is giving the fish a 'story', linking it to the place where it has been caught. This is important in terms of accessing international markets, but also crucially in terms of **encouraging domestic demand**. In Tuscany, there is also support for extending the markets fishers can access through developing pesca-tourism; similarly, in Cornwall there is support for fishers to better access the large tourist market, while at the same time the **tourist offer** is enhanced by vibrant fishing communities. In the Montado meat case in Portugal, there is also recognition that it should be supported as a **regional asset** for sustainable development, notwithstanding that the market price currently achieved generally fails to recognise this. In contrast, the Danish meat example, which is highly industrialised and globally oriented, makes a minimal contribution to the local/regional economy. EU geographical indications (e.g. PDO and PGI) are important in providing support for **territorial and regional development**. In the Tuscany wine case, the PDO status has been very important in helping to establish a **strong identity** in international markets. At the same time, the local RDP has ensured that the importance of wine at a regional level is also recognised, helping to encourage investment. PDO certification is also important in the feta case study in Greece, although there are concerns that the regulations are not sufficiently well policed.

Developing new markets, both national and international, is particularly highlighted in the fruit case studies. Raspberry production is the most important fruit sector in Serbia, contributing a high share of the total agricultural export from Serbia and accounting for 21% of the entire world production of raspberries. Currently, most the crop is exported frozen, but much higher prices could be achieved for fresh raspberries. As such, there is considerable government support for the **development of new varieties** that will enable more of the crop to be sold, and at higher prices, for export. In the Belgian case there has been much research effort to **develop new cultivars** that are more attractive to the tastes of the **modern consumer**. There is also an emphasis on high quality produce for export markets. The governmental promotional campaign has been critical in this regard, as has the work of VBT in the development of **new export markets**, including putting pressure on both the national government and the EU. Similarly, in Italy, where there is a recognition that many of the older varieties are no longer favoured by the modern consumer and that more needs to be done to make Italian fruit more attractive to, and recognisable by, Italian consumers. The O-pera cooperative initiative is very important in developing new markets. In Poland there is criticism that the government is not doing enough to promote Polish apples and that there is a need for more 'economic patriotism' that can help support **domestic markets**. The need to better **educate consumers** about what is produced in their own country was echoed in a number of the case studies. Despite a range of efforts to develop international markets, this is fraught with difficulties, not least in terms of phytosanitary barriers and the fact that there is an oversupply of both apples and pears on the world market.

Farmers in the producer survey were asked to evaluate how much, in their opinion, their current supply chain arrangement contributes to sustainability. Sustainability was evaluated in terms of

environmental, social and economic sustainability. Four components were identified for each dimension of sustainability. For each component respondents were asked to assign a score from 1 (strongly disagree) to 5 (strongly agree) regarding the potential impact of sustainability to the sales agreement/membership rules (if part of a collective organization) (see Table 17). Feta cheese agreements scored the lowest (based on producers own self-evaluation); beef and olive commodity groups scored their arrangements most favourably. Maintaining biodiversity and securing a successor scored the lowest as specific sustainability challenges; interestingly, maintaining profitability scored the highest; the overall scores are all close to the midpoint, (i.e. neither agree/disagree).

Table 17 Farmer perceptions of the environmental, social and economic sustainability of their current supply chain arrangement

	Arable	Milk	Fruits	Feta	Beef	Poultry	Wine	Olive	All Groups
Environmental sustainability									
Maintain biodiversity	3.02	2.68	2.62	1.83	3.94	2.67	3.86	3.82	2.82
Support animal welfare	2.27	3.71	2.22	2.44	4.38	3.90	n/a	3.70	3.25
Maintain water quality	3.01	3.46	2.66	1.55	4.13	1.89	3.44	3.94	2.98
Maintain soil organic matter	3.42	3.20	2.72	1.92	4.09	2.65	3.89	3.92	3.13
Social sustainability									
Create a good connection with buyers and input providers	3.51	3.28	3.18	1.94	3.94	3.49	3.94	3.97	3.30
Connect with other farmers	3.51	3.43	3.34	1.91	3.72	3.55	2.67	3.97	3.33
Achieve societal recognition of your farming activities	3.24	3.18	3.13	1.86	3.59	2.34	3.10	3.86	3.10
Secure a successor	3.05	2.66	2.88	1.68	3.77	2.27	3.77	3.82	2.86
Economic sustainability									
Maintain profitability	3.63	3.31	3.16	3.88	4.49	3.41	3.52	4.13	3.48
Invest in the farm business	3.43	3.01	3.06	2.93	4.00	3.18	4.03	3.82	3.24
Sell the products in periods of greater difficulty where prices were low	3.02	3.15	2.91	2.10	3.36	2.90	3.41	3.53	2.99
Cope with changing market conditions	3.28	3.34	3.14	2.07	3.78	3.42	3.38	3.81	3.20
Overall Sustainability (Avg.)	3.29	3.21	2.99	2.21	3.93	3.12	3.54	3.85	3.15

Data source: producer survey

Note: The sustainability scores were assigned by farmers during the survey (i.e. self-assessment).

These points were further examined in the qualitative datasets. Engagement with **social and environmental sustainability** varied across the case studies. In the dairy case studies, it was highlighted that there are a whole range of environmental regulations (such as nitrate vulnerable zones) which have resulted in very considerable costs and restructuring, as well as fundamental changes to policy targets (e.g. in Denmark). In this respect, that wider sustainability issues are not generally seen as a specific strategy, but rather as a **response to obligations**. However, amongst the fruit case studies (especially the Italian case) there are concerns about the amount of chemicals needed to reduce pest damage to their crops, and the risk to the environment as a result. Hence the

desire for more research and development into this, as mentioned above. In both the olive oil case in Portugal and the wine case in Italy, **environmental sustainability** is seen as critical. In the Tuscan wine case, climate change represents a major threat; there is also concern about the health of the soil and biodiversity in terms of helping to ensure high quality wines. Related to this, there are concerns about the **health of consumers**, and the need to reduce sulphites and chemical inputs. Similarly, in the intensive olive oil case study in Portugal, where there are concerns about the amount of water being used for irrigation, as well as the impact on the **social sustainability** of many local communities, whose cultures are rooted in traditional, extensive farming systems. In the Montado beef example in Portugal it is clearly recognised that it is **important socially** in terms of its traditional systems, but at the same time frustration that neither the social nor environmental benefits are sufficiently noticed by the price received in the marketplace. It is also acknowledged as being a **regional asset for sustainable development**. The strategy promoted going forward is that of 'sustainable intensification', which involves a simplification and specialisation of an otherwise multifunctional system. There are concerns that a failure to view and support the system holistically (such as an almost exclusive focus on trees) may be to the detriment of the system.

Social and environmental sustainability are particularly important in both the aquaculture and fisheries cases. As mentioned above, the fisheries studied within SUFISA are small-scale in terms of overall GDP but are of very considerable significance in **socio-economic terms** at a local level. As such, they have received a range of support, as outlined above. In addition, fisheries are intrinsically dependent upon the environment for their continued existence. In the first instance this is in terms of marine stocks and the dangers of overfishing, but also eutrophication, habitat loss, biodiversity, pollution, global warming, acidification and extreme weather. The latter three items are global issues, but many of the issues are being addressed / need to be addressed through the CFP. This was something raised in the UK fisheries case in relation to how important it will be to ensure coordination across European fisheries, even once the UK leaves the EU. Finally, the aquaculture examples highlighted the pressures faced by this sector in relation to potential damage to the environment. There was recognition that the sector in general now has an image problem as a result of a range of negative publicity about the impacts of the production processes used (or at least perceived to be used). Consumer trust has been damaged and there is a need to rebuild this trust through **consumer education** and better communication processes (such as the use of social media), which is starting to happen. This includes **highlighting the quality and environmental sustainability** of the modern processes, especially in relation to the levels of **technology** used in the RAS system in Germany. The traditional nature of carp production in Germany is also being highlighted, linking it to tourism and improving its image. In Tuscany specific links to the territory of production are also being made.

iv. Combinations of conditions and strategies (CSP inventory)

We conclude this section on producer strategies and supply chain arrangements with further analysis of CSP inventory data, in this case to identify combinations of conditions and strategies across the commodity groups. The inventory data are examined to identify trends in terms of favoured strategies in response to given conditions across the sectors. Table 18 contains pairwise correlations (and the associated significance level) between each condition and each strategy listed in the CSP inventory. Correlations are on the interval [-1 ; 1] where *correlation (Condition₁ ; Strategy₁)* = 1 reflects an exclusive relationship, i.e. Strategy₁ is the only answer to Condition₁ and Strategy₁ is never mentioned

for any other Condition. A correlation of -1 reflects the reverse, that is, when one is mentioned (eluded), the other one is systematically eluded (mentioned). The closer the correlation is to zero, the higher the noise in the answers associated to both items. Correlations thus reflect the exclusiveness of the relationship meaning that it takes into account both the appearance of the link (*Condition_i ; Strategy_j*) and the number of alternative links for a given *Condition_i* and *Strategy_j*. The higher correlation between (*Condition₂ ; Strategy₃*) as compared to (*Condition₁ ; Strategy₁₃*) in Table 16 reflects, for example, the fact that the “Focus on Environmental Issues” is more exclusive to the “Environmental” condition than the “Market Orientation” strategy is to problems associated with “Demand”. “Market Orientation” is a strategy that is used to answer a number of conditions. To help draw general observations, we also combine the information contained in table 16 with observations from a table of two-way frequencies between conditions and strategies (see Figure 2).

Based on the analysis described above (summarised in Table 18 and Figure 2), and further searches in the CSP inventory cross-referenced with earlier analysis of CSP data across the regions (Bundhoo et al., 2018), the following six observations emerge from the inventory data regarding combinations of conditions and strategies. Firstly, **market orientation** is an answer to many conditions (Table 18). This outcome might be driven by the relatively vague characterisation of this concept as compared to other strategies. Hence this strategy is used to cope with issues of market access, problems on the demand side, price levels and volatility and regulation and policy. This strategy is the most frequently mentioned for all sectors except for the arable crops and the meat sector, which predominantly rely on **collective arrangements**. Interestingly the latter strategy is mainly used to cope with price levels and volatility but also market access, which are the most important issues that both sectors face. The second point is that **contractualisation** is also used as a way to keep prices relatively stable and to control volatility. This strategy is mainly used in the fruit sector, but it ranks as a second strategy after the pure market strategies. Thirdly, **environmental issues** are only mentioned within the fish sector with no other strategies directly targeting them. Fourthly, **diversifying income sources and extensification or even downsizing** score relatively highly, and most strikingly they appear to be strategies deployed to cope with many different issues such as environmental ones but also price levels and volatility and factor and market access issues. Interestingly these strategies are mentioned within all sectors. Fifthly, **intensification and specialization** are more or less equally mentioned but only as answers to two main issues, which are price levels and volatility and regulation and policy issues. This strategy is equally mentioned by all sectors, but as a secondary option. Finally, the search for **subsidies** are also used for the whole set of conditions mentioned and used by all sectors.

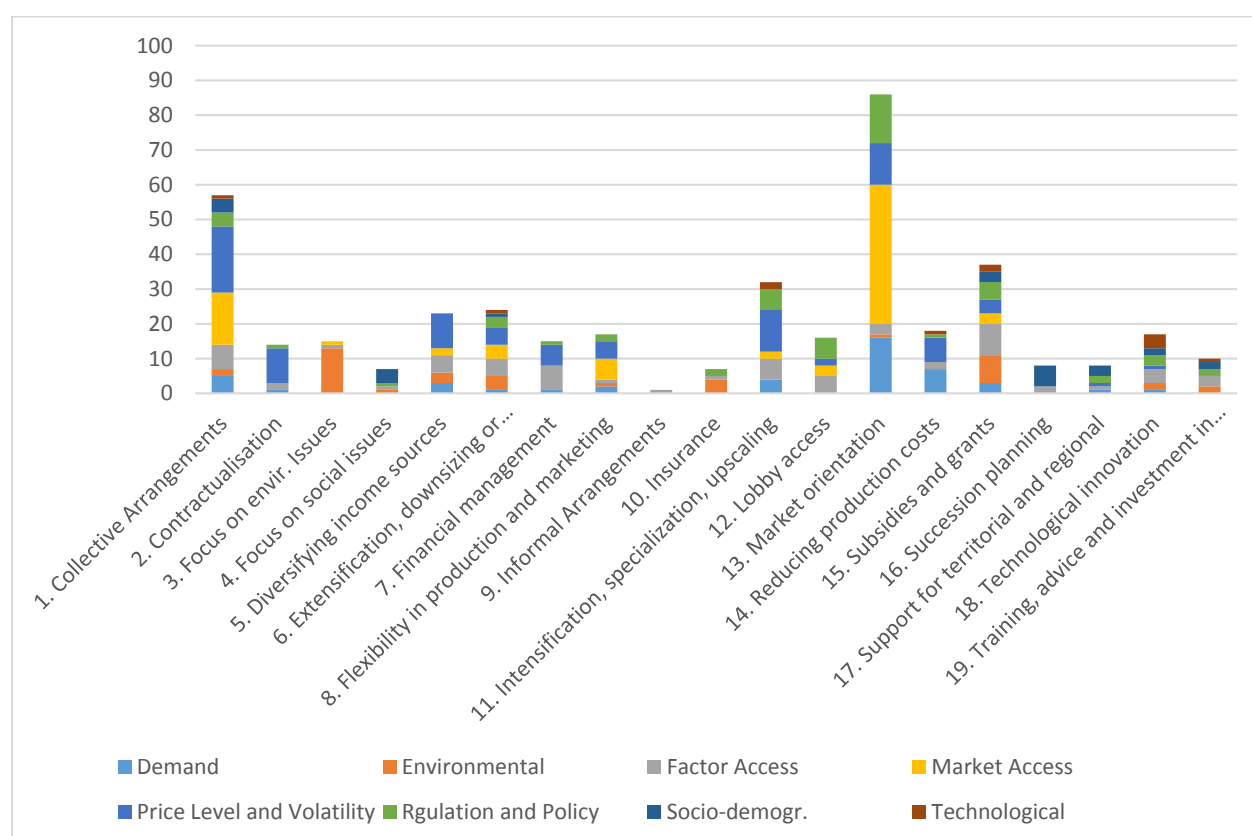
Table 18 Pairwise correlation between conditions and strategies

		Conditions							
		1.	2.	3.	4.	5.	6.	7.	8.
		Demand	Environmental	Factor Access	Market Access	Price Level and volatility	Regulation and Policy	Socio-Demogr.	Technological
Strategies	1. Collective Arrangements	-0.0257 0.5927	-0.0789 0.1005	-0.0450 0.3492	0.0711 0.1392	0.1000 0.0373	-0.0617 0.1996	0.0128 0.7900	-0.0283 0.5564
	2. Contractualisation	-0.0217 0.6527	-0.0590 0.2202	-0.0113 0.8143	-0.0888 0.0646	0.2133 0.0000	-0.0283 0.5570	-0.0470 0.3284	-0.0321 0.5050
	3. Deliberate focus on environmental issues	-0.0659 0.1703	0.4995 0.0000	-0.0505 0.2941	-0.0599 0.2127	-0.1022 0.0333	-0.0706 0.1422	-0.0487 0.3111	-0.0332 0.4897
	4. Deliberate focus on social issues	-0.0446 0.3538	0.0212 0.6599	-0.0079 0.8691	-0.0623 0.1955	-0.0691 0.1504	0.0081 0.8662	0.2699 0.0000	-0.0225 0.6402
	5. Diversifying income sources	0.0169 0.7262	0.0291 0.5456	0.0327 0.4963	-0.0627 0.1921	0.1182 0.0137	-0.0882 0.0663	-0.0609 0.2052	-0.0416 0.3877
	6. Extensification, downsizing or abandonment	-0.0519 0.2809	0.0597 0.2144	0.0276 0.5664	-0.0151 0.7534	-0.0101 0.8336	0.0021 0.9647	-0.0206 0.6690	0.0166 0.7298
	7. Financial management	-0.0253 0.5985	-0.0611 0.2038	0.1530 0.0014	-0.0920 0.0555	0.0788 0.1010	-0.0320 0.5055	-0.0487 0.3111	-0.0332 0.4897
	8. Flexibility in production and marketing	0.0061 0.8996	-0.0246 0.6092	-0.0581 0.2269	0.0830 0.0841	0.0330 0.4931	-0.0028 0.9543	-0.0520 0.2797	-0.0355 0.4610
	9. Informal Arrangements	-0.0162 0.7358	-0.0764 0.1119	0.0880 0.0669	0.0680 0.1571	-0.0294 0.5418	-0.0882 0.0663	0.0242 0.6146	0.0188 0.6966
	10. Insurance	-0.0446 0.3538	0.2088 0.0000	-0.0079 0.8691	-0.0623 0.1955	-0.0691 0.1504	0.0640 0.1834	-0.0330 0.4932	-0.0225 0.6402
	11. Intensification, specialization, upscaling	0.0152 0.7527	-0.0911 0.0578	0.0164 0.7336	-0.0924 0.0545	0.1007 0.0360	0.0563 0.2415	-0.0727 0.1307	0.0539 0.2628
	12. Lobby access	-0.0682 0.1562	-0.0632 0.1888	0.0771 0.1087	-0.0019 0.9691	-0.0472 0.3269	0.1511 0.0016	-0.0504 0.2949	-0.0344 0.4750
	13. Market orientation	0.1244 0.0095	-0.1408 0.0033	-0.1751 0.0002	0.3462 0.0000	-0.1026 0.0327	0.0617 0.1992	-0.1280 0.0076	-0.0874 0.0691
	14. Reducing production costs	0.1878 0.0001	-0.0672 0.1623	-0.0306 0.5244	-0.1012 0.0352	0.0811 0.0914	-0.0423 0.3795	-0.0536 0.2654	0.0312 0.5163
	15. Subsidies and grants	-0.0267 0.5786	0.1271 0.0080	0.0635 0.1869	-0.0855 0.0751	-0.0859 0.0737	0.0121 0.8010	0.0238 0.6203	0.0432 0.3697
	16. Succession planning	-0.0478 0.3209	-0.0443 0.3576	0.0310 0.5197	-0.0666 0.1658	-0.0740 0.1237	-0.0511 0.2881	0.3902 0.0000	-0.0241 0.6169
	17. Support for territorial and regional	0.0074 0.8784	-0.0443 0.3576	-0.0151 0.7543	-0.0666 0.1658	-0.0330 0.4924	0.0535 0.2659	0.1775 0.0002	-0.0241 0.6169
	18. Technological innovation	-0.0321 0.5042	0.0160 0.7396	0.0377 0.4338	-0.0982 0.0409	-0.0806 0.0934	0.0335 0.4862	0.0463 0.3355	0.2432 0.0000
	19. Training, advice and investment in research	-0.0535 0.2659	0.0554 0.2494	0.0554 0.2498	-0.0747 0.1203	-0.0829 0.0844	0.0365 0.4478	0.0876 0.0683	0.0631 0.1895

Note: colors correspond to level of significance with dark blue, middle blue and light blue corresponding to 1%, 5% and 10% of confidence level respectively

Data source: CSP inventory

Figure 2 Cross-frequencies between conditions and strategies



Data source: CSP inventory

7. Intended performance outcomes

A set of ten factors were drawn from the case study reports to map the intended performance outcomes (IPOs) of the strategies employed by primary producers in response to the conditions they face in their business operations. Subsequently, each of the project partners entered their data into the CSP Inventory in order to facilitate comparison between both sectors and regions. The numbers in Table 19 are the frequency with which each IPO was cited in the inventory. For example, 'enhanced farm / business resilience' was cited 44 times within the arable sector and 223 times across all sectors. Given the diversity within the cases studied, and the lack of representativeness of each case commodity for a particular sector, the resultant data need to be understood as an indicator of trends rather than statistically-significant facts.

Table 19 Intended performance outcomes

			PL, LV, SB, DE, BEL, FR	DK, LV, FR, UK,GR	PL, SB, IT, BEL	PT, DK	IT, UK, GR	DE, IT	PL	IT
Intended performance outcomes	Ranking (as a %)	All	Arable	Dairy	Fruits	Meat	Fisheries	Aquaculture	Olives	Wine
Enhanced farm / business resilience	17	223	44	79	14	12	45	8	7	14
Greater financial stability	17	220	57	85	18	5	36	8	3	8
Greater profitability	16	208	47	74	20	9	39	7	2	10
Added Value	10	131	22	44	13	8	23	8	3	10
Improved access to markets	10	131	18	32	22	6	25	13	3	12
Strengthened negotiation power	7	93	24	26	11	2	19	3	1	7
Increased productivity	7	84	22	30	4	-	12	5	4	7
Social benefits	6	74	16	20	4	4	20	3	3	4
Environmental benefits	5	70	12	16	5	3	24	6	3	1
Improved information and communication	3	44	9	11	4	3	7	2		8

Data source: CSP inventory

i. Intended performance outcomes across the sectors

It is clear that the performance of the agricultural and fisheries sectors studied are very much driven by their ability to adapt and transform (resilience), but also the need to create economic value to stabilize and enhance their business incomes. This is apparent from the trends in intended performances observed across sectors, wherein ‘enhanced farm / business resilience’ (223), ‘greater financial stability’ (220) and ‘greater profitability’ (208) score highest as IPOs across most sectors. In those sectors where this is not the case (e.g. fruits and aquaculture), the focus is more on improved market access (131) and added value (131), which also score relatively highly across all sectors.

Enhanced farm / business resilience as a performance outcome relates to the adaptability of businesses and sectors in the face of regulatory, market and societal pressures and changes. **Greater financial stability** links notably with the issue of price volatility and income, and the ability to provide greater surety in the face of uncertainty; while **greater profitability** is linked with controlling costs, income and price levels. **Added value** and **improved market access** are often associated with discourses concerning differentiation and entrepreneurialism, and the ability / inclination to add value to the raw material in some way. **Strengthened** (or a current lack of) **negotiation power** is certainly an issue to some extent for most primary producers; however, for many producers (such as fruit growers and dairy farmers) it is the norm to sell through collectives and hence it was not often mentioned as an IPO. Having said that, it is clear that power (or a lack of it) can be a critical factor in determining the ongoing viability of a primary producer’s business. **Increased productivity** as an intended outcome was seldom mentioned except where it helped in coping with soaring land prices, or where technological innovations allowed for higher rates of production with lower inputs. In this

respect, it was discussed more as a strategy to reduce costs and increase income rather than as an outcome pursued *per se*.

With the exception of the fisheries sector and Montado beef in Portugal, **social benefits** were scored quite low, discussed principally in relation to issues of succession and the ever-increasing average age of both farmers and fishers. While some sectors (or at least some actors within sectors) were intent on enabling younger people to enter their sector, others were more fatalistic (or at least lacked concern) about the issue of succession. Similarly, **environmental benefits** were generally not a priority across sectors, again with the exception of the fisheries sector and Montado beef and traditional olive oil in Portugal. The environmental benefits were defined mainly in terms of the benefits (or risks) of environmental degradation on their own businesses, rather than the benefits of their businesses on the environment. **Improved information and communication** was discussed primarily in terms of lobbying, developing new markets, or in the building of new collective arrangements. Nevertheless, as with 'increasing productivity', it was discussed more as a strategy than an IPO as such.

ii. Intended performance outcomes by sector

Those sectors trading at a global level, such as arable and dairy, are subject to the greatest volatility in terms of price fluctuations meaning that financial stability was often emphasized as being the most important IPO in these two sectors. To this end, in the **arable sector** at a farm level diversifying income sources, contracting insurance and market orientation strategies were highlighted, as well as the adaptation of production systems through intensification, specialisation, cost reduction, upscaling or increased flexibility in production. A second response was often to seek policy level support through subsidies and grants, which are perceived as a means of ensuring a degree of income stability. At the sector level, the main strategies are collective arrangements and contractualisation, aimed at having more control over the prices achieved and thereby greater farm resilience.

In the **dairy sector**, the issue of price volatility links closely to the enablement of farm resilience, which is the second most cited IPO in this sector. Another issue faced by dairy farmers concerns low farm gate prices which fail to cover the costs of production, particularly where farmers sell their milk without product differentiation, rather than adding value to it in some way (such as through making cheese). This explains the relative importance of greater profitability as an IPO, as well as added value. As with the arable sector, the strategies employed by dairy farmers are at three levels: at a farm/business-level; at a sector level; and at a policy level. Collective arrangements aimed at strengthening the negotiation power of dairy producers are becoming increasingly important, as are longer-term contracts that can facilitate business planning.

The **fruits sector** in general is faced with oversupply, old varieties and declining demand, with Serbia in particular keen to achieve harmonization with the EU. As such, the most notable IPO in this sector is improved access to markets / expanding into new markets, as well as the development of new cultivars that are both more disease resistant and at the same time appeal to the modern consumer. This has in a number of cases involved developing more efficient collective supply chain arrangements.

The highlighted IPOs in the **meat sectors** in Portugal and Denmark relate to farm resilience, profitability and added value. However, it is important to note that the two sectors are very different.

In the case of Denmark, it relates to intensive poultry. In this case, the key difficulty is predicting where the market will go in the future and therefore determining how best to invest. There is no specific concern about social sustainability, simply the ongoing resilience of the sector, which may include new actors coming in and making new investments to meet emerging demands. The situation in Portugal is very different, wherein the Montado regime is more concerned with tradition and the preservation of both the environmental and social status quo. In this instance, product differentiation and adding value are key to the sector achieving its IPO.

The **fisheries sectors** examined in this research are all very small-scale. As such, the IPO of achieving greater resilience, financial stability and profitability is related to value added based on accessing and developing niche markets that are focused on quality, freshness and seasonality, rather than on the quantities of fish caught. In addition, in the Italian case, it has involved the development of *pesca-tourism*. In turn, the approaches taken are linked to protecting the local environment, while at the same time helping to ensure the integrity of local social communities. The **aquaculture sector** is faced with an image issue with the consumer, which is restricting access to certain markets. The key IPO is to enhance business resilience and develop greater financial stability and profitability through increasing access to markets. Key to this is cultivating consumers' perceptions of the quality and environmental sustainability of aquaculture products through investing in technology and engaging in vertical arrangements with, for example, restaurants.

Given the growing international demand for **olives** and olive oil, producers in Portugal are under pressure to increase production. However, while this IPO of intensifying production is achievable for the larger producers, it is much more problematic for the small-scale traditional producers who, in many cases, are struggling to survive. Intensification on the larger groves is leading to pressures on the environment, while the continued loss of small-scale producers is putting pressure on the social sustainability of many rural communities. In the Tuscan **wine** case study, enhanced resilience and improved access to markets and added value are amongst the most noted IPOs. Although Tuscany has a strong identity and global reputation for quality wines, it will have to market and add value to its produce in order to ensure competitiveness in the international market. If not, there is likely to be rural depopulation, especially in relation to young people.

8. Conclusions

In conclusion, this report has provided important data from farmers that informs earlier findings and policy recommendations initiated by Veerman et al. (2016) and others e.g. Martino et al. (2017). In all sectors we can see how agricultural commodities are becoming more exposed to markets and the different ways that farmers are adapting, some of it constrained by structural issues. The Russian embargo on EU products emerged as a common factor that caused the reorganization of food markets and forced farmers and governments to take action to alleviate negative effects.

The liberalisation of commodity markets is proving challenging for the majority of farmers. Farmers often respond to external conditions at a farm-level (which may help them but not the wider sector). The analysis of organisational change and contracts by Grandori (2015) shows the variety and change of contracts and institutional arrangements in agri-food over time, from contract farming, to associational contracts, to cooperative arrangements (well established but evolving), to franchising

and mechanisms such as quality labels. The SUFISA data note the rise of modular arrangements. Collaborative approaches are potentially beneficial, although not all sectors or commodities trust these forms of institutional arrangement. Contractualisation and to a lesser extent insurance have important roles, especially production contracts, which have been around for some time but are evolving with new tools to better monitor markets. Options for some commodities are still limited e.g. sugar beet, oilseed rape. Some less discussed strategies, including the potential to improve crop rotations (arable and orchard fruits), should be considered too. Informal social ties are less noted but play a role and should also be considered as part of farmers' strategies to manage external conditions. This is important in countries with significant land fragmentation and a large number of family farms.

Finally, we observe strategic differences between farmers that consider their farms as businesses versus farmers that consider their farms as a lifestyle choice. This to some extent explains why we see evidence of a heterogeneity of strategies (cf. van der Ploeg and Ventura, 2014). That said, options in some cases are limited. The issue of 'lock in' and what this means for adaptive capacity (Darnhofer et al., 2016) is therefore important – dairy and fruit growers, for example, cannot easily switch production and increasingly neither can some arable growers (due to specialisation). In short, adaptive capacity is not easy to action in reality, especially for farmers in more intensive production pathways.

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Appendices

Appendix 1: Commodity cluster reports (arable, dairy, fruits, meat, fisheries, aquaculture and wine and olives)

Arable – Belgium, France, Germany, Latvia, Poland and Serbia

CONTEXT

Sugar beet production is well-established in **Belgium**. It is the fifth largest beet producer in the EU. There are a **total of 7,500 sugar beet farmers** in the country, although the **number of growers has been declining** steadily over the last decade. Similarly, only three refineries exist in Belgium, owned by just two companies. Despite the **concentration of the industry**, the importance of sugar beet to Belgian agriculture has remained and sugar beet cultivation remained under a quota system until 2017. Owing to this, sugar beet farmers enjoyed **above-average prices until 2016** and it has been hugely valuable to the country's sugar beet farmers. **Innovation** has played a key part in the trajectory of the industry. Sugar content has risen significantly from 12 to 20 per cent (from 1968-2017). These innovations have allowed profitable production of sugar from sugar beet farming.

Cereal farming in **Ile-de-France** occupies just under half of the regional territory and employs 0.2 per cent of the active population. The area is **dominated by relatively large farms** (115 ha average) in which cereal crops are cultivated in rotations including rapeseed and barley (nearly 2/3rd of the agricultural area is cereal, 60 per cent of which is wheat). The area is **homogenous in terms of structure**, although practices vary locally. Farmers in the region are some of the wealthiest in the country, however they have been hit by successive climatic events recently which have had a negative impact on economic performance. Despite their physical and political connectedness to CAP policy makers in Paris and Brussels, French farmers face issues, including pest resistance, increased price of nitrogen inputs, and increasing competition from grain imports from Black Sea countries.

Farmers grow oilseed rape in many regions throughout Germany. In the Wetterau are, arable farms cultivate rape on around 10-15% of their fields. In the 1990s and early 2000s, farmers grew more rape and less sugar beet due to economic reasons. In 2007, the areas planted with rape peaked in 2007 due to policy measures that aimed to foster renewable energy sources. Compared to sugar beet, rape was superior in crop rotation for many years in the Wetterau. With the abolition of the sugar beet quota in 2017, it is unclear how rotation systems and the related production volumes will develop in the areas with high-yielding arable farming such as the Wetterau. Rape is an intensive crop that requires **cost-intensive** inputs because oilseed rape is particularly vulnerable to pests. Without pesticide applications as one element of the crop management, yield losses are common as a result. Organic oilseed rape production is very limited. The Wetteraukreis region is one of the most **productive agrarian regions** in Germany: the climate is moderate and the soil is fertile. Arable crop rotation with wheat, oilseed rape and/or sugar beet are characteristic of the area. Although arable farming in the area has been traditionally linked with pork or dairy production, **livestock farming has decreased** steadily. A farmer-established machinery ring has played a significant role in arable farming

in the region since the 1980s. The producer organisation HERA is still important partner who takes over the marketing, quality testing and transportation of the rape harvest.

Wheat production is **highly traditional** in Latvian agriculture. Whilst crop production is distributed nationally, the highest yield capacity is found with the Zemgale region. This region accounts for nearly one third of all crops in 2014. Wheat is the main agricultural commodity produced in Latvia in terms of number of farms, cultivated area, export volume, and total farm income. Wheat growing is more developed in medium and large-scale specialised grain farms with intensive methods of cultivation and use of modern agro-technologies. Crop production in Latvia is largely **influenced by the price levels in the world stock market**. Prices both internationally and in the EU between 2012 and 2014 have been fluctuating, although the overall price trend is downward. Poland is one of the largest wheat producers in the EU. Opolskie Voivodship is an agricultural-industrial region with **advantageous climate and soil conditions** and, as a region, is the leading producer of wheat in the country. Almost 2/3rds of the region is arable land, producing more than 6 per cent of the grain in Poland. The region boasts impressive productivity levels – significantly above the national average owing to its favourable climatic and topographic conditions.

Like Latvia and Poland, wheat is a key product in Serbian agriculture. Worryingly, in view of its importance, there are **significant fluctuations in wheat yields per ha** (from 3.4 to 4.8 t/ha, 2005-2016) and areas sowed with wheat each year (from 590000 ha to 632000 ha, 2005-2016) owing to weather conditions and the impact on stock prices. It is believed that volatility in yields is the result of weak implementation of the agro-technical measures and a low irrigation rate. Specifically, only 2.6 per cent of arable land is irrigated (3.5 times lower than the European average). This relates to underinvestment rather than a lack of water. Additionally, farmers use wheat as the only winter crop that plays a significant role in the sowing structure for crop rotation purposes. There are two types of wheat producers in Serbia – individual producers, i.e. family agricultural holdings, and companies (legal entities) including agricultural cooperatives. **Small farms (<2 ha) dominate in the overall structure** (47.2%), owing to historical processes and the legal framework relating to the way land is divided. In the observed region (northern part – Vojvodina) the average farm size is about 11 ha, which is two times higher in comparison with the Serbian average. The Republic Directorate for Commodity Reserves plays a key role in the Serbian wheat market (see below). More generally, Serbia faces significant demographic issues, including **rural depopulation**.

CONDITIONS / DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

Sugar beet production in Belgium (and elsewhere in the EU) **has been highly regulated** over a number of decades. Although overtime these regulations have been loosened and the sugar market has been **increasingly liberalised**. Until 2017, the sugar market was under a quota system. Among the EEC/EU countries, quotas were distributed among farmers. In 2006 a major reform lead to significant reduction of quota and the minimum price, preparing farmers for the transition to market liberalisation and increasing competitiveness of the domestic sugar market. EEC/EC regulations also required refineries to negotiate delivery conditions with the farmers' union; in addition to the termination of the quota system, this has levelled the playing field in what is a highly concentrated

market. The reduction in and eventual **abolition of quota** has meant the number of farms cultivating sugar beet has reduced. At the same time farm size increased continuously. It is currently unknown what impact the abolition of quota will have; it is anticipated that overproduction may lead to a decrease in price, which may make the cultivation of sugar beet unprofitable.

The Île de France's arable farming systems is shaped by two prevalent policy conditions. The first concerns the significant **decrease in direct aid** to arable crops following the 2013 CAP reform. A second aspect concerns the development of agri-environmental and environmental measures. These measures have been criticised for not facilitating changes to agronomic practice, as well as the additional **administrative burden** they have put on farmers. The role of legislation and policy conditions was recognised as very influential in the case of rapeseed oil production in Germany, owing to its predominant use in bio-diesel. Most significantly was the 'Electricity Feed-in Law' which introduced a **minimum compensation for electricity from renewable sources** that producers fed into the grid. The law was formal recognition for the importance of power/electricity production based on biogas technology. In addition, policy focused on encouraging the systems in place to produce bio-diesel aiming to replace a certain proportion of fossil fuels used in transportation.

Joining the EU is identified as a clear turning point for the Latvian grain sector. Although local farmers have not had any influence on global grain prices, they have benefited from being part of global markets. For farmers this meant new regulations, including access to finance and subsidies. These processes (EU regulations, VAT regime etc.) have strengthened farmers' position, as well as helping to improve transparency of the supply chains. Direct payments and access to funds prompted a rise in agricultural land prices. Access to funds from the EU has also allowed farmers to **invest in machinery and land**, although according to many farmers, access to support came too late because much of the agricultural land was already distributed and remaining land became too expensive. **Tax exemptions** have a significant role to play in Latvian wheat production, including a rate of excise duty applied for diesel fuel for agricultural production and cultivation of agricultural land, as well as a special VAT regime for the crop sector pertaining to the deliveries of unprocessed crop and technical cultures (including wheat). A big issue in the Latvian crop sector is the **considerable differences in EU support levels across other arable crop producing countries**; from a Latvian perspective, this has resulted in unfair competition and inequality amongst producers. Also significantly is a national government run scheme which offers farmers funding for **insurance**, although the money available for this support declined significantly in 2016 and it is important to note, only a small share have insured their crops. Grain cooperatives, agricultural associations and NGOs are actively involved in policy dialogue and lobbying in Latvia. It is felt that the Ministry of Agriculture is more concerned with the interests of biggest economic actors and it is thought that regulations are therefore made with bigger farmers in mind, despite their lack of involvement in lobbying or policy dialogue.

In Poland, wheat producers are **keen to ban grain imports** into the country. They believe such grains are of poor quality and, when integrated with Polish grains, they reduce the overall quality of Polish grain. Broadly, Polish wheat producers felt **threatened by the import of grains to Poland from other European countries** such as the Czech Republic, and from outside the European Union (e.g. Ukraine). Wheat producers in Poland report a **strong attachment to the land and the farming tradition**; farmers believe this means politicians responsible for agricultural and rural policies are able to overlook wheat producers in terms of support because of their ongoing commitment to the land, no matter what. In

the Polish case, Poland's potential exit from the EU dominated discussion of policy and regulatory conditions and a **Polish agricultural policy was heralded as the best way** of supporting the industry by allowing the level of wheat imports to be managed. This has prompted Polish wheat producers in the region to demand strong support of the government and the associated wheat policy.

A recent shift towards direct payments per area in Serbian reflects the National Policy's readiness to **accept broader CAP practice**. Although direct payments were originally introduced in 2005, they were gradually reduced until they largely disappeared. In 2012 and 2013 they were reintroduced in relation to **crop production and have steadily increased** since then, although farmers are not required to comply with broader basic standards, e.g. those concerning the environment, safety, natural resource management and animal welfare. This largely reflects the lack of willingness and ability to take what the report describes as 'radical changes'. **Input subsidies have also increased**, which in combination with a new model of credit support which makes borrowing money for farmers easier, is hoped to stimulate productivity and efficiency. The introduction of the **public warehouse system** (where farmers can store their goods to preserve quality and quantity) enables farmers to wait for better prices, secure loans based on deposited goods, as well as conferring a wealth of other benefits, and has also played a significant role in the development of Serbian wheat production. Furthermore, the **improvement of advisory and technical services** – particularly the use of technological solutions in farming, e.g. GIS and Big Data Analysis with efficient dissemination of relevant information ready to use by farmers in their practices (the aim is to reduce use of chemicals as much as possible and to ensure productivity growth at the same time). Additionally, starting from 2018 Serbian farmers may apply for IPARD funds, e.g. large scale subsidies for investment in machinery and rural development.

This table summarises the key policy and regulatory conditions identified in the analysis, it also captures farmers' perspectives about the policy and regulatory conditions.

Country	Policy & regulatory conditions	Farmer perspectives
Belgium	Liberalised market	Some speculation around the ongoing profitability of sugar beet
France	Decrease in direct aid for arable crops	Agri-environment requirements are administrative burden
Germany	Favourable conditions and support available to the production of energy crops	Decreasing profits from rape cultivation has opened up dialogues between farmers' associations with food and feed industry
Latvia	Strong connections to policymakers	Despite increased opportunity to access finance and subsidy, farmers have had difficulties in meeting many of the practical requirements
Poland	Potential to leave the EU ?	Dissatisfaction with EU/CAP regulation Polish (arable) farmers think their needs can be better met by a Polish Agricultural Policy Polish regulation currently exploits farmers who will 'put up with anything' because they're attached to the land
Serbia	Shift towards accepting CAP/EU practice and regulatory frameworks e.g. direct payments Investment in and introduction of new technologies such as GIS and Big Data	Small holders are unable to afford new technologies and are ambivalent about the return on their investment

Markets and market conditions

The common market conditions facing the arable sector were increasing cost of production costs and the overall impact on the profitability of arable farming in these areas.

Belgian sugar beet farmers sell their produce via only **one sales channel**, the Confederatie van de Belgische Bietenplanters (CBB) – a Producer Organization established in 1965. The CBB is responsible for the sales of crop to sugar refineries and represent and defend the interests of Belgian sugar beet farmers at local, regional and national level. Sugar beet marketing is **regulated by interprofessional agreements** between refinery and the CBB. In previous years, the minimum price was set by the European Commission, and whilst a premium was paid in years of higher world market prices, the price could not fall below the minimum price. However, since 2006 the minimum price has reduced. The recent **termination of the quota system** threatens this price further. In 2016/17 the two refineries Iscal Sugar and Raffinerie Tirlemontoise (French version)/ Tiense Suikerraffinaderij had different approaches. While Iscal Sugar maintained their past price strategy, the Raffinerie Tirlemontoise / Tiense Suikerraffinaderij price reduced. It is yet to be seen how prices will develop following the termination of quota, and whether Iscal Sugar will be forced to reduce their price as well. **The profitability of sugar beet farming in Belgium is declining, largely because of increases in cost of production.** So far one of the main strategies to counteract this development is intensification and increasing farm size (see below).

In the French case, a big challenge was not always about the increasing cost of production, but the **varying cost of production** that was hard to manage in terms of farmers' income. This variability has led to a complete disconnect between selling prices and production costs. A second issue relates more specifically to the wheat market. **Competition from Black Sea countries and Eastern European countries**, with higher protein levels at lower prices, has forced French wheat producers to up the quality of their produce. There are 3 main responses to this: (1) The 'protein plan', aims to increase the protein content of French wheat to improve its position on the export markets; (2) The creation of direct supply contracts between cooperatives and processors, so specifications can be clearly demanded; and (3) Development of the organic market to access the associated premiums. A third dynamic relates specifically to the rapeseed sector, which is made up of biodiesel and animal feed, both of which supply a domestic market. Production of **rapeseed oil could soon be challenged** by the development of alternative industrial processes, e.g. using palm oil, the price of which is more advantageous. Lastly, the continuous reduction of protein crops over the last 20 years has prompted development of the **'protein plan'** 2014-2020 is expected to revitalise agricultural research and provide farmers with the economic incentive to revive the production of protein crops.

Because of its **dependence on the strength of the international market** rapeseed farmers in Germany have faced **markedly low prices since summer 2014**, showing little sign of recovery since the period of crisis in 2008-2010. Like the other arable case study countries, input price increases have put further pressure on producers during this period. The report also highlights how rapeseed farmers are limited in the marketing channels they utilise; depending on 2 or 3 marketing channels through agriculture trading companies or processors. There are limited differentiation opportunities for oilseed rape producers, e.g. organic production is difficult and alternative supply chains based on specific product

or process standards do not exist. So farmers are locked into the supply chain and have little power within the existing structure.

In Latvia, domestic **expenditure on wheat bread has dropped** by almost half. The **domestic market has not been able to buy all the wheat** produced by Latvian farmers. The sector has managed to successfully **reorient towards the global** market and farmers have managed to strengthen their position in the supply chain. This reorientation has allowed the sector to organise and develop strong organisational structures to facilitate Latvian grain farmers' presence in foreign markets. The grain sector's global success is at least partly owed to the strong and centralized actors operating in the sector and states willingness to introduce regulations ensuring transparency of the sector. However, despite this success, the industry faces a number of other problems, including:

- (1) insufficient capacity of pre-processing, storage and logistics of grain;
- (2) owing the competition from energy production, land market dynamics have limited the availability of land which is of critical importance for the operation of grain producers;
- (3) to continue to compete in the global market, Latvian wheat farmers face challenges of maintaining grain quality (particularly relating to protein content), as well as ensuring high quality seed material.

Broadly, Polish wheat producers felt **threatened by the import of grains** to Poland from other European countries such as the Czech Republic, and from outside the European Union (e.g. Ukraine). Polish wheat farmers' economic performance is strongly linked to the **uncertainty characteristic of global markets**. They claimed that policymakers viewed the market from the narrow perspective of product price thus resulting in the import cheap grains from Ukraine. Developments for biomass energy is viewed as an alternative and potentially lucrative option for Polish wheat producers. The Polish report highlights a number of different farm types according to the ways they sold their products. This typology is presented in the 'Strategies for sustainability' section, below. Small Polish wheat producers felt **unable to compete with the largest farms** who could produce large quantities.

Serbia **exports high volumes of wheat and flour**. Although Serbia's wheat production is not competitive regarding quality and price with major exports countries in the region such as Hungary and Ukraine, but it is very competitive in countries of former Yugoslavia such as the FYR Macedonia, Bosnia and Herzegovina and Montenegro. These countries rely on Serbian as a trading partner due to low trade costs and a good political relationship. However, in times of high wheat price on the world market, **Serbia has previously banned the export of wheat** as to protect domestic consumers from inflated prices (although this was not deemed to have worked, with bread prices increasing disproportionately during the ban >50%).

The following table summarises the key market conditions for each of the case study countries:

Country	Key market conditions
Belgium	<ul style="list-style-type: none"> • The profitability of sugar beet farming in Belgium is declining, largely because of increases in cost of production (and decreasing prices for the final product) • Minimum price for sugar beet (set by the EC) has reduced since 2006 • The recent termination of the quota system threatens this price further
France	<ul style="list-style-type: none"> • Varying cost of production proving hard to manage for farmers • Variability has led to a complete disconnect between selling prices and production costs • Competition from Black Sea countries and Eastern European countries, with higher protein levels at lower prices, forcing French wheat producers to up quality
Germany	<ul style="list-style-type: none"> • Rapeseed farmers in Germany have faced markedly low prices since summer 2014 • Input price increases have put further pressure on producers during this period • Rapeseed farmers are limited to existing marketing channels • Farmers have limited differentiation opportunities
Latvia	<ul style="list-style-type: none"> • Sector has managed to successfully reorient towards the global market but is now hindered by: <ul style="list-style-type: none"> ○ insufficient capacity of pre-processing, storage and logistics of grain; ○ limited availability of land ○ farmers need to focus efforts on demand for quality – particularly relating to protein content levels
Poland	<ul style="list-style-type: none"> • Polish wheat producers felt threatened by the import of grains to Poland from other European countries such as the Czech Republic, and from outside the European Union • Position of wheat producers strongly linked to the uncertainty of global markets
Serbia	<ul style="list-style-type: none"> • High demand for exports from countries with whom it has strong political relations • Has previously banned exports to protect domestic market from inflated prices globally – this was not deemed to have the desired effect and bread prices increased by >50%

Common conditions in the sector:

The complexity of and inability to predict the global market, alongside **prolonged periods of low prices** for arable products, are common and difficult conditions faced by arable farmers across many of the case studies. Similarly, the **impact of input price increases and cost of production increases** was noted. Overall, arable farming was felt to be becoming less profitable and more challenging. The competition between food and fuel uses for arable products – the so called ‘food versus fuel debate’ – emerges across many of the case study contexts; for some this allows farmers to diversify into the production of energy crops for better financial rewards, but in other cases land allocated to ‘energy production’ and to other purposes is increasing the cost of land for arable farmers. This inhibits expansion, and a lack of access to land is an acute problem which limits the economic and ecological sustainability of the industry’s development.

Drivers influencing future performance:

- Global market patterns – particularly demand and globalisation of the market, as well as a general pattern towards decreasing world market prices (and lacking international standards of production of globally traded agricultural commodities)

- Power imbalances – i.e. where farmers have no alternative marketing channels and face negotiations with large-scale sales or processing enterprises (that can purchase their inputs on the global market)
- (Increasing) cost of inputs and the profitability of arable farming
- Political relationships and conditions, including the low importance of farmers in policy and regulation design, emphasis or privileged status of large farms, existing trading relations
- Sustainability of the sector, including environmental impacts of producing arable crops
- The role of farming for fuel – opportunity for arable farmers or competition/threat?
- (Linked to farming for fuel) availability and access to land
- Poor public perception of farming
- Various forms of political support, including quotas and subsidies
- Emerging actors in the global market e.g. Latvia and Poland competing with other EU countries

STRATEGIES FOR SUSTAINABILITY

In order to overcome these challenging conditions, arable farmers across the case study areas have developed a range of strategies aiming to ensure economic viability of their farm; there is some debate as to whether the emphasis on economic viability has (or will) come at the cost of environmental and social sustainability. In the case of Belgian sugar beet, a **range of strategies** were identified and discussed (see the table below). Not all were widely adopted. Although these strategies seem both comprehensive and promising, the report highlights **how many of these strategies have been taken up already**, thus their **further exploitation** in order to maintain or even improve farmers' situation is **limited**. Although it is hoped that the termination of quota may open up options in this regard.

French cereal farmers have developed (or tried to develop) strategies at two different levels to cope with contemporary conditions: at the **farm level** and at the **collective level** (targeting either policy makers or other value chain actors). Most farmers however feel they are limited in their responses by the contemporary regulatory framework. At the **farm level efforts** to specialise and enlarge is the accepted strategy. More specifically, risk management practices, including marketing options. This may mean looking at alternatives to the cooperative they belong to. Insurance instruments to protect against climatic risks were viewed as controversial option, adopted by some but opposed by others. Identifying and exploiting small "niches" that can complement farm income and generate more value added was a popular strategy at the farm level. Also at the farm level – farmers were trying to minimise production costs. Despite concerted efforts to do so over a sustained period (past 5 years), successes were variable. The French report suggests **collective level** amongst French cereal farmers is well established. They identify three main forms of collective action, which they note reinforce each other, including collaborative learning processes, upstream market segmentation in order to capture/generate greater value at the farm level (this involves working on the supply chain organisation to enable consumers to trace raw ingredients back to the farm gate) and lastly, lobbying policy makers in order to defend collective interests. Cereal farmers are thought to have privileged access to policy makers in the Île de France, as they are geographically close to Ministries and administration centres. The 'protein plan' is a good example of collective level action; by incentivising increased protein content, French farmers are able to compete with Black Sea and Eastern European producers.

Strategy	Information
Choosing another refinery	Although there are two refineries in Belgium, choosing the refinery that offers the best conditions is not an option. Farmers are bound to the closest refinery due to transportation costs.
Vertical integration	Relates to either, farmers buying more shares of the refinery, or the refinery getting more engaged in farm activities. More recently farmers are discussing the idea of a new cooperative refinery.
Innovation	Innovation is seen as the main strategy for the time being in order to increase output and thus hopefully increase income.
Intensification - upscaling	Farmers point out that they do not have an influence on prices, thus the only possibility to increase income is to produce more. Increasing production is the only aspect farmers can influence. On the other hand, it is argued that farmers should abstain from producing more, since this would result in increased production and thus in lower prices.
Branding	Regarding branding farmers do not see much opportunities. On the one hand, they realize that this is already partly done, but they also point out that these activities do not have a positive effect on them. This is related to the problem pointed out in the section on power imbalances, where farmers stated that profits are generated only downstream the supply chain, but not on farm level.
Alternative crops	While choosing an alternative crop is indeed a strategy that farmers may need to take up, if prices are not acceptable, the practicalities of changing crop are by far not simple.
Alternative end-products	Bio-plastics and bio-ethanol would offer alternative end-products for sugar beet. Up until now farmers see a limited solution in this strategy, since the demand is not big enough.
Additional income	Generating additional income is a common strategy employed by farmers. Often their wives have an additional job and many farmers seek a second income stream too. While subsidies are acknowledged as providing a basic income, this is not seen as positive. Farmers express that it should not be necessary to provide farmers with subsidies to guarantee their persistence. Farming should be profitable enough on its own.
Striking for better prices	Farmers pointed out that if the refinery has to stop working for one season, it would terminate its operations completely.
Stronger sugar beet syndicate	The farmers' union is seen as an effective tool already. However, the effectiveness of the organization is restricted by policies that create diverging comparative advantages across Europe as well as globally.

In the case of oilseed rape in Germany, farmers deployed a range of strategies aiming to improve economic and environmental sustainability that were **less associated with either the farm or collective level but transcended both levels**. They describe the following strategies. Farmers have adopted many strategies for the financial compensation of sustainability/environmentally friendly performances. For example, cooperation with a local water supplier who compensated farmers for applying reduced nitrogen levels. Another key strategy focuses on better ways to communicate with the public, including ways of self-marketing of better production processes. Social media is considered to be a significant part of this (little success so far). Linked to this is the vision of marketing of a high-value rape oil from the region – emphasising aspects such as quality of the rape seed and the products that come from it. The idea of a regional marketing strategy for the Wetterau region was considered as a potential avenue for the future.

As previously recognised, the amount and the quality of grain produced in Latvia has risen significantly during the last decades. Latvian grain producers have adopted a number of strategies to do so. The most significant of which is the **emergence of farm cooperatives**; during this time frame grain prices have become more transparent, and farmers have managed to get into a position where their voice is louder and better heard. Cooperatives have introduced several novelties that have allowed farmers to gain more control over the bargaining process. The major achievement of the cooperatives was **introducing transparent pricing**. Cooperation as a mechanism has also allowed farmers to benefit more from the collective bargaining. Whilst in Latvia there have been multiple attempts to introduce common response to the challenges, these interventions have not resolved the problematic relations farmers have with upstream stakeholders. The principal problems that farmers identified during the discussions are unfounded price fluctuations, low quality services, lack of choice, etc. Strategies to overcome **climate change** were controversial. Whilst farmers referred to an arsenal of pesticides, herbicides and fungicides, they were critical of the restrictions imposed by the EU on their usage, making them an unviable strategy without an obvious alternative.

The Polish case study identified four marketing strategies/arrangements. These included:

- **Producer group** – provides farmers with better bargaining position in relation to both the retailers of means of production and the purchasers of their product (namely wheat).
- **Direct marketing** – involves direct selling of wheat to a grain elevator, had a rather good reputation among farmers. It allowed for flexible reactions and selling wheat at the moment, when the price was the best. According to the surveyed farmers, this was an ideal strategy for medium farms that were not big enough to create channels to directly market or sell their products to big processors but at the same time were too big to concentrate on dispersal distribution within niche sales channels.
- **Selling to processors** – selling wheat directly to processors, but this was only feasible for larger producers who had large quantities of homogenous grains at their disposal.
- **Selling during harvest time** – only suitable for the smallest farms, whose area did not exceed 30 ha. This strategy could be summarized as immediate sales of wheat during harvest necessitated by an inability to store the grain.

In addition to these arrangements, **operating collectively** within a producer group was a **common strategy** and was seen as commonplace in Polish wheat farming. However, the report identifies how the future of producer groups is unknown, owing to the strength of individualistic values. The report identifies the importance of other resilience strategies surrounding the maintenance of the farms over a sustained period of time.

Serbian strategies for sustainability were largely long-term and focussed on both the regional and international levels; specifically, **The Black Sea Economic Cooperation** includes 12 countries in the region. This region is very important in the context of wheat sector development in Serbia. One of the organization's major, strategic development projects is the **joint transportation system**. It is anticipated this will allow the creation of a single transport system in the Black Sea region. The creation of logistics and transport infrastructure will significantly simplify physical access to joint agri-food value-added chains and improve their effectiveness.

Farmers' strategies in the wheat sector in Serbia:

Category in focus	Bottom-up approach
Quantity	Insurance, IT in agriculture/Big Data, Education
Quality	Differentiation of products by quality
Price risk management and farm income	Education, warehouse receipts, developing of business plan with other alternatives around agriculture in rural areas, part-time farming, involvement in the local initiatives and projects
Fixed cost	Credit lines and leasing
Variable cost	IT in agriculture
Consumers	To offer higher value added products, to offer sustainable practices
Traders and processors	Straitening producers power throughout producers groups, cooperatives, contracting
Product reorientation	Develop of business plan with alternative production or quit agricultural production (development of new business alternatives in rural economy)

The business strategies for sustainable agricultural development in Serbia relay both on productivity growth and strict control of chemical use in the wheat production (IT implementation in agriculture – Big data and its implementation in agricultural practices), improvement of education and implementation of price risk management tools. In the future more attention should be paid to straitening of producers' power by improving producer groups, cooperatives and contracting.

THE FUTURE SUSTAINABILITY OF THE SECTOR

The reports were a mix of optimism and pessimism when it came to the future of the arable sector across the different regions. Unsurprisingly given the varying histories of the different commodities and the challenges they faced, they had different concerns. The following points summarise some of the key future sustainability issues/concerns:

- Competition for and **access to land** is seen by many countries as a key issue holding back their arable sector. Land was typically being bought up by large farms who were pricing smaller farms out of the market, or bought up for energy crops.
- There is significant concern about the **availability of a 'next generation'**/successors arable farmers across the case studies. The causes are thought to be two-fold throughout the reports; a result of limited potential for appropriate financial reward and the poor regard for farming from a public perspective. Many of the reports detailed how young people were preferring to move to the cities. There is scope here in future research to identify ways to increase interest in arable farming amongst the next generation.
- The impact of **climate change** – and in particular the impact of **extreme climatic events** – on the future of the arable sector was also a key concern to emerge in the analysis. The sustainable use of pesticides was also something debated in a number of the case studies.
 - By reducing the use of fossil fuels, biofuel from some arable crops is also seen as 'the solution' to broader sustainability questions
 - The **role of insurance** (and its benefits) were contested throughout the different case study reports. In some examples there was significant opposition to the principal of insurance. The futures market was suggested as a viable alternative to insurance.

- The continued **availability of labour** is a concern for some, particularly in the case of wheat in Latvia and Serbia.
- **Access to finance** is currently a significant issue for many arable farmers. Difficulties accessing loans reflects the lack of strength farmers have in the supply chain and the uncertainty in the global market.
- **Diversification** of produce is also a potential avenue for the future sustainability of the sector.
- Future **policy and regulatory** decisions, including the amount of direct support available for farmers is a contentious issue across all the cases. Countries such as Poland believe their needs can be met in a better way by a Polish Agricultural Policy.
- As the case studies have shown, increasingly arable farmers' income is determined by **global markets and the uncertainty** associated with such complex markets. This uncertainty is increasingly characteristic of the sector and is likely to become more so.
- Increased **utilisation of the futures market and virtual trade mechanisms** are of interest to the sector and the various commodities. This is already showing significant upward trends, for example in Belgium it is estimated that in 10 years' time, the virtual trade in food has potential to increase from 25% to 50%.

Commodity: Arable				
Country	Context	Conditions	Strategies	Future
Belgium (sugar beet)	<p>Well-established sector and hugely valuable to the country's sugar beet farmers</p> <p>Recent removal of quota</p> <p>Enjoyed above-average prices until 2017</p> <p>Sugar content has risen significantly over the recent period, owing to innovation</p> <p>Innovations have kept the sector profitable</p> <p>Trend towards intensification and increasing farm size</p>	<p>Sugar beet production previously been highly regulated</p> <p>Recent removal of quota</p> <p>Only has one sales channel which farmers are tied in to</p> <p>Uncertain about implications of removal of quota</p> <p>Increasing cost of production and land, as well as the limited availability of land</p>	<p>Variety of strategies, including:</p> <ul style="list-style-type: none"> • Choosing another refinery • Vertical integration • Innovation • Intensification - upscaling • Branding • Alternative crops • Alternative end-products • Additional income • Striking for better prices • Stronger sugar beet syndicate <p>Many these strategies have been taken up already, thus further exploitation in order to improve farmers' situation is limited</p>	<p>Recruiting successors is a significant issue; it is anticipated that this lack of successors will result in a decrease in the number of farms</p> <p>New entrants are priced out of buying farms because of the cost of the land</p> <p>Issues around the sustainability of sugar cane over sugar beet production?</p>
France (cereal)	<p>Dominated by large farms (115 ha average) in which cereal crops are cultivated in rotations including rapeseed and barley (nearly 2/3rd of the agricultural area is cereal, 60 per cent of which is wheat). The area is largely homogenous in terms of structure, although practices vary locally. Farmers in the region are some of the wealthiest in the country</p>	<p>Significant decrease in direct aid to arable crops following the 2013 CAP reform</p> <p>development of agri-environmental and environmental measures and the administrative burden they are placing on farmers</p> <p>Varying cost of production that was hard to manage in terms of farmers' income</p>	<p>At the farm level efforts to specialise and enlarge is the accepted strategy. Also of significance were risk management practices and insurance instruments.</p> <p>At the collective level, 3 strategies were identified:</p> <ul style="list-style-type: none"> • collaborative learning • upstream market segmentation in order to generate greater value • lobbying policy makers in order to defend collective interests 	<p>No alternative to the 'specialisation/enlargement' pathway and neither farm level or collective level strategies are able to counter the difficulties farmers face; very negative outlook</p>

Germany (oilseed rape)	Farmers grow oilseed rape in many regions throughout Germany. In the Wetterau are, arable farms cultivate rape on around 10-15% of their fields. Oilseed rape is particularly vulnerable to pests, with yield losses common as a result. A farmer-established machinery ring has played a significant role in arable farming in the region since the 1980s. The rape producer association HERA emerged from the farmers' cooperation in the machinery ring.	Rapeseed oil production in Germany has been strictly shaped by energy-policy and related regulations. Favourable conditions and support available to those producing energy crops. The Electricity Feed-in Law' ensured remuneration for electricity from renewable sources fed into the grid.	Financial compensation of sustainability/environmentally friendly performances. Better ways to communicate with the public, including ways of self-marketing of environmentally friendly production processes. Linked to this is the vision of a marketing of a high-value rape oil from the region – emphasising premium quality properties of the oil.	Biofuel from oilseed rape is a renewable resource that replaces a certain amount of fossil fuel but it does compete with food production; balance needs to be made here?
Latvia (wheat)	Wheat production is highly traditional in Latvian agriculture. Wheat is the main agricultural commodity produced in Latvia in terms of cultivated area, export volume, and total farm income. Amount and the quality of grain produced in Latvia has risen significantly during the last decades. Largely influenced by price levels in the world stock market.	Joining the EU is identified as a clear turning point for the Latvian grain sector. For farmers this meant new regulations, including access to finance and subsidies. Direct payments and access to funds prompted a rise in agricultural land prices. Increased access to finance and subsidy.	Emergence of farm cooperatives; this has proved a major factor in introducing transparent pricing. Collective bargaining (although these have resulted in problematic relationships with upstream stakeholders). Strategies to overcome impacts of climate change were controversial and thought to be limited by EU policy and regulation.	Availability of labour Recruitment of a next generation Development of ways to fight new pests and diseases – it was felt that the EU was restricting their use Potential to diversify products to spread risk
Poland (wheat)	Poland is one of the largest wheat producers in the EU. Opolskie voivodship is an agricultural-industrial region with advantageous climate and soil conditions and, as a region, is the leading producer of wheat in the country. Almost 2/3rds of the	Dissatisfaction with EU policy; wheat producers are keen to ban grain imports into the country. A Polish agricultural policy was heralded as the best way of supporting the industry by allowing the level of wheat imports to be managed.	Four marketing strategies/arrangements were identified. These included: <ul style="list-style-type: none"> • Producer group • Direct marketing • Selling to processors • Selling during harvest time 	Development of a domestic agricultural policy and leaving the EU? Diversify production to spread risk Lenders are more willing to lend money and sensitive to demands of farming

	region is arable land, producing more than 6 per cent of the grain in Poland. The region boasts impressive productivity levels – significantly above the national average owing to its favourable climatic and topographic conditions.		Operating collectively within a producer group was a common strategy	
Serbia (wheat)	Wheat is a key product in Serbian agriculture. Worryingly, in view of its importance, there are significant fluctuations in wheat yields per ha and areas sowed with wheat each year owing to weather conditions and the impact on stock prices.	Shift towards accepting CAP/EU practice and regulatory frameworks e.g. direct payments Investment in equipment and introduction of new technologies such as GIS, fostering farmers to effectively use of IPARD funds, available from 2018.	Strategies for sustainability were largely long-term and focussed on both the regional and international levels. The Black Sea Economic Cooperation focuses on marketing logistic support. Efficiency is still in the focus. In the future, more attention should be paid to straitening of producers' power by improving producers' groups, cooperatives and contracting.	Serbia faces significant demographic issues, including rural depopulation . More policy/government commitment to improving farmers' position on the market

Dairy – Latvia, Denmark, France, UK, Greece

CONTEXT

The dairy cluster in SUFISA examined four dairy case studies from Latvia, Denmark, France and the UK respectively, and a feta cheese case study from Greece. The Latvian case study covered the whole country (NUTS 2 level). The Danish case examined dairy farming in the Region of Southern Denmark. Finistère, a NUTS 3 region (department) and a peninsula at the westernmost part of Brittany, was selected as the French case study region. Somerset, a rural county located in south-west England, was selected as the UK case study. The feta case study examined small and medium-sized milk producers and cheese makers in Thessaly, a NUTS 2 region in central mainland Greece. This section summarises findings across the five regions in terms of farm structural change, value chain organisation and other contextual issues.

Dairy farming in Latvia has a long tradition and is important in terms of national agricultural output (24% in 2016). Productivity is increasing (5.9kg per cow in 2015) but it is still less than the EU average. Dairy farms are **highly fragmented** and the sector is dominated by small farms. There were 19,408 dairy farms in 2015 with an avg. herd size of 8.4 cows. This fragmentation is an issue for the sector in terms of competitiveness with other dairy markets, for example. Producers also have a weak position in the milk supply chain. There is a number of small dairy processing companies but they too are fragmented (Miglavš 2015). Dairy processing is dominated by big processors and retailers. There has been **some consolidation and concentration** at the farm level but mostly at the expense of smaller farms; there has also been a reduction in the number of dairy farms (25,740 in 2013, 19,408 in 2015) and an increase in the average herd size (6.4 in 2012 to 8.4 in 2015) – but they are still very small compared to some other European countries.

Danish dairy production is highly concentrated in the western part of the country. The sector is undergoing significant **structural development** that has resulted in a general increase in the number of cows per farm, from a national average of 52 in 1982 to 126 in 2014, and this figure is even higher for the region of Southern Denmark. Structural development has also significantly reconfigured the dairy value chain and today the sector is comprised of 28 dairies, of which Arla is by far the largest (traditionally it was made up of large number of small-scale dairies). In the early 1990s a large-scale conversion to **organic dairy production** was initiated and currently around 10% of Danish dairy production is organic. The Southern Denmark region has a high concentration of organic dairy farms. Danish farming is in a significant **financial crisis**, which is evidenced by an unusually high rate of bankruptcies among farmers. Prior to 2009 there was an overinvestment in farmland and the gradual build-up of a land price bubble, which burst in 2009. Land prices subsequently decreased by more than 40%. Denmark currently has the highest debt pr. farmer in the EU, which amounted to 370 billion DDK (~€50 billion). Many Danish dairy farmers have a significant income problem, with around 40% operating with both a high debt and a deficit on the annual accounts.

France is the second largest European milk producer, representing about 20% of European production, with 65,000 dairy farms and around 3.7 million dairy cows. The dairy sector forms an important part of the French economy, with a turnover of around 30 billion euros. Like Latvia and Denmark, dairy farming has experienced **significant restructuring**. In the Finistère district, the total number of farms

has decreased by 2.9% per year from 2000 to 2010 (-32 % in 10 years), and by 62 % from 1988 to 2010. Farm size has increased as well as capital intensity. A typical dairy farm is run by 2 persons, with 60 milking cows and 78ha of arable and pasture land, producing on an average 600,000 litres of milk a year. Dairy production is often linked to pig and/or vegetable production on the same farm, which allows farmers to diversify their income sources. The typical Finistère farm is relatively small compared to Northern European countries, but things are changing. The proportion of farms having more than 100 cows has increased. Dairy production systems in the region still rely largely on grass for their feeding strategy, but there are important disparities between production systems, with one more **intensive system**, that represents more than 70% of farms, in which feed strategies rely mainly on maize and soybean cake; and another **“thrifty / autonomous” system**, which represents around 15 to 20% of farms, in which feed strategies rely predominantly on grassland. The processing sector in Brittany has a diversity of dairy supply chain actors, including large multi-nationals and smaller-scale processors. The Finistère district is marked by the presence of major industrial players, both cooperative (e.g. Sodiaal) and private (e.g. Lactalis), which compete on the global market with other international brands / groups (e.g. Arla, FrieslandCampina). The **milk crisis** has severely impacted most farms in the region (particularly in 2016 although 2009 was also severe).

The UK is the third-largest milk producer in the EU. The sector accounts for about 18% of the UK's total agricultural output. In the last ten years the number of dairy farms has declined at an average rate of 4% per year. The average farm size increased from 75 cows in 1996 to 133 in 2014. The **pattern of structural change** on UK dairy farms is thus towards **fewer, larger farms**, which mirrors change in France, Denmark and Latvia. There is a concentration of dairy farms in the mid-west and western regions of England, although even these established dairying areas have experienced a decrease in the total number of dairy farms. The milk market, particularly for liquid milk, is dominated by **supermarkets** through which as much as 80% of milk produced is sold. Like France and Denmark, the **milk crisis** has severely impacted the sector. There was a SOS Dairy Campaign in 2015 and a number of well-publicised farmer protests at supermarkets and processors about the price farmers were receiving for their milk relative to costs of production. Dairy farms in the UK range from small scale, family, extensive units where animals are exclusively grazed, to units where cows are housed and fed for the duration of their lactation. Dairy farms in Somerset account for about 12% of the county's farms. Herd size numbers in the county have increased, but the county retains a profile of mostly smaller-scale, family run dairy farms. Somerset is home to a number of large processors and high-quality dairy industries, including Dairy Crest, Müller, Wykes, Barber's, and Yeo Valley Organic. Among Somerset's traditional dairy products, West Country Farmhouse Cheddar was awarded a Protected Designation of Origin (PDO) label in 1996. In the UK, the other significant issue is **Brexit**, including what this might mean for dairy markets in the future.

The Greek case study covers sheep and goats milk production for **Feta cheese**. Milk production is almost 41% of the total value of livestock production in Greece. Sheep and goats milk production accounts for 60% of total milk production. Cheese is the main dairy product in Greece and is produced almost exclusively from sheep and goats milk. Greece produces a range of cheeses, with 21 certified as Protected Designation of Origin (PDO) cheeses. Feta is the most important and was awarded a PDO in 2002. Feta is produced using traditional techniques in the defined geographical area that is made up of the administrative regions of Attica, Central Greece, Western Greece, Peloponnese, Thessaly, Epirus, Western Macedonia, Central Macedonia, Eastern Macedonia, Thrace and the regional unit of

Lesbos. There are 242 processing units licensed to produce, process and pack PDO Feta cheese. In Thessaly 79 production units currently process Feta. Farms are **small and fragmented**. This results in the inability of farms to achieve economies of scale both in terms of farming practices and investments. Most of the infrastructure and equipment available to sheep farming holdings in the region are not maintained and are outdated. Less than 200 (8%) of the approximately 2,500 sheep farms in the area have milking units for their ewes. An additional problem is created by the lack of a land registry. Unclear land use and ownership institutional arrangements, especially for pastures, are further complicated by the EU eligibility criteria concerning wooded pastures, since the vast majority of pastures for the area are wooded rough grazing land.

This table summarises the key contextual issues across the five study regions:

Country	Study region	Farm structural change	Value chain org.	Context
Latvia	Latvia	Fragmented sector; some consolidation; polarisation / duality re dairy farms	Small dairy processors who are fragmented and big processors (i.e. further polarisation).	Post-Soviet transition Milk crisis
Denmark	Southern Denmark	Concentration and intensification Organic dairy	Major structural development; Arla dominates	Financial crisis in Danish farming
France	Finistère	Concentration and intensification + “alternative” models resist and tend to develop.	Dominated by major industrial players Organic value chain emerging and niche markets (local and regional)	Milk crisis
The UK	Somerset	Concentration and intensification	Dominated by supermarkets/ large processors	Milk crisis; Brexit
Greece	Thessaly	Fragmented	Fragmented PDO (Feta)	Financial crisis Land use rules

In summary, there is a high level of **farm-level and value chain structural change** evident across the five regions. There is a clear pattern of intensification and concentration of dairy farming in Denmark, France and the UK; the structure is more fragmented in Latvia and Greece. The context for all five case studies is a period of ‘crisis’, in some cases specific to milk but also, especially in Denmark, Greece and the UK, linked to wider financial and political issues. Some sub-sectors have been less exposed to the crisis e.g. thrifty/autonomous farming systems in France. There are also important contextual differences across the five cases in terms of the initial structure, the underlying ownership structure and the way this is supported in the value chain.

CONDITIONS/DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

The **Common Agricultural Policy (CAP)** has played a fundamental role in shaping European agriculture and regulation of the dairy sector. The CAP provides direct financial support to dairy farmers through its two pillars: the direct support package (Pillar I) and the rural development programme (Pillar II).

When milk prices are good the reliance on subsidy support is not as significant as some other sectors, or for farmers in more deprived regions. However, in periods of poor milk price the subsidy is a lifeline, particularly for smaller farms and/or farms exposed to global market fluctuations. CAP support levels also vary significantly across new and old member states. In Latvia, for example, the direct payment is the only reliable funding source farmers receive, allowing many to stay in farming. The **key policy changes** that have had an influence on the dairy sector can be summarised as follows:

- the introduction of milk quotas in 1984;
- the 1992 CAP Reform and farmers' payments for ecosystem services;
- the abolition of the milk marketing board in the UK in 1994 and the inter-branch organisation in France in 2009;
- the introduction and implementation of the nitrates directive; and
- the abolition of milk quotas in 2015.

This table summarises the key most recent policy/regulatory conditions identified from the analysis, including farmer perspectives in relation to regulation and policy.

Country	Policy/regulation	Farmer perspectives
Latvia	Abolition of milk quota CAP subsidy/competitive advantage	Concern re how milk quota changes will impact small dairy farmers
Denmark	Transferable quota system Abolition of milk quota Environmental issues Changes to agricultural law	Farmer ambivalence towards agricultural law allowing new financial capital into the sector; distrust of the regulatory process
France	Abolition of milk quota Milk Package, 2012 Environmental regulations	Quota impacts re land organisation Despite the Milk Package farmers are still isolated in their negotiation with buyers
UK	Abolition of milk quota Milk Package, 2012 Environmental regulations	Milk quota has not been an issue due to structural changes (i.e. not near the quota limit) but their abolition opens the market
Greece	PDO regulations (breeds allowed), availability of pastures and eligibility of wooded pastures	Policy for livestock production lacks a coherent strategy; bureaucracy

Two themes are prominent in the case studies: **milk quota** and **environmental regulations**.

The **abolition of milk quotas** on 1st April 2015 is one of the most significant policy changes for European milk producers in recent years. As noted in the Danish case, producers are no longer limited in their production by a quota system but by the capacity of their farms (Arla, 2016), thereby effectively liberalising production. Along with opportunities for expansion and intensification of production, the abolition of quota creates production and marketing issues that dairy farmers have to face, particularly production and price effects (Kovács 2014). The key issue then is **how dairy farmers adapt**, although one should note that the quota system only limits production in a few countries. In Latvia the sector is adapting with divided opinions, viewed by some stakeholders/farmers as an opportunity to expand production; however, smaller farmers were worried how it would influence them. In Denmark the abolition of milk quotas has had a different impact on the **organic and conventional milk** market. The supply of organic milk was fairly stable prior to the abolition, but decreased suddenly by the end of 2014. This decrease is attributed to the fact that a number of organic

producers converted their production to conventional to increase their production once quotas were abolished. In France the quota system had maintained highly stable prices for thirty years. It offered a “price insurance” that allowed farmers to invest in their production system. When the end of the quota system was confirmed, most anticipated a growing demand from China and the world market. Investments to develop production in the district were encouraged; a similar message was promoted in the UK, Denmark and Latvia. However, the end of the quota led to growing instability on world markets. The **Milk Package**,² negotiated in 2012, was supposed to soften the impact of quota abolition, but its implementation has not yielded the expected results. Similar to France, in the UK the Milk Package has so far had a muted impact (see also strategy section). The abolition of milk quota was not an issue per se for UK dairy farming, because reaching quota has not been an issue for several years due to the significant decline in dairy farm numbers. However, as interviewees noted, the removal of quota impacts the milk pool and opens up the market, particularly at a European level.

Various environmental regulations and legislation are of importance, especially nitrogen reduction measures within the Nitrates Directive (91/676) and the Water Framework Directive (Dir. 2000/60/EC). One of the major challenges here is the reduction of diffuse pollution from agriculture. In the case of dairy farmers, the main source of pollution comes from nitrates from livestock manure. In France the implementation of these directives has led to a profound restructuring and modernisation of most dairy farms, whose cost has been mostly borne by public money. The implementation of the nitrates directive was viewed as a major period of restructuring. Livestock buildings have been modernised and facilities have been developed for the management of mineral and organic nitrogen inflows, stock and outflow of the extra quantities. In the UK, 62% of the land area of England was designated as Nitrate Vulnerable Zones in 2010. If a dairy farm is within an NVZ zone farms must have adequate slurry storage (6 months), which has meant significant investment costs for some farms. WFD policy targets are based on an assessment of ecological conditions. The objective is that water bodies should have a “good ecological status” by 2027 at the latest. In Denmark this has led to a fundamental change to the development of policy targets. **Environmental planning** has been restructured from a wide range regime dominated by general policy instruments applied across the territory to a spatially differentiated regulatory scheme.

There are also some other specific national issues, including **Brexit in the UK** (see futures section) and **PDO regulations** for feta producers in Greece. For the latter this concerns the role of animal breeds in Feta PDO production. There is a debate on the issue of which breeds should be used for the production of Feta PDO, which is a highly sensitive issue because of the historical dispute regarding the designation of feta as a PDO. There is also an unresolved issue of **eligible pastures**, especially for extensive livestock farming (sheep and goats). The regulatory framework applied for rough grazing areas by the EU and the Greek administration, has not been supportive of extensive livestock farming. Farmers were critical of political personnel and their inability to formulate a coherent and consistent strategy for the sector, not helped by a complex bureaucracy, which increased administrative and transaction costs.

²The “Milk Package” was designed to help ensure the long-term future and sustainability of the dairy sector following the abolition of the milk quota system. The measures have been applicable since 3 October 2012 and apply until mid-2020. The measures constitute a major amendment to the Common Organisation of the Markets in Agricultural Products (Regulation (EU) No 1308/2013 of the European Parliament and of the Council) in which the milk sector is integrated. The aim is to enhance information availability and the transparency of the market.

In Denmark there has also been some important changes to **agricultural law**. Historically private ownership has been the dominant form of enterprise in Danish agriculture, which has been protected by agricultural law that details the legitimate owners of agricultural properties. The law was revised in 2012 and 2015 in order to attract investment capital into agriculture. This enables new forms of ownership, such as ownership by non-farmers, liability companies or pension funds. Requirements for the farmer to take residence on the farm were also abolished along with restrictions on maximum farm size. Danish farmers were ambivalent about the **entrance of financial capital** to the agricultural industry. The Danish case study also highlighted two other farmer perspectives regarding regulation:

1. *The image and status of farmers as a regulatory object.* This is a central point of concern and revolves around the status of farming vis-a-vis other types of activities in the countryside. The central question is whether Denmark is an agricultural “producing country” or not. For some farmers who live in proximity to areas of high biological value this is a matter of farm survival, as production regulations may impose too many restrictions on farming practice for it still be viable.
2. *The representation of farmers in the regulatory process:* Farmers distrust agricultural regulation. Farmers directed this distrust towards the scientific basis of environmental management and a sense that they are not recognised in the regulatory process.

Markets and market conditions

The common market conditions for the dairy sector are **low milk prices**, which are often below the cost of production, and **price volatility**. The abolition of milk quotas is one of the main reasons why prices have been low in recent years, due to an oversupply of milk and increased exposure to international markets. Sheep and goats milk prices in Greece are less volatile but prices are also low and insufficient to cover the costs of production.

When reflecting on **low milk prices** and **price volatility**, a common view across the case studies was that the market for milk had changed dramatically in the last decade or so. Price volatility is a common feature of milk markets but farmers pointed out that spikes have become more pronounced in recent years (cf. Tangermann 2011). More volatile milk markets were generally associated with the abolition of milk quotas and a progressive reduction of farmers’ protection because of a more market-oriented EU agricultural sector (Bardaji 2011), as well as an import ban from Russia and a Chinese import stop of milk powder. The terms ‘accommodation milk’ and ‘milk washing’ (i.e. oversupply) also emerged in the focus group discussions in the UK as a cause of milk price volatility.

In Latvia, the Russian embargo on EU products has been particularly significant (Russia was an important export market). The milk price crisis meant that farmers were forced to sell their milk below the costs of production – in the focus groups farmers explained this was not the first crisis but that is has been the longest and most painful to absorb and respond to. Price volatility posed considerable financial and operational difficulties for Latvian dairy farmers and some who wanted to exit were trapped by previous public financial support. This is not helped by the fact the supply chain is very fragmented, which creates low efficiency and **low market power** for farmers and the processing industry, with the latter uncompetitive in the EU single market because mass products with low added value dominate milk exports.

A decreasing and more volatile world market milk price is highly constraining for Danish dairy producers because of their reliance on exports. Danish dairy products are primarily exported to Germany, China, United Kingdom and Sweden. 65 % of the exported dairy products is cheese, whereas powder, concentrate and butter account for 15 % and 11 % respectively. Exposure to volatile world market prices is particularly challenging because producers have high debts, which implies a high share of fixed costs that are difficult to meet when it is impossible to up and downscale production. Producers must plan on a long timescale and depend on high production and a steady cash flow. It is not an option for Danish producers to reduce production in times of poor prices. There is link then between **price volatility and wider financial conditions**. As farmers in the focus groups explained, volatile prices are not an issue if producers have sufficient liquidity when prices are low; however, overinvestments, poor loans and a lack of savings has been a huge problem for many dairy producers.

In France dairy farmers deliver their production through two main channels: **cooperative dairies** or **private dairies**. The split is pretty even but they are quite different (see the table below), with co-operatives becoming bigger and bigger, with farmers feeling they have no control anymore over co-operative governance and milk sold to private dairies through PO and contractualisation, but with little changes so far as PO are too small and not effective enough to redress fundamental power imbalances between producers and dairies. Most of the **milk is sold undifferentiated** to dairies who, in turn, transform it into basic products: butter, cheese (with no PDO / PGI), milk, cream, yogurt, skimmed milk and infant milk powder (for the Chinese / export market). On all these products, the value added is realised and captured down the value chain by dairies and supermarkets. However, there are emerging niche markets, either for organic milk (notably with the creation of the Biolait cooperative), or for local, “pasture milk” (lait au foin Carrefour, lait C’est qui le patron). In Finistère, about 50% of the milk is exported. As per the other case studies, farmers felt that markets were now much more volatile. Besides quota, French farmers used to negotiate milk prices with private dairies and cooperatives through the **inter-branch organisation** (created in 1974). The agreement reached in 1997 between producers and dairies was denounced as incompatible with European competition rules and partly abandoned in 2009. This helped previously to protect farmers from volatility.

The **Milk Marketing Board** performed a similar function in the UK but was abolished in 1994. About 65% of dairy production in the UK is sold as liquid milk, with only 25% turned into cheese and 10% into powders and butter. This contrasts with the rest of Europe, where only 30% of dairy production is sold as liquid milk. Since liquid milk cannot be easily stored in the same way as milk powder or cheese or butter, UK dairy farmers are more affected by volatility and global market changes (DEFRA 2016) i.e. price volatility in part reflects the peculiarities of the UK dairy market. There are three price categories in the UK milk market (similar to other farm products): 1) farm gate prices; 2) wholesale prices and; 3) retail prices. Prices at different stages of the chain do not move up and down in line with each other. This is because of differences in market power between supply chain actors and the value added by manufacturing of dairy products with respect to liquid milk (Ruslan 2011). The recent “price war” around milk thus reflected **asymmetric price transmission** and supermarkets stated that the retail price was not necessarily related to the farm-gate price. In the focus groups farmers explained that **low milk price** was a major and sensitive issue. Farmers received different prices depending on the buyers and product quality. The impact of poor milk price is therefore not felt evenly across the sector. Around 10% of the milk produced in the UK is sold on the basis of a pricing mechanism which relates to the cost of production (there farms are protected from volatility).

There is discussion about the benefit of **production contracts** for farmers in achieving a degree of price stability, by agreeing in advance the purchase price (see below). To enhance contractual relationships within the supply chain, the industry agreed the Dairy Industry Voluntary Code of Best Practice on Contractual Relationships in September 2012. The code was developed to improve the equity of contractual relationships and to provide an alternative to the government regulation of contracts. Adoption of the code is voluntary, but currently involves 85% of UK milk purchasers (Dairy UK 2013). The code provides purchasers with greater flexibility in deciding purchase prices according to developments in the market place and farmers can in theory obtain fairer prices, security and continuity with respect to market access (Dairy UK 2013).

There are two other market conditions that emerge across the case studies: the first concerns **organic milk**; the second concerns **co-operatives**, relevant also to the Greek Feta case study.

In the Danish and UK reports there is a **growing difference between organic and conventional dairy markets**. In Denmark this is attributed to an expanding domestic and German organic market and a higher demand for organic milk internationally. A number of organic dairy producers also converted their production to conventional when the quotas were abolished in 2015 and this created a regional void. There are also opportunities for adding value to dairy production, particularly organic and foods of origin. The price for organic milk in the UK is also good. The situation was different a few years ago when some organic milk producers exited and returned to conventional. This is not the case now. The UK is the second largest organic dairy market in the EU, involving about 11% of dairy producers (OMSCo 2015). From 2013 to 2014 the organic sector experienced 6.4% value growth compared to a decline of 1.6% in the conventional milk sector.

Co-operatives are an important feature of milk markets and their role was much debated in the farmer focus groups and stakeholder interviews/workshops. Historically the Danish dairy industry has been important in the development of the organisation of cooperatives and nearly all milk is processed by cooperatives. In France 55% of farmers currently sell their milk to cooperative dairies. These arrangements are not impacted by the PO Milk Package arrangements introduced in 2012 and farmers raised concerns about the **progressive concentration of dairy cooperatives**, following a series of mergers / acquisitions. Two main concerns were expressed:

- First, most farmers who are members of cooperatives have the feeling that they do not have much more influence in decision making processes.
- Second, they denounce the lack of competitiveness of some cooperatives compared to private dairies and the fact that farmers delivering to cooperatives are often paid less than those delivering to private dairies.

The UK dairy supply chain is characterised by a relatively low level of concentration compared to continental counterparts. Of the five major organisations leading the UK dairy industry three are co-operatives: Arla Foods, First Milk, and United Dairy Farmers; the other two are a public UK company (Dairy Crest) and a German-based private company (Müller Wiseman Dairies). In the UK further opportunities for industry rationalisation and merges are likely. The analysis in France is instructive in this regard. In Latvia and Greece there was **distrust towards co-operatives**. In the focus groups in Latvia, for example, it was felt that co-operatives were not working to protect farmer interests,

fighting instead to raise income/profits for smaller groups of managers. In Greece co-operatives and the co-operative movement has a long history and were viewed by producers as part of a clientelistic system, that had created corruption and led to the detachment of producers from co-operatives.

In the Feta cheese study, the other market issues are two-fold. First, there is **uncontrolled milk adulteration** with imported milk used in Feta cheese production. This practice, apart from being incompatible with EU PDO regulations and national specifications for Feta cheese, is leading to consumer fraud and market distortion, particularly, in price formation. The problem is linked to a deficient control system, with fines not high enough to prevent repetition. Second, whilst Feta is a "strong asset" due to the increased demand for exports the **export price for Feta** is not high. Stakeholders attributed this low export price to big dairies and their policy to compete on the basis of low price instead of high quality. The consequence of this is that the price of milk at the farm-gate destined for PDO feta production is not much higher than other markets, which is a concern given high production costs. This table summarises the main market conditions and farmer perspectives:

Country	Market conditions	Farmer perspectives
	National regulations tend to favour national industries vis-à-vis neighbouring countries	Farmers in each country see themselves as competitors to neighbouring countries
Latvia	Milk price crisis/price volatility Russian embargo on EU products Fragmented milk chain, with low market power and weak cooperatives	The milk price crisis is not the first crisis to hit the sector but it has been the most challenging to manage; price volatility poses financial and operational difficulties
Denmark	Decreasing world market milk price More volatile market situation Inefficient liquidity/farm bankruptcy Organic and conventional milk	The unpredictability of the market is challenging because of high debts; vulnerability to value chain dynamics; yet farmers maintain a liberal worldview
France	Milk price volatility/market exposure Milk is sold undifferentiated Progressive concentration of co-ops Production contracts with private dairies but minor changes in power asymmetries Organic and conventional milk Emergence of niche markets	Value added capture is downstream; no inter-branch organisation there to protect milk prices; concern over co-ops power
UK	Milk price crisis/price volatility Asymmetric price transmission Production contracts Organic and conventional milk	Low milk price is an existential concern but price stability (stable market) is also essential; farmers receive different prices based on the nature of their contract
Greece	Price stability but low milk price Milk adulteration/milk imports Co-operative movement	Farmers have significant production costs Milk imports is a major concern

In summary, **low milk price** is the existential threat from a farmers' perspective but market conditions are context-specific. Milk price and low milk price strategies dominate farmer thinking. Dairy farmers were also concerned by market changes that had meant markets had become much more volatile. Since 2015 the price for dairy has fluctuated significantly - there was consensus for greater stability and predictability of milk prices to enable businesses to properly budget and manage their farms. The structure of the retail sector and the asymmetric power relations between dairy farmers and downstream actors is also problematic, with vulnerability now linked to development in the retail sector and the world market, especially in Denmark. This liberalisation and marketization of the milk

market, it was argued, is not benefitting farmers. This led to debate about **whether markets should be allowed to liberalise or whether intervention is better**. This was articulated in the Danish report as *'the paradox of farmers' market orientation'*. Farmers were apathetic about trying to change the current situation. Farmers generally observe market developments from a liberal point of view. This liberal worldview produces a blind spot in terms of understanding free market dynamics. Each country also sees themselves as a competitor. For example, what is happening in France cannot be fully understood without analysing what is going on elsewhere. This leads to the emergence of specific national regulations that favour the national industry vis à vis other countries, but at the same time some processors (e.g. Lactalis, Sodial, Arla) are present in many countries, meaning that while farmers see themselves in competition, for large processor it is part of the same business.

Factor access

The analysis focused mostly on regulatory and market conditions but there are two critical factor conditions that emerged from the data related to **land and finance** respectively. In terms of **land issues**, there was concern about the opening up of the land market to foreign buyers; a move which was not supported by Latvian stakeholders. In France, farmers in Finistère were concerned about land fragmentation, a legacy of milk quota policy. Quotas were allocated on the basis of land, so farmers who wanted to increase their production capacity bought land irrespective of the possible impacts on land fragmentation.

The other big factor is **access to finance and the increasing financialisation of agriculture**. Finance is a particularly significant issue in Denmark. Access to finance is an important issue for many Danish farmers, particularly dairy producers, as the number of loans provided has been reduced significantly. This is related to the current low commodity prices that make Danish dairy production economically challenging. However, interviews with bankers also indicate that the problem is not only related to a lack of liquidity and funds in the finance sector, but uncertainty concerning the yield of agricultural investments. The problem for the Danish dairy industry is therefore twofold: first, a huge debt which is difficult and which makes investments risky due to a high sensitivity to increasing interest rates and decreasing land prices; and 2) a business model that is unable to deliver sufficient yields that will compensate for the risk associated with the loans. Dairy farmers reported difficulties accessing finance. In Latvia, for example, the dairy crisis means that financial institutions are reluctant to lend to dairy farms. In Greece high number of farms are unable to implement their approved investment projects due to a lack of access to bank loans, which has led to a stagnation of the Rural Development Programme measures related to investment.

Socio-demographic conditions

There are significant socio-demographic issues facing dairy farming, particularly in relation to **succession and new entrants**. A familial connection to the industry has traditionally been the only way into farming. The family structure was identified as problematic for the progression of young people in the industry. This issue – also known as the 'farmer's boy problem' – is considered highly debilitating for the younger generation. These issues are linked to other conditions, particularly the issue of finance and land access. In Denmark the focus groups revealed that farmers were quite conscious about the difficulty of selling their farms at a decent price or finding a successor due to the structural

development of the sector. One of the key issues is the barrier to young people entering farming due to the requirements posed by the financial sector combined with the size of the farms and the resulting requirements for down payment. In Latvia new entrants (young farmers, start-up farmers, farm managers) and succession was also an issue that emerged in the focus groups; farmers also discussed overall depopulation in Latvia, which reduced the pool of potential employees and the strength of local brands. In Greece the average age of inhabitants in rural areas exceeds 60 years of age and less than 4% of farmers have received some kind of formal training. There is a lack of adequate education and training.

STRATEGIES FOR SUSTAINABILITY

The milk crisis and the abolition of milk quota and liberalisation of milk markets has triggered significant changes in the dairy supply chain, in particular the emergence of **new forms of contract** and the development of **co-operative models**, including producer organisations (POs), as well as other strategies. The French report stratifies farmer strategies to cope with contemporary conditions – alone or in partnership with other key actors of the sector – at three levels: the **farm level**, the **collective level** (targeting policy-makers or other value chain actors), and the **territorial level** (which are typically endorsed and supported by a broad set of actors, beyond the agricultural profession). The table below summarises strategies in relation to the case study reports.

Country	Farm-level	Collective	Territorial
All	Reducing production costs Internal re-organisation De-intensification Exit farming Succession planning Diversification of income sources Adding value Organic production Contractualisation	Farmer co-operatives Producer organisations Machinery partnerships Collective learning Political mobilisation/lobbying	Regional branding New land access and ownership models
Latvia	'Lone ranger' Survival via subsidy Diversification Exit farming	Farmer co-operatives	
Denmark	Reducing production costs Internal organisation Exit farming Adding value/organic milk Succession	Farmer co-operatives	Regionalisation Structural re-organisation New ownership models
France	Reducing production costs De-intensification Market segmentation Organic milk Contractualisation	Political mobilisation/lobbying Producer organisations Machinery partnerships Collective learning	Territorialisation Land exchanges
UK	Reducing production costs Contractualisation/pricing Diversification of income sources Adding value Organic milk Market data/futures	Farmer co-operative Producer organisation Contractualisation Market data/futures	
Greece	Reducing production costs	Producer co-operatives	Regional training/advice

Farm-level strategies

Farmers described various coping strategies that they implemented to help manage poor milk prices, particularly **costs of production-related strategies**. In Denmark, for example, the most dominant response farmers provided to meet current market conditions is to “dilute” the costs of production by increasing efficiency, increasing the scale of operation and cutting costs/cancelling reinvestments. Farmers in the UK described something similar. This rationale makes sense at an individual farm-level; however, it is problematic for the wider dairy sector because it further increases production and thereby puts pressure on prices. Farmers were aware that diluting costs will not necessarily address the underlying causes of the challenged economy. Farmers in Denmark explained too how they attempted to adapt the **internal organization of the farm** to manage market volatility, as this for many was a major concern.

The French report differentiates farm-level strategies based on the nature of the production system. In Finistère over 70% of dairy farms are engaged in intensive systems reliant on external resources, especially energy crops and proteins for feed. In response to price instability, farmers using this system have followed a similar pathway to farmers in Denmark and the UK (i.e. cut investments, increase production and control production costs, including possible mechanisation (e.g. robotic milking)). For farmers using pasture-based systems (10 to 30 % of all farms in the region) the approach is **de-intensification**, in which farmers have deliberately chosen to embark on, as part of a medium to long term strategy. There are gradients between fully autonomous systems and semi-autonomous systems, but all put grass at the heart of their feeding strategy. The sustainability of these systems (including economic profitability) usually exceeds intensive systems.

Diversification of income sources is an important farm-level strategy. In the UK case study dairy farmers diversified on-farm activities by adopting technologies such as solar panels, establishing B&Bs, farm shops and/or renting out converted farm buildings as either long-term lets or holiday homes. Some dairy farmers have started to bottle and sell milk directly (via milk huts or farmers’ markets) and/or add value through cheese or ice cream processing which is sold through different (local and national) retail channels. Farmers or members of the farming household have also taken a second or non-farming job, which provides a source of stable income. In Denmark there has been a change in farmer attitudes towards products that involve **adding value**, particularly organics, with such activities now no longer perceived as the preserve of “longhaired hippies”. In fact, direct sales and diversification are also strategies that farmers recognised in the focus groups as way to ensure the farm economy. In the French case study upstream market segmentation has been put forward as a way to counter that fact that value added is mostly captured downstream. Short chains and especially organic production have been put forward as ways to allow farmers to get a greater share of the value added, including intensive or semi-intensive system. This idea is not new but until recently the main farmer union was reluctant to consider it. It gained resonance when Finistère farmers discovered that their Dutch, German and Danish counterparts were getting a “grazing premium” for applying grazing for at least six hours / day during 120 days.

A large number of farmers in Denmark are **exiting farming** due to bankruptcies, forced sales or voluntarily agreements. A number of farmers have exited farming too in the UK, typically as a last resort, and some have exited dairy but remained in farming. The current difficulties facing the dairy

sector raised interesting discussions in relation to **succession planning**. In Denmark, for example, the traditional generational change for many was not an option, due to the lack of a successor, and those who have a successor may be unable to find an investor. Only a few of the interviewed farmers planned for a traditional succession, but farmers considered a number of other options. Interestingly, farmers did not envision the coming generation of farmers to adhere to the same mode of production as the current generation and expected that new models for succession and ownership have to be developed. In the UK farmers also appealed for innovative start up initiatives, such as share farming schemes developed in New Zealand. Participants recognised an increase in interest in and enthusiasm towards agricultural work in contrast to recent years, although dairy farming was less unappealing – mainly relating to the unsociable working hours required, but also relating to the hard work required.

The production of **organic milk** has been a successful strategy for farmers to differentiate and improve their farm business situation. It was mentioned in the Danish, French and UK reports and has been a successful strategy for some producers. However, not all farmers have access to the organic market. In the UK, for example, although organic represents a way for dairy farmers to achieve price premiums at a time of depressed milk prices, it is not always possible to access the market. Supply for organic milk in the UK is in balance and tightly controlled by the organic industry with limited scope for new producers to enter the market (OMSCo 2015).

In the UK and to a lesser extent France and Latvia, the big strategic question concerns **production contracts** (which applies at the farm and collective level). The analysis has identified a number of different institutional arrangements for selling milk. These different arrangements represent different strategies that potentially help dairy farmers to manage market volatility. These arrangements are essentially different types of contract. Some have been in place for some time but there are developments within these arrangements (e.g. new pricing mechanisms) in response to volatility. In general terms, it is possible to distinguish between **individual** and **collective arrangements**:

- Individual sales
 - (i) Supermarket-aligned contracts
 - (ii) Direct to processor/milk buyer
 - (iii) Informal arrangements (direct to the consumer e.g. milk hut or local delivery scheme)
- Collective organisational sales
 - (i) Co-operatives (e.g. Arla)
 - (ii) Dairy Producer Organisations (DPOs) (e.g. Dairy Crest Direct in the UK)

Contracts are an increasingly important feature of dairy supply chains. The main **pricing mechanisms** used are as follows. First, *cost of production plus*, in which the farmer receives a price for their product that covers cost of production as a minimum, plus a bit more, ensuring sustainable profitability of their business. In the UK they applied in supermarket-aligned contracts and account for about 10% of the industry. Second, *A and B pricing*, which is a pricing matrix with a core price and a market realisation price. This was used by Dairy Crest Direct in the UK and some of the smaller dairies and cheese producers. There was some debate about whether A and B pricing is the best way forward, or whether it would be better to just have one price. Third, *formulaic or basket pricing*, where dairy farmers are offered one price for their milk for a period, which is derived from four or five prices currently offered by processors in the market. This pricing mechanism was used, for example, by Muller (non-aligned

contracts) and the Arla co-operative. There is also debate about offering future prices for milk contracts. In the UK Muller have introduced this option for one of their manufacturing contracts. The biggest difference in contracts is in terms of the quantity supplied. Processors who favoured A and B pricing argued it was a good way to control supply. This was critical for smaller cheese processors and dairies. The approach has been criticised by farmers as merely a smoke screen for poor milk prices. Co-operatives like Arla have no limit and guarantee to take whatever a farmer produces. Muller require farmers to notify them if they will exceed 10% of their previous milk year. There is some debate about what mechanism is best, with some arguing no limit contracts were one of the reasons why oversupply happened in the first place.

Contractual relationships in the UK dairy case were much discussed. At an individual farm-level the strategic question concerns the type of contract that they sign up for but options can be limited, as per the cost of production plus contracts, for example. These supermarket-aligned contracts have been divisive at times of low milk price, because the majority of farmers cannot access them. The other strategic issue is the use of **market data and futures (contracts)**. This was also evident in the UK case study. A wealth of market data and statistics exist to support dairy farmers and processors in their decision-making. Some focus group participants and dairy processors argued farmers can, and should, use market information to their advantage. Although this data is widely available, and can be used to improve farmers' bargaining power, a number of interview participants noted farmers' lack of engagement with such material. This is because a lot of dairy farmers are simply too busy. Interestingly, some dairies and processors that were interviewed, notably Barber's in the UK, were making efforts to get farmers to engage with such material. Dairy farming in a time characterised by volatility will require, it was argued, a different set of skills – particularly business skills – which will require closer engagement with market data and futures. Workshop participants were positive about the use of futures data as a means of controlling milk price volatility. In Latvia contractualisation was viewed by farmers as important to establish long-term contracts between farmers and milk processors that incorporated fixed prices. However, the 'lone ranger' strategy was dominant in the actual behaviour of farmers – individual farmers look for short term benefits in times of crisis, including breaching contracts with co-operatives and processors.

For **Feta** producers in Greece the prevailing arrangement is an **individual transaction** with a single dairy, with only a small percentage of farmers selling their milk through the co-operative. Small family dairies establish more personal relationships with their farms and the agreements are usually informal, resulting often in poor terms regarding the price set for milk. Co-operative and large dairy processors pay higher prices but they pay a single flat price to all farmers, regardless of specific product characteristics.

Collective strategies

In terms of collective strategies, there is some interesting discussion in the reports about farmer co-operation and strategies to improve farmers' bargaining power through **co-operative governance** and/or the development of **producer organisations (POs)**. In Latvia, for example, co-operation was identified as one of the main solutions to the crisis. Participants argued that solutions should be approached at a sectoral level, giving preference to collective strategies, including product and organisational innovations. Dairy farming has played an important historical role in the development of co-operatives within agriculture and there was a commitment to co-operative models, even though

farmers recognised that some had now become quite large. In the UK, for example, several farmers surveyed supplied Arla. Farmers were passionate advocates of the co-operative model. It was argued that a strong co-operative was critical to dairy farmers when it came to negotiating milk prices.

In France dairy farmers tended to feel “trapped” in their commercial relationship with dairies, be they cooperatives or private dairies. They felt they had weak bargaining power. To reverse this situation, some farmers selling to private dairies have put a lot of effort into the development of POs. At the moment most POs are unable to influence dairies and to improve the situation of their farmer members. This is because firstly they are all attached to one dairy instead of being able to negotiate with several dairies; and second, they are too small and do not represent significant volumes to truly negotiate with dairies. Consequently, some farmers suggest it would be useful to combine POs in **one single regional federation** for the western part of France to create better leverage and bargaining power. Most farmers are not hopeful this will happen. PO models have been successful though. Organic producers are currently organised through a specific PO (Biolait) that sells to all private dairies and gives those farmers real bargaining power.

The PO model was also examined in the UK as strategy to improve producer bargaining power when negotiating contracts. So far there has been limited uptake of this option. However, those farmers participating in the Dairy Crest Direct DPO, the only one running in the UK, felt it was beneficial. Some argued it was the next best thing to a co-operative. It was recognised that the scheme was rather cumbersome (at least as implemented). Stakeholders and farmers recognised the need for greater co-operation to sell milk, including joint ventures at a farm level (to share capital, expertise, etc.). Although there is only one DPO, a number of milk pools set up by other dairies were effectively running as DPOs, but without the formalised governance structure. There was some concern that the Dairy Crest Direct DPO did not have any leverage over the price the processor is offering.

In Greece a new **specialised co-operative of livestock farmers** has been created defying the generalised reluctance to co-operate. It enables the following:

- the marketing of milk in order to achieve better terms and conditions in the market e.g. higher and stable prices, improved frequency and reliability of payments.
- the joint supply of animal feed to reduce the purchase cost for its members.
- A single price for milk which is offered to all members regardless of the quantity or the quality delivered (i.e. fat content).
- The availability of credit which can be used for the purchase of animal feed, etc.

Three other collective strategies were noted in the reports:

First, **co-operative arrangements to share machinery and labour**. A key farm-level strategy for all forms of dairy system is the minimisation of production costs, especially in terms of machinery and labour costs. In France some producers have invested in two collective institutional arrangements to reduce production costs/working time (not all farmers opted for these arrangements): Cooperative of Agricultural Machinery Utilisation (CAMA) and Enterprises for Agricultural Labour (EAL). Second, **collaborative learning** was also important, particularly to improve the efficiency of the dairy system as well as to generate new ideas to rethink how they do things. In the UK case study, for example,

some dairy farmers were part of a pasture-based working group that meet regularly and shared data about their farm business to identify cost savings and efficiencies. In France too collaborative learning processes were important, especially for farmers using extensive systems. They were organised through working groups. These were often run by a technician or an engineer from the public extension services. Third, **political mobilisation and lobbying**. This strategy was particularly evident in the Finistère case study, which has a strong cultural history of farmers' unions defending the so-called "Breton modèle" when regulations threaten the industry. Such mobilisation was considered an integral part of the overall strategy of farmers in the region, particularly as a way to help farmers be better remunerated and to increase milk prices at the farm-gate.

Territorial strategies

A series of other strategies are evident which involve stakeholders beyond the agricultural profession, particularly at a regional / territorial level. The strongest example is **regional branding and territorialisation**. In the Region of Southern Denmark, for example, organic dairies at a regional level, including "Naturmælk", have helped to produce a range of value added organic products. There has also been an increasing focus on gastronomic events and initiatives in the region to promote organic production and regional and local food products. In France too there is a strategic need to develop the demand for higher quality products at the territorial level. This strategy is undertaken jointly by local NGOs, local governments and groups of farmers. They have invested resources to develop local demand for organic products and to encourage conversion of local farmers to organic.

There are also public and private strategies in relation to **land**. In France farmers need to work collectively with public authorities to facilitate land exchanges and land reallocation to enable a more coherent agricultural landscape. This is important to develop farmers' accessibility to pastureland (an important variable to transition towards low-input systems, whose performances on the economic, social and environmental dimension are clearly superior). In Denmark changes to the regulations concerning farm ownership means that a number of new actors are now investing in agriculture (e.g. pension funds, investment funds and private persons) and some larger farms are experimenting with different forms of ownership, such as liability companies.

In the Feta case a key strategy was improved **training, advice and technical support**. Training provided to farmers has never been substantial and sufficient. Technical advice is mostly private input (via a veterinarian, for example). Whilst young farmers and/or new entrants are, in general, better educated they are not trained in production issues. Technical assistance is needed to upgrade product quality and the role of universities, research institutions and experts is important in this regard.

THE FUTURE SUSTAINABILITY OF THE SECTOR

When asked about the future some producers were not optimistic. Farmers in the focus groups in Greece, for example, expressed despair about the future and there was a general feeling that the sector had been abandoned by the state and would not be sustained. Some clear messages emerge in the case study reports about the future sustainability of the sector. From a farmers' perspective, market stability is critical for farmers to be able to make strategic decisions. However, whether they include sustainability concerns in their strategic decision making if they have stable market conditions

is another matter. For instance, many Danish farmers still struggle with economic burdens due to previous overinvestments from a time when market conditions were much more stable and easier to plan investments. So, the fact that price stability is essential for farmers to sustain their business does not necessarily lead to decisions re. environmental sustainability.

The main points are as follows:

- **Price stability** is essential to plan for a viable dairy business (risk management). **Production contracts** can help farmers achieve a degree of price stability, by agreeing in advance the purchase price. This provides a certain degree of protection from price volatility. In this regard, longer-term fixed contracts are to stabilise income flows and thus help farmers to better plan for the future.
- **Futures contracts** can help in planning cash flows, as they help farm business management on the basis of a guaranteed income for the milk commodity. This form of contract, which has an element of hedging, is likely to become more important in the future.
- In France actors recognised that **pasture-based systems** are more resilient and more sustainable (even those embarked in more intensive systems accepted this); the current polarisation of the two knowledge systems is likely to **impede a true agricultural transition** at the district / regional level and a transition to pasture-based systems could only happen if collective and territorially-based strategies are implemented and succeed.
- Enhanced cooperation is essential, as are strategies to improve added value.
- In Latvia there was discussions about the role of national borders. Farmers felt that in the future there will be more pan-national collaboration between farmers, which would strengthen farmers position in global markets.
- There is a key question about how farms should be organised in the future and a general recognition that **new models for succession and ownership** have to be developed. In Denmark, for example, the old image of a farm with a family, is not seen as the future (given changes to agricultural law), but it is difficult to see what should replace it at this moment in time. There is scope here to think about how to facilitate succession in the dairy industry, so as to allow 'young blood' to come through and benefit the industry. There is a wider question too as to whether the accelerated financialisation of the sector and the emerging new models can be considered sustainable, from a social or ecological perspective. Often wider sustainability issues are not a part farmers' strategic considerations, with farmers adopting these models because they have no other alternative.
- **Access to finance** is currently an important issue for many dairy farmers, particularly in Denmark. Consequently, **banks** are the engine of transformation in the sector and their decision to finance an investment or not is of crucial importance; banks are increasingly beginning to observe farmers as 'capital managers' and to assess whether or not they are credible capital managers.
- **In a UK context, discussions about the future were dominated by Brexit.** Trade, and specifically whether a trade deal with the EU would be secured, was the biggest post-Brexit concern. Unsurprisingly, groups that were reliant on exports and/or the ability to move products across European boundaries were most concerned about the impacts of no trade deal. Overall, it was felt that whatever trade deal was eventually agreed, it would be less protectionist than the status quo and would expose the dairy industry to more competition, for which it would have to be fitter and more competitive.

Commodity: Dairy				
<i>Country</i>	<i>Context</i>	<i>Conditions</i>	<i>Strategies</i>	<i>Future</i>
Latvia	Fragmentation; some consolidation; Small dairy processors who are fragmented; Post-Soviet transition	Policy and regulatory: Abolition of milk quota; CAP subsidy / competitive advantage Markets and marketing: Milk price crisis/price volatility Russian embargo on EU products Fragmented milk chain, with low market power and weak cooperatives	Farm-level: 'Lone ranger' Survival via subsidy Diversification Collective: Farmer co-operatives Government regulation re contracts Subsidies and grants	Enhanced cooperation is essential; longer-term contracts are important for business planning
Denmark	Concentration and intensification; organic dairy; major structural development; Arla dominates; financial crisis in Danish farming	Policy and regulatory: Abolition of milk quota Environmental issues Changes to agricultural law Markets and marketing: Decreasing world market milk price More volatile market situation Inefficient liquidity/farm bankruptcy Organic and conventional milk	Farm-level: Reducing production costs Internal organisation Exit farming Adding value Organic milk Succession Collective: Farmer co-operatives Regional/strategic: Regionalisation Structural re-organisation New ownership models	New models for succession and ownership; access to finance – banks are increasingly important
France	Concentration and intensification; dominated by major industrial players; milk crisis	Policy and regulatory: Abolition of milk quota Milk Package, 2012 Environmental regulations Markets and marketing: Milk price volatility/market exposure Milk is sold undifferentiated Progressive concentration of co-ops	Farm-level: Reducing production costs De-intensification Market segmentation Organic milk Contractualisation Collective: Political mobilisation/lobbying Producer organisations Machinery partnerships Collective learning Regional/strategic: Territorialisation; land exchanges	Pasture-based systems would represent a true sustainable agricultural transition but this will be limited because the intensive and grass-based systems exist as quite distinct communities of practice; the need to improve land accessibility through collective working with public bodies.

UK	<p>Pattern of structural change on UK dairy farms is towards fewer, larger farms. The milk market, particularly liquid milk, is dominated by supermarkets. Milk price – and specifically milk price volatility – represents a significant challenge for the industry (not sufficient to cover production costs). Brexit</p>	<p>Policy and regulatory: The CAP has played a fundamental role in shaping regulation of the dairy sector. Key policy changes: the introduction of milk quotas (1984); the 1992 CAP Reform and farmers’ payments for ecosystem services; the abolition of the MMB (1994); Milk Package, 2012 abolition of milk quotas (2015). Environmental regulations</p> <p>Markets and marketing: Global, European and UK dairy markets are strongly integrated. Recent spikes linked to EU Russian trade sanction and oversupply of milk on the global market. Milk price volatility is a major and sensitive issue for dairy producers. Asymmetric price transmission</p> <p>Production contracts</p> <p>Organic and conventional milk</p>	<p>Farm-level: Reducing production costs Contractualisation/pricing Key arrangements:</p> <p>1. Individual sales</p> <ul style="list-style-type: none"> (i) Supermarket aligned (ii) Direct to processor/buyer (iii) Informal arrangements <p>2. Collective organisational sales</p> <ul style="list-style-type: none"> (i) Co-operatives (ii) DPO <p>Standards and certification play an important role in adding ‘value’ to dairy products.</p> <p>Organic milk and Free Range Dairy.</p> <p>Diversification of income sources.</p> <p>Collective: Farmer co-operative Producer organisation Contracts legislation Market data/futures</p>	<p>Brexit represents the biggest challenge and potentially a significant opportunity. Issues of trade and access to the EU market threaten arrangements reliant on trade with the EU. Smaller, individual sales arrangements could see increased domestic demand for their produce. The impact of subsidy removal is also unknown at this stage. A key social challenge is the availability of new entrants. The redistribution of agricultural support, post-Brexit, may reduce land prices and make this easier for new entrants. This reduction in land values may prove problematic for farmers who have borrowed money against the value of their land.</p>
Greece	<p>Fragmentation of farms and processing; PDO (Feta); Financial crisis Land use rules</p>	<p>Policy and regulatory: PDO regulations and eligible pastures</p> <p>Markets and marketing: Price stability but low milk price Milk adulteration / milk imports Co-operative movement</p>	<p>Farm-level: Reducing production costs</p> <p>Collective: Producer co-operatives</p> <p>Regional/strategic: Training, advice and technical support</p>	<p>The sector has been abandoned by the state and may not recover; sheep enterprises can be profitable but they will need investment and support</p>

Fruits – Poland, Serbia, Italy and Belgium

CONTEXT

The fruits cluster in SUFISA includes pears in Italy; apples and pears in Belgium; apples in the Malopolska region of Poland; and small family owned raspberry farms in the Region of Sumadija and Western Serbia, Serbia.

According to the Food and Agriculture Organization (FAO) the world production of pears is growing. Between 2009 and 2011, the Europe average production was equal to two million tons. The main producer is China, followed by Europe. Within Europe, Italy is the main producer. However, the main exporters are countries from South America (Argentina and Chile), who sell almost all of their production on the international market. Italian exports are concentrated in the European market (more than 90%).

The Italian case study is based on the Emilia-Romagna region, which is predominantly rural. Pear orchards have been grown in the region since 1600. The cultivation of pears in Italy covers 33,000 ha, of which more than 20,000 ha are concentrated in this region. About 96% of the farms growing pears are owner run, with only 3% having employees. 82% of farms are individual enterprises, with about 15% companies. The market for pears grown in this region is somewhat old-fashioned, and has been declining of late.

Belgium is the EU's fourth largest food exporter. The share of agriculture in the Belgian GDP is 0.7%. Most of the value added is created by the food industry– five times more value-added per labour unit than agriculture. Most food is sold through the retail sector. Three companies dominate 70% of the market. Small shops have virtually disappeared and local markets are insignificant. There is a focus on premium products and on export.

Apple and pear farming are treated jointly in this Belgium case study, as the production of both top fruit crops has always been strongly connected in Flanders (61% of farms produce apples and pears jointly). In fact, the production process is nearly identical. The market dynamics of apple and pear however are highly different. In 2015, Flanders counted 949 top fruit farms. This number is declining each year. Over the period 2001-2012, the number of Flemish open-air fruit production firms decreased by 43%, while the total acreage of apples and pears combined has remained relatively stable. This indicates an increase in concentration and scale. In 2014, the total fruit sector was worth 370 million euros, of which apples represented 74 million euros and pears 151 million euros, for roughly the same tonnage.

An important characteristic of orchard fruit production is the **long rotation period** of the trees, which is approximately 10-14 years for apple trees and 25 years or longer for pears. Currently, Flanders sees a shift from apple to pear production: the apple acreage decreased by 24% while the pear acreage increased by 49% over the period 2001-2014. Regarding apple cultivars, the three most planted ones in Belgium are *Jonagold*, *Jonagored* and *Golden*, covering 79% of trees in Belgium. Many other cultivars are planted on a smaller scale. Regarding pears, the level of specialization of the Belgian sector is even higher: the *Conférence* cultivar accounts for 87% of the acreage in 2015.

Poland has the highest agricultural population in the EU-28 and is characterized by great fragmentation. However, the average farm size has been increasing in recent years, and reached 10.3 ha in 2014. Still, more than half of agricultural farms (51%) in Poland operate on no more than 5 ha of utilized agricultural land. Starting in 2008 farmers' inclination to take out farm loans and credits dropped by 10%. Agricultural incomes are currently twice as high as they were before the accession to the EU. In Poland, about 50% of farmers' revenues comes from various forms of EU subsidies and grants. This provides an incentive for young people in Poland to stay in rural areas. According to EUROSTAT, Poland has the largest number of young farmers (under 40) among all EU countries, although there are concerns that the average age is increasing.

Małopolska is one of the smallest regions in Poland (NUT 2). About 83% of farms are smaller than 5ha, and only 3.1% of them occupy more than 15 ha. Almost all of them might be defined as individual/family units. The region has been one of the biggest producers of fruits as well as vegetables in the country, based on tradition as well as local/regional knowledge. In the context of EU, apples have been the number one export product for Poland and Małopolska in recent years (it is worth noting that the production of Polish apples is ten times higher than in Belgium). Family farms in the region use family labour almost exclusively (99.6%). Farm operators tend to be older than 45. Almost 2/3 of family farm operators are over 45. Very young people (under the age of 25) are rare among farm operators and make slightly more than 1% (!). It should be also stressed that agricultural activities provide a rather minor part of the total income of farming families (only 13.1%). Major sources of income are working in industry labour and in the services sector (37 %) and social benefits transfers (26.3%). It is important to note that Małopolska is only one of the regions in Poland in which fruit and vegetable production has been important. Especially concerning apple production (apple orchards), there are at least two other regions in Poland that have been characterized with this particular type of agricultural production. They are located in Świętokrzyskie and Mazowieckie regions (Sandomierz and Grójec areas respectively in central Poland). Both these locations are more connected within the international (European, global) system of apple production. As such, it should be stressed that observations and considerations presented in this report cannot be treated as a representative of all apple production in Poland.

Transition to a market economy and improvement of business strategies in Serbia are generally based on harmonization with the EU legislation and practice. Agricultural sector risks and strategies in Serbia are influenced by the broader conditions present at the global level. Serbian rural areas are generally characterized by depopulation processes which has meant that over the 20% of the total rural population is 65 or older, with only 14% up to 14 years old. There is very small share of young people (up to 35 years of age) and mostly very small farms (up to 1 ha). Specifically, for the raspberry sector, farms of 0.5 ha dominate the structure. For rural area development, the quality of labour force is very important. Raspberry production entails significant levels of seasonal labour, which requires training as well as ensuring adequate availability. In this context, the educational structure of rural population is one of the key variables. In Serbia, more than half of the rural population older than 15 years has primary education at the most. Agricultural and rural development policy measures applied at the local level are oriented toward improvement of management quality and skills (training, education and innovations).

Sumadija & West Serbia is a NUTS 3 region and includes the north-western and south-western parts of the country as well as the central area (Sumadija). This is a predominantly rural area, characterized by a significant share of old people (20,6%) and a high percentage who have not finished even primary school (37%) and very low portion of those with a secondary (35%) and higher education (3%). Average farm size is around 3ha for the Region in general (although for the sector in the focus it is around 1.5 ha), and there is significant portion of very small farms up to 1ha (around 12% for all farms, and in the case of raspberry sector slightly above 40%). The agricultural potential of this arable land is high, with fertile soils and favourable climatic conditions for raspberry production. Small family owned farms are in the focus of analysis. These farms perform raspberry production activities as a part of tradition. Recently, young couples have started their family business with raspberries as one of the widely available activities for the organization of business within the rural economy – not least because it is generally hard to find employment due to the fact that many factories were closed down during transition.

Due to its high market share, global recognition and competitiveness, raspberry production has been the most important fruit production in Serbia. This sector is also interesting due to its high potential for fresh and high value-added market development. From the economic point of view, the raspberries sector contributes a high share of total agricultural export from Serbia to the EU and global market. This sector generates a significant contribution to farm income in the Sumadija and Western Serbia Region. Fruit production is one of the key sub-sectors of Serbia's economic development and therefore given a strategic treatment by the Government of Serbia. In 2015 Serbia accounted for more than 21% of entire world raspberry production (with around 79.000 tons produced and export revenues amounting to \$270 million, Serbia was the largest exporter of raspberries in 2015 globally)`. Therefore, most of the raspberry production in Serbia is part of the standard supply (value) chain, with the largest number of significant relationships belonging to intermediaries.

Summary

- Italy is the main producer of pears in Europe. 96% of the farms growing pears in the Italian case study are owner run and individual enterprises. The market for pears in this region is old-fashioned and in decline.
- Apples and pears are treated jointly in the Belgium case study as both products are considered as perfect substitutes and benefit from the same sale channels. The number of top fruit farms is declining each year, yet the acreage is relatively stable. i.e. there is a concentration of production in the hands of highly capitalized farms, owned by highly-skilled and innovative farmers. Because these farmers are relatively independent, the ancestral cooperative structures are in crisis. There is active research for the development of new cultivars, as a reaction to increasing competition on international markets.
- The long rotation period for orchard trees is significant: 10-14 years for apples, 25 years for pears. This constrains flexibility and innovation, at least in the short term. Yet, in Flanders there is a shift from the gradually less competitive apple market to high-value/quality pear production.
- Poland's farms are highly fragmented, yet increasing in size in recent years. Since 2008 come farmers are disinclined to take out farm loans and credit. Poland has the largest number of young farmers among all EU countries, although there are concerns that the average age is increasing.
- The Malopolska region of Poland is typified by small family farms. It is one of the biggest producers of fruit in Poland. Production is based on local/regional knowledge. Apples are the number one export product for Poland and this region.

- It is important to note that Małopolska is only one of the regions in Poland in which fruit and vegetable production has been important. Especially concerning apple production (apple orchards), there are at least two other regions in Poland that have been characterized with this particular type of agricultural production. They are located in Świętokrzyskie and Mazowieckie regions (Sandomierz and Grójec areas respectively in central Poland). Both these locations are more connected within the international (European, global) system of apple production. As such, it should be stressed that observations and considerations presented in this report cannot be treated as a representative of all apple production in Poland.
- The overriding driver in Serbia is to develop a market economy and to harmonise with EU legislation and practice. During development and harmonization processes, the Serbian economy is faced with numerous problems: rural areas in Serbia are characterised by depopulation and an ageing population; the farm sector structure is unfavourable – very small farms, which are generally family owned; and very low levels of education, etc.
- Raspberry growing is the most important fruit production sector in Serbia. There is potential for fresh and high value-added market development. Raspberries are a very important agricultural export for Serbia.
- The fruit production sectors looked at in Italy and Belgium are of marginal significance to the agricultural economies of these two countries. On the other hand, apples and raspberries in Poland and Serbia, respectively, are both of significant importance to the countries concerned.

CONDITIONS/DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

In order to ease the free trade of agricultural goods within the EU common market, the European Commission has outlined marketing standards for F&V. These are the minimum requirements a product has to meet in order to be tradable inside the EU. GlobalGap is an important private international standard. In Belgium, Vegaplan has been developed. This has involved collaboration along the supply chain, ensuring market access for those products that achieve this standard. It incorporates cross-compliance measures, as well as being exchangeable with the German equivalent, thereby allowing access to the German market.

Since the establishment of the Common Market Organisation (CMO) in 1972, Producer Organisations (PO) in the sector have been very important. The majority of Italian POs are specialized in apples and pears, representing 89% of market production, by value. In Emilia-Romagna there are thirty-two POs of which eighteen include pear fruit producers. The main purpose of CMO through POs is to market the output from primary producers, to match production with demand, to optimize production costs and to stabilize prices. POs and their associated forms continue to be the core instrument of European policy for the sector, intent on improving the position of producers in the market, thereby enhancing profitability and efficiency, as well as achieving a better redistribution of value in the supply chain. The main sales channel for fruit producers is cooperatives; nevertheless, among big producers it is often direct sales to traders.

The marketing of fruits and vegetables in Belgium is traditionally dominated by cooperatives (coops). Belgium has a long tradition of coops and was a pioneer in this regard. The majority of coops are recognized as POs. In the F&V sector, 83% of the producers are members of a PO. That is, for F&V, coops hold about 85% of the market share and, most notably, about 70% is for export. For many years,

coops have been merging, up to the point that in 2017 only two ancient independent coops remain: “*Belgische fruitveiling*” (“BFV”, F) and “*BelOrta*” (F&V). Besides these very large coops, new coops have entered the market in recent years. These operate on a much smaller scale (40 to 100 members).

Traditionally, coops in Belgium dealt mainly with auction sale, administration, product control and logistics such as collection, storage and transport. Today, this role has expanded to mediation for bilateral contracts between producers and final buyers, quality control, support for production planning, marketing and innovation, and wholesaling, including importing and exporting. Coops have thus integrated some functions of their former downstream trading partners. The traditional auction remains, but is much less important. This phenomenon is not only observed in Belgium: Bijman and Hendrikse (2003) described how a very similar transition of “auction cooperatives” to “marketing cooperatives” occurred in the Dutch F&V industry. Many factors have contributed to this transition, but the following are of major importance: the concentration of food retail; the increased demand for differentiated and high quality products; increased variation in consumer preferences; and the increased scale and specialisation of primary production. The coops are now focused on capturing economies of scale and lowering transaction costs of large retailers and exporting wholesalers. This evolution is clearly accompanied by a decrease in the commitment of members to the coop.

Apple and pear trees have a rotation period of about 14 and 25 years, respectively. As such, land tenure security is a key component of apple producers’ strategies. In Flanders, a farmer’s land tenure is protected by a “leasing regulation”, which covers about 75% of agricultural land. The minimum term for leasing contracts is nine years, after which the landowner can cancel a contract unilaterally. The apple and pear sector in Flanders is highly dependent on seasonal labour. Seasonal workers are paid considerably more than their Polish competitors.

Policy and regulatory conditions in Poland. The respondents in Poland were critical of current state policy, arguing that it is not supportive of orchard fruit growing due to limited access to subsidies. They also noted that the state response to the Russian embargo included the distribution of free apples in Malopolska Province, favouring producers from the area around Warsaw, where the apples came from. The respondents thought that the state policy was giving advantage to mass production of low quality fruit (production of industrial apples amounts to 60% of Poland’s entire apple production). Generally, the respondents complained about the lack of a national policy regarding apple production, which would point out production directions and possible investment needs, including encouraging ‘economic patriotism’.

Polish farmers have a long tradition of recognizing the importance of state policies towards agriculture and rural areas. During the communist period the state was generally recognized by them as a force acting against them. As such, there are very high expectations for state policies to now be supporting family agriculture. In addition, the EU has been recognized as a very supportive system for family farmers. The result is that Polish farmers have been expecting the implementation of such policies in Poland that – according to their opinions – has not quite happened yet in Poland (contrary to Western members of EU).

The CAP also received a lot of attention from the respondents. In their opinion, starting in 2016 Polish farmers should receive direct subsidies equal to those received in the countries of the old EU. They claimed that Polish producers were not currently competitive as their incomes were lower than the incomes of their Western counterparts. It was stated several times that the position of orchard farmers from Małopolska (and from mountainous regions in particular) was more difficult than that of orchard farmers in other regions of Poland.

The idea of “justified EU subsidies” seems to be especially popular among Małopolska farmers (including apple growers). It results from the mix of two ideas. The first one is that Polish farmers work “as hard as their Western European colleagues”. The second one (and this is the Małopolska peculiarity) has been connected with the mountain character of the region that results in ever hard working conditions.

Policy and regulatory conditions in Serbia. EU accession is critical in determining agricultural policy in Serbia. Through the EU accession process the future member state is preparing to be able to implement all the CAP elements after joining the EU. Nevertheless, there is still a hangover from the socialist period. Prior to 2000, the state was responsible for everything. In the Serbian Agriculture Strategy drafted in 2004 (the first strategy that was not defined in the context of the socialist plan) it clearly stated that producers are responsible for their decisions and no one will make decisions in their name any more. Some of the participants recognized the importance of coordination between local/regional and national level, but all of them generally continued to put too much attention to the role of principal decision maker – the minister. Producers in Serbia are still waiting for strong state support, both in direct and indirect ways (role of the agricultural subsidies and market institutions). Generally, Serbia’s agricultural policy mostly focuses on input subsidies, output area and animal payments, while the share of rural development programmes in the total spending has declined considerably (from 44% in 2006 to 7% in 2013).

Besides the basic subsidies for crop production, agricultural policy measures are oriented toward promotion of high quality food through organic production schemes and improvement of raspberry producers’ marketing activities. Some authors argue that low productivity, small farm area, lack of equipment and machinery, insufficient state support, inadequate and insufficient infrastructure, lack of investment, low levels of education, lack of marketing and limited membership in cooperatives or associations, are the main characteristics of rural areas in Serbia. Small rural households form 48.8 % of total number of agricultural producers in Serbia, holding approx. 8 % of agricultural land (Census data 2012). In most cases they are characterized as capital limited farms, owned by the elderly, often single-person households or part-time farms with regular income outside of agriculture. They are seen to be an essential part of the rural economy. Their numbers are decreasing due to the aging of the village population, migration to urban areas, concentration of capital in agriculture and other factors. Agriculture policy in Serbia aims to support competitiveness of the raspberry production sector, including: input subsidies, support for purchase of equipment, support for expansion of land used for raspberry planting, support for organic production, and support for insurance from hazards.

Organic production in Serbia. Generally, government policy is governed toward promotion of high quality food; particular attention has been paid to the fruit organic sector growth. Land under organic production in Serbia is constantly growing, especially in raspberry production. However, the Serbian

organic sector faces numerous problems, such as: the sector and domestic market are small; International (EU) markets are insufficiently exploited; Insufficient cooperation of actors in value chain; Sector at all levels severely underfinanced; Data base on organic agriculture processing and marketing weak and not transparent. The most active NGO in the sector is Serbia Organica, which is an independent non-governmental organisation committed to developing organic farming and organic markets in Serbia. Their mission is to make organic farming stable and competitive on both the national and international markets.

Environmental legislation

The fruit sector as a whole uses a lot of pesticides and it is heavily regulated in terms of maximum pesticide levels, through a number of EU regulations. This includes restricting certain chemicals, leading to concerns in Italy that there are a range of incoming diseases such as Psylla, Bed bug, Xilella that are difficult to keep under control. There is also concern in Italy that there is a lack of investment into research and development of new chemicals by agrochemical companies in order to address emergency events.

The decision taken by the European Commission to no longer authorize the use of Ethoxyquin is having a significant negative impact on the commercialization of pears. In particular, on the Abate Fétel, which is one cultivar that, more than others, during the conservation stage requires the use of this chemical in order to preserve a high quality of fruit texture. The same problem is not so relevant for other pear varieties such as Williams or Conference.

Market conditions

In Italy, there is a decreasing consumer demand for pears, especially among young consumers. This is putting pressure on the sustainability of Italian pear producers. The Italian pear market is characterised by varieties that are old and outdated; significantly, surveys suggest consumers do not like them. There is a need to develop more modern fruit that is attractive and recognisable by a larger population in terms of age classes. Producers are intent on improving the quality of their products, but compared to apples and other types of fruit, quality characteristics (taste, fragrance, text etc.) are more related to the ripening and storage stage rather than harvesting and transportation. Compared to other European countries, farmers in Italy do not own fruit storage systems. This leads to both high and low quality apples being mixed together in order to try and achieve a higher price in the market, but is often found out.

Italian pear producers can either market their product through independent traders or through a producer organisation. The PO has a number of advantages, mainly in relation to stability. Stability both in terms of supply taken, but also price received. On the other hand, the producer is restricted by a contract and therefore loses some flexibility in terms of where they can sell their product. Pear producers can also sell their fruit to processors, to make juice and marmalade. Pears of Emilia-Romagna in 1998 were given PGI status. 87% of Italian pear exports are delivered within the EU. Very often, access to new markets outside Europe is hampered by phytosanitary barriers, which in fact are more about defending local production. In particular, the export of pears from Italy to the United States is legally allowed, but in practice is not feasible due to the inspection procedures. The export

to Russia suffered a contraction with the establishment of the embargo. Export to China is also difficult. The Chinese agri-food sector is subject to particularly restrictive sanitary standards which, in some cases means there is a total ban on imports of agricultural and food products.

For many years, the apple and pear sectors have been characterized by oversupply, resulting in stagnating or even decreasing prices. The difficulty for farmers to adapt their production to new market conditions is due to the long rotation period of their orchard, as well as entrenched attitudes. Polish exports of apples went up sharply during the last three decades, and especially the last five years. Belgian apple farmers are particularly affected by this because they have relatively higher labour and land costs compared to Polish farmers, while they produce similar varieties of apples.

The main producers of both apples and pears in the world are China, the US and the EU. Even though it benefits from huge production capacities and low costs, China is not a direct competitor for apples, not least because Chinese quality standards do not yet meet international requirements. While Polish production, and in particular *Jonagold*, is very similar to Belgium in terms of quality and yet has lower production costs. Hence, Belgian farmers are not competitive on this market, surviving largely on the basis of consumer preference for local products. On the contrary, pears are rather rare and high value products for which Belgian farmers are more competitive. In general, apples are mainly produced for the domestic market and pears for exporting. In recent years, up to 80% of pear production has been exported. Therefore, the sector is very vulnerable to negative export shocks.

For fruits in Belgium, Russia used to be the most important non-EU export destination with 25% of fruit exports in 2013 and up to 40% for pears. This explains why the year 2014 was gloomy for Belgian apples and pears following the Russian import ban, which is still in place today. The world market for apples is characterised by oversupply. In Belgium, the most popular apple variety is still Jonagold, but in general traditional varieties are being replaced with new varieties. Pink Lady is growing in popularity, but cannot be grown in Belgium. To counteract this, local cultivars are being promoted. Stakeholders feel that apple exports from Belgium will not be very important in the future. Partly because new varieties are less suitable to the Belgian climate than a southern European climate, and partly because Jonagold is not popular as an export. Domestic demand for apples and pears is falling. The demand for pears has benefited from a promotional campaign by VLAM since the Russian boycott.

In Poland, there are three main models for selling apples: producer groups are mostly focused on international (global) and national markets, cooperatives are mostly focused on regional markets; and small family producers are mostly focused on local markets. The Polish government has attempted to gain new foreign markets for apples. However, the agreements signed with China, Canada and other countries so far did not bring the expected results, and orchard farmers have to expand their distribution on local and foreign markets on their own. There was also an opinion among respondents that orchard farmers found a way to go around the Russian embargo on apples. As respondents suggested, Polish producers indeed stopped exporting apples to Russia and started to transport them to Belarus and Ukraine, where these apples were repackaged for further export to eventually reach the Russian market. As a result, Belarus became a leader in consumption of Polish apples and 26% of the entire export went there. The Polish respondents criticised the weak promotion of apples and processed foods made from apples. The government encourages modernisation which has increased the number of apples per hectare, but insufficient thought has been given to the marketing of apples.

This includes improving consumer awareness of the benefits of consuming apples. The participants in Poland mostly focused on factors that influenced apple prices. They pointed out that prices did not depend on local factors or conditions as they were globally determined by the price of industrial apples, which in turn was influenced by the price of apple concentrate.

Almost 90% of raspberry production in Serbia is frozen in cold storage plants, while only 10% is used for processing or sale in retail stores. Most raspberries are exported in a frozen state (up to 93%). Intermediaries make up the most important part of the network, consisting of regional centers (cooling houses), small traders and only a few large and brokers/exporters. They have significant market power in relation to the farmers as primary producers. There are approximate 320 cold stores and an estimated 15,000 raspberry producers. Serbian raspberry farms are small, usually, family-owned seasonal business. Average raspberry plots are between 0.5 and 1 ha. Farmers sell their products to intermediaries, rarely directly to processing companies or exporters and usually with no further engagement. Most fresh raspberries are sold and consumed during the summer season, and only a small number is exported fresh mostly in the Western Balkan region. They account for less than 2-3% of total raspberries production in Serbia which includes home made products of fresh raspberries (juices, traditional food).

Farmers in Serbia are very concerned about the raspberry price in the domestic market. The price is unpredictable. Due to the lack of stable institutional arrangements in the food chain, agricultural producers are faced with numerous problems - they simply depend on price determined by cold storages (traders). The interviewee producer gave following evidence: *"The biggest problem, year after year, is an enormous oscillation of price.* The Serbian market is currently in the stage of hyperproduction. This year all storage capacities are fully loaded - what will happen if they face with barriers in selling current stock at the foreign markets?" For small farms in Serbia it is difficult to take advantage of economies of scale and its production costs are usually high. Investments in transportation and technology improvements are required to facilitate export of high-quality fresh raspberries. Also, they are characterized by the low market and bargaining power. This disequilibrium may to a certain extent be reduced by increased state support programmes targeted at acquisition and construction of cold storages by raspberry producers and cooperatives, so they can be more flexible in terms of the time of sale of their products. The implementation of agricultural standards in Serbia are mainly forced in the context of the EU accession process and will be supported by the IPARD programme.

Summary

- Common sector issues: 1. characteristics influencing market position such as long rotation period and seasonal work force, 2. Market trends in consumer preferences, 3. Export ban and its effects 4. Who is the counterpart in selling fruit 5. Importance of standards 6. Use of chemicals and sustainability.
- In order to ease the free trade of agricultural goods within the EU, the European Commission has outlined marketing standards for fruit and vegetables. These are the minimum requirements a product has to meet in order to be tradable inside the EU.
- Since the establishment of the Common Market Organisation in 1972, producer organisations have been very important in the sector. The main purpose of CMO through POs is to market the

output from primary producers, to match production with demand, to optimize production costs and to stabilize prices. POs and their associated forms continue to be the core instrument of European policy for the sector, intent on improving the position of producers in the market, thereby enhancing profitability and efficiency, as well as achieving a better redistribution of value in the supply chain.

- The marketing of fruits and vegetables in Belgium is traditionally dominated by cooperatives. The majority of coops are recognized as POs. In the F&V sector, 83% of the producers are members of a PO.
- Traditionally, coops in Belgium dealt mainly with auction sale, administration, product control and logistics such as collection, storage and transport. Today, this role has expanded to mediation for bilateral contracts between producers and final buyers, quality control, support for production planning, marketing and innovation, and wholesaling, including importing and exporting.
- In Poland, respondents were critical of national policy regarding apple production, which was felt to give insufficient direction and investment.
- EU accession is critical in determining agricultural policy in Serbia. Agricultural policy aims to support the competitiveness of the raspberry production sector in Serbia, through investing in a range of different elements in order to improve productivity. Key amongst these are improving educational levels, as well as improving marketing through the use of cooperatives. Government policy is also oriented towards promoting high-quality food, particular supporting the development of the organic food sector.
- There are concerns, most notably in Italy, that EU regulation of pesticides is creating a problem with emerging diseases, not least because there is insufficient investment into new chemicals by agrochemical companies.
- In Italy, there is a decreasing consumer demand for pears, not least because many of the varieties are considered outdated in terms of new costumer habits/preferences. In addition, the pear supply chain is very fragmented, leading to a lack of negotiation power. In general, the apple and pear sectors are oversupplied. A key issue has been the Russian embargo. Developing export markets outside the EU is also problematic, principally due to tough phytosanitary standards, which are effectively protecting domestic supplies – in the US and China, particularly.
- Apple and pear trees have a rotation period of about 14 and 25 years, respectively. As such, land tenure security is a key component of apple producers' strategies. However, this extended timeframe makes it difficult to adjust production in the short term, in reaction to market demand.
- In Serbia, 90% of raspberry production is sold frozen and principally for export. The primary producers receive a relatively small percentage of the final price, reliant on the price received from cold stores. There is an attempt to increase the supply of fresh raspberries, which enable a better price for the growers.
- Fruit producers principally sell through producer groups, cooperative groups or local markets/independent traders. Each has certain advantages and disadvantages. However, what is clear across the case studies is that the primary producer generally has the least power within supply chains, making them price takers and affecting their sustainability.

STRATEGIES FOR SUSTAINABILITY

New markets as a high priority. It is becoming increasingly important/strategic in Italy to find and consolidate new markets. Italy exports to certain markets, such as Hong Kong and Canada, but due to the Russian embargo and Chinese phytosanitary barriers much of its attention has been diverted to the Far East. The pear supply chain is highly fragmented. Greater efficiency and organisation is required. The main strategy pursued has been the aggregation of diverse existing groups in order to concentrate production and negotiation power and in so doing improve quality and organization of the supply chain. The most important example of this is "O-pera", an organization that involves

exclusively Italian fruit growers specialized in the cultivation of pears. It represents more than 1,000 pear fruit growers, with the support of agronomists and technicians. Each Opera pear follows a precise path, from cultivation to packaging. There is also a focus on developing new varieties which are more attractive to the consumer. However, this takes a long time and needs to be carefully evaluated. The idea is to open up new markets and market opportunities. They are also working on creating a new label which identifies high-quality pears. Innovation is important, not only in terms of varieties, but also new technologies – especially in relation to pest management.

Experts highlight the key role of cooperatives in Emilia Romagna, in particular for small and medium sized pear producers. In many cases the coops arrange production among their members in order to meet market requirements/demands. Consumer preferences are detected by retailers who then pass this on to intermediate dealers or cooperatives. The result influences not only future production, but also the development of new fruit varieties and new technologies. The dominance of large trader groups necessitates membership of a PO, but this in turn constrains flexibility in terms of management.

The 2014 Russian ban on European F&V is still in place. Being a major export market, the loss of the Russian market is still regarded as a primary reason for the problems that Flemish top fruit farmers face today. In terms of market contraction pears were affected the most: in 2013, pears accounted for 30.1% of the agro-food exports to Russia. Apples accounted for 5.6%. This resulted in a market contraction of 39.33% for pears and 11.06% for apples. To counteract the effects of this sanction, *VBT* started working on getting increased access to new markets, by putting pressure on the Flemish and EU governments to increase the speed of bilateral trade negotiations. *VBT* also lobbied to get financial support for growers that were deeply affected by the boycott. The dramatic price drop of apples in the Belgian market appears to have been the result mainly of the influx of Polish apples that year, which traditionally were exported to Russia. Apple prices on the Polish market were significantly lower than on the Belgian market at that time (and still are today). Yet, a direct market connection and possibly a preference for Belgian apples seems to have been protecting Belgian apple producers.

Relationship with retailers: a contested market power. Farmers mainly sell their products through two different types of supply chain in Belgium. First, apples are cultivated in commercial apple farms in Flanders, based on integrated fruit production methods, before being transported to a cooperative auction where they are sorted, stored, packed and sold. The number of producers that have home-based facilities to sort, store and pack fruits is increasing, reducing their reliance on the range of services provided to them by the cooperative. Large retailers can also buy the apples and transport them to its supermarkets in Flanders. In the second type of supply chain, the local chain, the apples are being cultivated on a small scale organic farm and sold directly to a group of consumers through seasonal fruit and vegetable markets. Retail concentration is very high in Belgium: the three largest retailers now have a market share of more than 70%. This inevitably gives them market power. Concerns that the retailer takes a disproportionate part of the final price. Most of the risk is with the producers, while the margin is concentrated on the retail side. We suggested the possibility of more vertical integration in the supply chain as a solution to this problem. Most stakeholders, however, are not enthusiastic about this idea. They showed a lack of trust towards long-term vertical relationships with supermarkets, and fear that retailers will use producer's vulnerability and risk exposure to create strong competition between them. The long rotation period of apples and pears is also problematic in

this respect, since contracts are usually made up on a yearly basis and will not cover the entire production period of the trees, which would still result in a significant risk for the growers.

The answer to oligopsonistic market power has been the pooling of supply in cooperatives up to now. Farmer trust in cooperatives is currently very low, in Belgium. They are even seen as being partly responsible for the crisis, principally in terms of the marketing of apples and pears. A common feeling among farmers is that their voice is not being heard any more in the management of the cooperative. The idea that the coops have bypassed the common interest of farmers and have developed their own interests. Some farmers are unhappy with the expanded role of the coops in the supply chain, not least in terms of expanding their role towards wholesaling; furthermore, that they are insufficiently transparent. Others consider the investments in shared infrastructure for sorting, storage and packaging as a waste of money. They would rather see the coops' role limited to the pooling of supply, and possibly marketing activities. Despite the low trust and many negative comments on the coops, cooperation is still considered as essential for the strength of the position of farmers in the supply chain. In Belgium, more and more farmers are leaving cooperatives and signing direct individual contracts with retailers. Membership of cooperatives is expensive and their efficiency more and more criticised; furthermore, supermarkets offer the producer higher prices. According to stakeholders, selling to supermarkets is still more interesting than exporting apples, as prices are rather low and unpredictable on international markets. Some growers also adopt opportunistic strategies as they do not sign any contract with retailers but rather wait for high prices to sell their stored volume at once, usually through online platforms.

Due to the small scale and fragmented nature of many Polish farmers, European money was made available to encourage farmers to form producer groups. A key advantage of selling through a producer group is the scale of the sales that can be achieved by the group. This increased scale opens up chain stores and other large purchasers as potential customers. It also enables a stronger position in negotiating contracts; facilitates the storage and sales of fruit to large market chains; and enables farmers to conduct activities like the sorting of apples, which is required by large purchasers from supermarket chains and impossible for individual producers. However, the potential of producer groups for small-scale producers is not fully applied in practice.

There are three models of production and sales for apples in Poland: producer groups, cooperatives, and thirdly the dispersed operations of small, family farms. Direct marketing was discussed, but it was said to involve only 10% of orchard fruit producers in the Polish region. Producer groups or cooperatives were seen as dominating actors here as they could sell their products directly to stores. The respondents were very critical of the processing sector as the price of the final product received by farmers and small processors was unsustainable. The interviewees emphasized that cooperation between the producer group and large supermarket chains allowed for trading of the region's apples with European purchasers. According to fruit growers, a horizontal coordination of cooperation among farmers could be seen in cases of broken farm machinery or equipment. No other examples of horizontal cooperation were recognized in the focus group interview. Zaklina commented: what is the main obstacle? We have a similar impression for the Serbian CS that among numerous advantages, cooperatives and different forms of unions are not seen as important as they could be in the practice. Is it a socialist period heritage? The cooperative model was the dominant model for "agrarian question" solving in former YU.

The respondents in Poland addressed the issue of dependency of producers in their relations with large market and retail chains. They estimated that producers were only able to sell their apples for about 40 – 50% of their final prices. This was thought to be the result of retail chains forcing the producers to incur the costs of market preparation and product packaging, so apples could be placed on supermarket shelves. Contracts with large supermarket chains in Poland were seen to be an important aspect of cooperative work. There is a sense that agriculture in Poland is often run by global food concerns, who dictate market conditions to other players – to a larger extent than the state. They introduce their own criteria and standards for the fruit they are willing to buy. These concerns do not relate to quality particularly, but profit. These criteria also change frequently to the detriment of producers. Discussion in the focus group suggested that it would be beneficial to introduce regulations that could benefit local or regional markets. The idea of 'economic patriotism' was also emphasized and that this has happened in much of Western Europe, but not in Poland. The respondents in Poland were also very critical of the processing sector as the price of the final product received by farmers and small processors was unsustainable. This was attributed to the manner in which market chains operate. Traditional methods of processing in this context were difficult to maintain due to poor prices. During the research they argued that traditional production meant relatively small batches of diverse products (different apple varieties), destined for relatively small, sometimes niche markets.

Key conditions faced by small family raspberry producers in Serbia are unorganized producers/farmers and weak market position connected with poor management capacity. Raspberries are susceptible to numerous diseases and insects, particularly with new plantations, and require a great deal of labour for hand-harvesting (machine harvest is an option only for berries that will be processed and on huge farms, industrially organized), and have a very short shelf life. Raspberry production can be a good fit for small farms (and hence part-time farming). Regardless the size of farm, the production systems have to be improved significantly in the future. Particular attention should be paid to the food quality standards implementation and food safety control.

Raspberry producers don't have a contract price for their product in Serbia. Furthermore, the price of inputs is set and they make forward agreements without any information about the future price of commodity in which they are going to make final payment. *"We have a sort of "blind agreement" - there is no statement about raspberry price, but it has the price of all inputs we take from them."* A great dependence on exporting companies is evident. According to our discussions, there are a few export wholesale companies in the region of Arilje (5-6 larger companies). Farmers are at the bottom of the chain and in a very subordinate position in relation to other participants in the system. In order to improve their position, farmers who are able to build their own storage capacities do so to control the price during the harvest. Currently, around 250 small cold storages operate in the Arilje municipality (a small community in the Region of Sumadija and Western Serbia where 80% of total raspberry production is concentrated). However, the current situation is unfavorable regarding the position of farmers and it is certainly unsustainable in the long run. *"The state should take care to prevent monopolies in the market...the producer takes a lot of obligations, but the trader doesn't have any obligation to the producer. This contract is not fair".*

Raspberry growers in Serbia are unorganized, fragmented and left without adequate representation on those bodies responsible for governance. Strengths of the raspberry sector are: good soil and climate conditions for fruit production; and a long tradition of producing fruit (mainly comparative

advantages). Weaknesses are seen as follows: weak vertical and horizontal links in the domestic market; decreasing competitiveness in international markets; lack of producer organisations. Threats are derived from the broader environment: the economic crisis has influenced prices recorded in the international markets, which has also had a negative influence on the domestic market.

Market chains in Serbia are underdeveloped and in the most cases they are short and do not include small-scale farmers. Due to the cooperative model implemented in the socialist era, cooperative sector in Serbia is constantly faced with problems. The cooperatives of the new generation have been established mainly by fruit-growers, to whom association was the next necessary, logical, economically inevitable step towards better access to the market. However, the activity of producer groups (nor necessarily organized in the form of cooperative) is seen as an alternative for better performance and organization of fruit producers.

Cooperatives in Serbia have a long history, and can be divided into two groups. The first group are pseudo-cooperatives, and the second are true cooperatives. "Pseudo-cooperatives" can also be divided into two subgroups. The one is referred as "old cooperatives" where farmers do not have the right to administer, but instead the employees do this (the farmer is only a "person who cooperates with organization", and is not a "member" of cooperative), and the other, the "private cooperatives" are formally registered as cooperatives but are really private companies owned by one or several individuals without open membership. The interviewees and stakeholders agreed on the importance of cooperation in the food chain.

The agribusiness sector in Serbia was supported under the USAID Agribusiness Project (2007-2012). Particular attention was paid to the berry fruit sub-sector, which was seen as a rare source of steady income for growers and the processing industry in western and south Serbia. The majority of the berries grown in Serbia are old varieties which are usually suitable only for processing and not for the fresh markets. These varieties are grown in open fields, with outdated technology, and as a result the farms have poor yields and low quality fruit. About 90% of all berry fruit produced in Serbia is exported. Although the global demand for fresh fruit grows continually, due to consumer interest in a healthy diet, the exports of raspberries, blackberries, currants and blueberries for the fresh market were non-existent for Serbia at that time. The project supported the development of the Fresh Berry Fruit Value Chain in Serbia. The processors were assisted to adopt, and become certified in, relevant international quality and food safety standards and traceability requirements.

Summary

- It is becoming increasingly important to find and consolidate new markets, not least due to the Russian embargo and Chinese phytosanitary barriers. The pear supply chain, in Italy, is also highly fragmented. Greater efficiency and organisation is required. The main strategy pursued is the aggregation of diverse existing groups in order to concentrate production and negotiation power. The most important example in Italy is 'O-pera'. The idea is to open up new markets and marketing opportunities. Innovation is important, not only in terms of varieties, but also new technologies in relation to pest management.
- In a number of the case studies, it was mentioned that it is important to develop new varieties. However, particularly in relation to apples and pears, there is a long time frame involved. In

relation to raspberries, there are also concerns that developing new varieties has in the past been associated with imported stock which has been prone to fungal disease.

- Cooperatives and producer organisations are very important in terms of improving prices and access for individual producers, as well as enabling access to certain markets, such as large-scale retailers.
- There are two main supply chains for fruit: larger-scale channels, such as selling to supermarkets or exporters; and more localised direct sales. Working with supermarkets can enable access to markets, but there is widespread concern that the retailer is too powerful and takes too much of the value-added. Cooperatives and producer groups help in this respect, although there seems to be a growing distrust of cooperatives, mainly because they have become too large and lost touch with their membership in some cases.
- Concern was also expressed in Poland and Serbia, particularly, that the prices paid by the processing sector are unsustainable.
- In Serbia, it was stressed that primary producers are very weak in negotiating terms, particularly in relation to export companies. Producers can help alleviate this by investing in their own cold storage.
- There is considerable investment in Serbia in developing marketing channels and quality controls, in order to help expand export markets. Raspberries are a very important export sector for the Serbian agricultural economy. A key component of this, is developing a market for fresh fruit, rather than simply frozen fruit, in that the former has the potential for greater value added.
- In general, individual fruit growers are fragmented and impotent in relation to other actors within the supply chain.

THE FUTURE SUSTAINABILITY OF THE SECTOR

At an institutional level there are negotiations initiated by the EU and the Italian Government with Chinese local authorities to unlock some regulatory restrictions related to apples and pears. There are also attempts to strengthen the PGI status. In addition, the EU-wide initiative “Fruit school scheme” aims to encourage good eating habits in young people, which is having a positive effect on fruit demand.

Although apples are characterised by very different market dynamics from pears, disentangling the marginal effects of each commodity is often difficult as most of the farmers produce both in Belgium. Hence farmers unanimously agreed that the sector is in crisis, principally due to oversupply. Both domestic and foreign consumers prefer new cultivars such as Pink Lady more than common Belgian apples such as Jonagold. Many producers feel this is due to poor marketing, rather than the quality of the apples. Despite the existence of some very innovative producers, retailers see Belgian farmers as being slow in adapting new cultivars. This is partly due to the expense of doing so, as well as the uncertainty of how well the new cultivars will be accepted within the marketplace, with the risks usually fully-covered by the producer himself.

Producers are also concerned with export issues related to political factors; for example, the Russian boycott. Brexit is also of some concern. Belgium top fruit farmers suffer from competition from other regions, especially the Polish apple sector. Many farmers believe top fruit production in Eastern Europe is heavily subsidised by the EU. Some argue that abolishing subsidies across Europe would benefit Flemish farmers, in that they are highly cost-efficient. Frustration also about non-European

producers (especially Argentina) who have less restrictions in terms of pest control, yet Belgian producers are not compensated with a price premium.

According to Belgian farmers there has been a **credit contraction** since the financial crisis. In Poland, intensification of production rather than its mere maintenance as well as its improved quality were seen as the remedies for the current situation. Participants contacted during the research pointed out the weak lobbying position of farmers who operate orchards. Access to credit was also mentioned in Poland. Firstly, in terms of what is the most suitable institution. Here, the respondents alluded to cooperative banks as local institutions, close to local matters, cooperating with local government, and as potential allies to local development. In cooperative banks the customer was never anonymous and the decisions were made locally. Farmers are wary of taking out loans, although cooperative banks generally enjoy a high level of trust. According to producers this type of bank should be supported by the state because of being farmer-friendly. Another problem mentioned by respondents related to the compatibility of the credit system to the rhythm of agricultural production. Farmers' unwillingness to take credits and mortgages was a sign of their fears of inability to pay them off as sales of products could be problematic and uncertain. In the future, it is important to strengthen the role of credit unions to be more sensitive and flexible in responding to producer requests unlike the commercial banks. In Serbia commercial credits are not well aligned to satisfy the needs of agricultural producers. One solutions is microfinance, due to raspberry sectors structure in Serbia.

The respondents noted that Polish agriculture was generally lacking a strategic policy for orchard fruit production that would allow the farmer to know what to invest in, what to cultivate. Emphasis on regional diversification of apple production should be an integral part of such a policy. Should also strengthen the role of producers when facing purchasers and processors through the strengthening of local apple processing and more intensive cooperation among individual producers.

Respondents in Poland find it difficult to access labour. Such work is not attractive to young people because it is hard and does not pay much. Young people are more likely to go abroad, where for the same work they can earn four times as much as what they would receive in Poland. As such, hiring workers from Ukraine is a frequently observed strategy. In Serbia too, workers are from Bosnia and Herzegovina or south Serbia and Macedonia. Small family farms were established because of inheritance or through marriages, in Poland. According to the respondents only 10 – 20% supported themselves exclusively through agricultural work (in orchards). Such orchards do not generate significant incomes and are mostly kept due to family tradition. Some growers were mostly supporting their orchards through agricultural subsidies from the European Union. There were also problems of a generational change as there were no orchard successors. The respondents described orchard work as hard and unprofitable and thus not very attractive to young people.

A need to change to new types of raspberries, in Serbia, that are sold as fresh produce. The current varieties (Vilamet and Miker) are sold in the form of frozen product. Price of the frozen products is less than for the good quality fresh produce. Simultaneously, it requires a new form of food chain organization starting from the producers, through development of systems for packaging specifically designed to cover all requirements in fresh produce transport and storage, to completely new marketing logistics (transport and retail). Quality schemes in Serbia are also important: as far as raspberries are concerned, our interviewees put attention on labels such as Made in Serbia, PDO and

Organic. In raspberry production, Serbia has a PDO standard. The other alternative in adding value is connected with fruit processing.

Raspberry production is recognized as a unique opportunity for the agricultural development in the Region of Western Serbia and Sumadija. However, there is a huge discourse related to planting materials (nursery stock/canes), environmental sustainability and trading. The problem is essentially connected with the necessity to shift sales from frozen to fresh raspberries. "Most raspberry plantings in our country were unfortunately set up by nursery stock (canes) from existing plantings. This is one of the most important reasons for low yields, bad quality of fruit and short duration of many plantings." Plant material is infected with a fungus *Phytophthora fragariae* var. *rubi*. Unfortunately, poor standards in import procedures have resulted in huge problems that raspberry producers have faced in practice. It is important to note that this fungus is permanently found in the soil, but for its activation is necessary to create the appropriate conditions such as a large amount of water in the soil. There is a positive trend in the development of young farmers' activity in the Arilje region (Serbia). During the last 5-6 years more people started with the agricultural (raspberry) business. It is evident that younger families are going back to rural areas to farm. Farmers in Serbia are very cautious in relation to finance. Family farmers usually use their own resources combined with subsidies to develop or technologically improve their production. The first formal model of a short- and long-term lending programme for agriculture was established in 2004 by the Ministry of Agriculture. In 2010 a new model of credit support by the Ministry of Agriculture was introduced - interest-rate subsidies are provided in order to encourage banks to lend to the sector.

Summary

- At an institutional level there are negotiations initiated by the EU and the Italian Government with Chinese local authorities to unlock some regulatory restrictions related to apples and pears. There are also attempts to strengthen the PGI status. In addition, the EU-wide initiative "Fruit school scheme" aims to encourage good eating habits in young people, which is having a positive effect on fruit demand.
- In Belgium, there is unanimous agreement that both the apple and pear sectors are in crisis, principally due to oversupply. Concern also that export issues are often related to political factors, such as the Russian boycott and Brexit.
- To some extent, all of the case studies involved have suffered a credit contraction since the financial crisis of 2008. Particularly in Poland and Serbia, it was mentioned that more flexible credit provision should be available.
- Particularly in Poland, it was noted that there is a lack of strategic policy for orchard fruit production.
- Across all the case studies, there are concerns that insufficient young people are coming into fruit production – generational succession. This is mainly because the work is considered hard, with relatively low pay. Polish young people, in particular, can get far more money for working in another country. The exception to this trend is in Serbia, where over the last 5-6 years more people have started raspberry production, especially younger farmers/families.
- In Serbia, raspberry production is recognised as a unique opportunity for agricultural development. Raspberry production is also a very important export earner in Serbia. As such, the future of this sector is particularly important in Serbia. Apple production is also of significance within Poland. As such greater emphasis is given to these two countries' fruit sectors, than in Italy and Belgium, where the food sectors involved are of relatively minor significance to their wider agricultural economies.

Commodity: Fruits				
Country	Context	Conditions	Strategies	Future
Italy	<p>The market for the pears grown in this region is somewhat old-fashioned and has been declining of late.</p>	<p>The majority of Italian Producer Organisations specialise in apples and pears, representing 89% of market production, by value.</p> <p>Decreasing consumer demand for pears, mainly because varieties are old and outdated. Pears marketed either through independent traders or a PO.</p>	<p>Increasingly important to find and consolidate new markets, but this is difficult due to phytosanitary barriers. The pear supply chain is highly fragmented. Greater efficiency and organisation is required. The main strategy has been to aggregate existing diverse groups in order to concentrate production and negotiation power. The idea is to open up new markets and market opportunities. Co-operatives are very important. O-pera is an important initiative.</p> <p>Advertisements and promotion to encourage consumer preference toward pears.</p>	<p>At an institutional level, there are negotiations initiated by the EU and the Italian government with Chinese local authorities to unlock some regulatory restrictions related to apples and pears. There are also attempts to strengthen the PGI status.</p> <p>Concern that there is a generally ageing farm population - a lack of generational succession.</p>
Belgium	<p>The number of top fruit farms has declined, although the acreage has remained relatively stable. I.e. there is a process of concentration. There is a general shift from apple to pear production.</p> <p>The Russian embargo hit both apples and pears, but particularly pears, which accounted for 30% of agri-food export to Russia.</p>	<p>The marketing of fruits and vegetables in Belgium is traditionally dominated by cooperatives. The majority of cooperatives are recognised as producer organisations. In the fruit and vegetable sector, 83% of producers are members of a PO. Coops hold 85% of market share, 70% of which is for export.</p> <p>The apple and pear sectors have been characterised by oversupply for many years – both for the Belgian and world markets.</p>	<p>To counteract the effects of the Russian sanction, VBT worked to increase access to new markets by putting pressure on both the Flemish and EU governments to increase the speed of bilateral trade negotiations. However, increasing exports is difficult due to phytosanitary barriers. (This is generally the case, yet Belgian fruit producers are performing rather well in this respect, giving them a comparative advantage and strength in the sector).</p>	<p>Both apple and pear farmers unanimously agreed that both of these sectors are in crisis, principally due to oversupply. Belgian farmers are seen as being slow in adapting new cultivars, which they need to do in order to access modern markets.</p> <p>There are also concerns about political issues such as the Russian boycott and Brexit.</p> <p>Concern that there has also been a contraction of credit since the financial crisis of 2008.</p>

			Larger scale producers sell through cooperatives and subsequently supermarkets; smaller producers sell through local chains. Concerns about disproportionate retailer power. Until now, cooperatives have been part of the solution, but farmer trust in cooperatives is currently very low. More and more farmers are leaving cooperatives and signing direct individual contracts with retailers or selling through online platforms.	Concern that there is a generally ageing farm population - a lack of generational succession.
Poland	Farm size in Poland is very small and fruit producers are highly fragmented. Apples are the number one export for Poland and the region of this case study.	<p>Respondents were critical of the current state of policy, arguing that it is not supportive of orchard fruit growing, that there is a lack of national policy regarding apple production and marketing, and that there is insufficient investment in innovation and development.</p> <p>In Poland there are three models for selling apples: producer groups focused on international and national markets; co-operatives on regional markets; and small family producers on local markets. Respondents were very critical of the processing sector, as the price received by farmers and small processes is unsustainable.</p>	Due to the small-scale and fragmented nature of many Polish farms, European money was made available to encourage farmers to form producer groups. Producer groups and co-operatives dominate, with direct marketing only involving 10% of orchard fruit producers. Producer groups are facilitating access to large-scale retailers and subsequently European-wide purchasers. The potential of producer groups for small-scale producers is not fully applied in practice.	<p>Intensification, rather than simply maintenance, is seen as a remedy for the current situation. Continued concern about the weak lobbying position of orchard farmers.</p> <p>There are continuing problems accessing credit, not least due to the credit system being incompatible with the rhythm of agricultural production. There is a need to strengthen the role of credit unions.</p> <p>Concern that there is a lack of strategic policy for fruit production.</p> <p>Concern that there is a generally ageing farm population - a lack of generational succession.</p>
Serbia	Transition to a market economy and harmonisation with EU legislation and practice override everything else. Low-levels of education in rural areas. Raspberry production contributes a	EU accession is critical in determining agricultural policy in Serbia. Low productivity, small farm sizes, inadequate infrastructure, lack of investment, low-levels of education, lack of marketing and	Regardless of the size of farm, production systems need to be improved significantly in the future, particularly in relation to food quality standards. Farmers are currently very	Need to develop new types of raspberries that can be sold fresh, rather than frozen in order to increase value-added potential. This requires new forms of food chain organisation

	<p>high share of agricultural exports from Serbia and is strategically important to the agricultural sector more generally.</p>	<p>limited membership in cooperatives are highlighted as key areas affecting raspberry production in Serbia.</p> <p>About 90% of raspberry production in Serbia is frozen in cold storage plants, with 93% exported frozen. The Serbian domestic market is currently fully supplied. Individual producers tend to be very small and lack negotiation power.</p>	<p>dependent upon a few exporting companies. In order to improve their position, some farmers are building their own cold storage facilities. There is also a drive to increase the quantities of raspberries grown for the fresh market, which has greater value-added potential, but there are problems with infected root stocks.</p> <p>There is a lack of producer organisation and decreasing competitiveness on international markets. Market chains are under developed and in most cases do not include small-scale farmers. Cooperatives are one answer, but have a problematic history in Serbia. More work needs to be done on developing suitable cooperatives and formal contracting.</p>	<p>and the development of quality schemes. However much of the new material is infected with a fungus.</p> <p>Farmers in Serbia of very cautious in relation to finance, usually relying on family members.</p> <p>Serbia is unusual in seeing an increase in young farmer activity over the last 5-6 years in starting raspberry businesses.</p>
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- A key issue with orchard fruit production is the long rotation period of the trees. 10-14 years for apple trees and 25 years or longer for pears.
- The Russian embargo has been difficult for producers in all case study areas.
- Concerns that retailers have disproportionate power within the supply chain, especially in relation to primary producers.

Meat - Portugal (beef-extensive) + Denmark (poultry-intensive)

CONTEXT

In Denmark there are around 400 poultry meat producers, the vast majority of these rear chickens with the Central Denmark Region having one of the highest concentrations of poultry meat producers in the country. Furthermore, the only two major slaughterhouses managed by the companies HKScan and Danpo are located within the region, which makes poultry production a regionally important industry. The Danish poultry meat production rate is fairly stable, with the sector producing around 125.000.000 birds annually, which are slaughtered in Denmark at the two major slaughterhouses, in addition 10.000.000 birds are exported as live birds and slaughtered in other countries. The poultry meat production has a total economic value of DKK 1.791 million (€240 million) (2015 figures). The production is organized under an industrial agricultural production model, with fairly large-scale and modern production facilities in farms that house chicken flocks typically ranging between 20.000-40.000 birds, the average number of conventional birds produced annually pr. production facility being around 500.000.

This is all in contrast with beef production in the Alentejo, Portugal, which is focused on extensive production within a multi-functional silvo-pastoral land-use system, the Montado. The Montado is acknowledged for its high level of sustainability and socio-ecological resilience, and currently covers over 47 % of the region. Alas, the Montado is also considered as heritage, thus being wider than a mere production system. Cattle is only a main (albeit essential) component of the wider system. The main components of the system are protected through regulation and planning (e.g. Oak trees cannot be cut down). Additionally, HNV Farming systems are strongly affected by nature and landscape designations (e.g. Natura 2000) and incorporate traditional cattle breeds (e.g. Alentejana, Mertolenga), with their own producers' associations.

Despite the prevalence of traditional and extensive production systems, between 1999 and 2009 a raise of a 2,76 % in the number of heads of beef was officially recorded, with a total of 209.215 heads for 2009, a 17.77 % of beef at the National level. This is however in contrast with the number of producers, which for the same period of time decreased by a 9,31 % to a total number of 1.159 producers by 2009, thus indicating to a gradual concentration of the property and production in fewer and larger farms. Furthermore, such statistical and territorial trends have remained constant for the years following 2009, although final numbers in the agricultural and livestock census will only become official in 2019, once the new census is published. In terms of changes in land cover, a generic process of degradation (both qualitative and quantitative) has lately been detected in the Montado, a trend that will undoubtedly have direct (likely negative) impacts over the extensive production of beef meat in the region. Alentejo is still the region with a largest number of heads of beef in continental Portugal, coping 72% of beef meat commercialization (www.ifap.min-agricultura.pt/). As an example of this, only in the local authority of Elvas (in the Eastern edge of Alentejo) a number of 94 producers and 13.684 suckling cows were registered in 2015, a vast majority of which operate in a Montado context.

Back to Denmark, and regarding trade, a relatively high share of export characterizes Danish poultry meat production, as more than half the production is exported. However, concurrently about half of the Danish consumption of poultry meat and poultry products is imported - a proportion that has been

increasing in recent years. A reason for this configuration of the value chain is that Danish slaughterhouses have specialized in the production of fresh poultry products, that are exported and frozen or processed chickens are imported. Furthermore, the Danish poultry industry is part of a globalized value chain, which implies that the cut-up chickens are retailed at the market where the value is highest, for instance, breast meat is sold locally and the chicken feet are exported to Asia. Extensive beef in Portugal has only very recently become an exportable commodity with the prospects open by new infrastructures in the region (Sines Harbour and Port) playing a major role in the opening of new markets, e.g. middle East and N Africa. In this context, distance and demand for certain standards and practices (e.g. Kosher) favour Portuguese commodities. This is despite of the fact that still much of the produce consumed nationally is of foreign origin (e.g. Argentinian) with the advantage competitiveness of Portuguese produce resting mainly on DOPs, at higher purchase prices.

The poultry value chain is composed of very few and specialized actors on both supply and processing side and they are primarily private companies. For instance, the day-old chickens are nearly all produced by one company, DanHatch and there are two major and privately owned slaughterhouses. Furthermore, there are only a handful of companies that produce fodder for the chickens (according to specifications developed by DanHatch, which is adapted to the particular breeds of birds that are used). Hence, this organisation of the value chain also means that there is virtually no competition between the actors, as there are no redundant actors in the value chain. Therefore, the actors in the value chain are also very well coordinated in their practice. Furthermore, when there are no cooperatively owned companies on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and also few options for negotiating other prices or qualities than what is automatically given. This configuration of the value chain means that production standards and qualities are very strongly coordinated.

The two abattoirs, Danpo A/S, which is a subsidiary of the Nordic based Scandi Standard and HKScan, which is also a big North European player are the result of a series of mergers and acquisitions. However, the economy in the two slaughterhouses differs significantly. Danpo have a fairly stable economy, with an annual turnover of about 1.8 billion DKK and produce an annual result of a more than 60 million DKK. Furthermore, earlier in 2016 Danpo acquired the dedicated organic slaughterhouse Sødum that has developed a range of organic chicken and welfare chicken products. HKScan has experienced a decline in their annual turnover of about 360 million DKK (2011-14) and has been struggling with a deficit in the past couple of years, primarily caused by the Russian food ban.

Beef from Alentejo produced in extensive traditional systems is instead heavily subsidized through CAP (according to farmers consulted within SUFISA, CAP subsidies can represent up to 60 % of their net total income, and is a required safeguard for their financial survival). Despite of this, qualitative and quantitative decline in the system (largely unnoticed), as reflected by the fact that in spite of Alentejo being the largest beef producer in the country no large-scale abattoirs are found in it. This creates dependence on external services and institutions to cope the whole value chain, which is mainly dominated by big National retailers, such as Pingo Doce (a big National supermarket chain). Central Denmark Region is characterized by extensive rural areas and a high proportion of agriculture (65 %). The region is diverse, as the western part is rural with intensive agricultural production, while eastern part is quite populous, containing the second largest Danish city, Aarhus. This is also reflected in the agricultural structure, where a number of small farms around Aarhus supply the city with

vegetables, while the western part of the region is dominated by large farms, with the main income from animal production. On average 3 % of the workforce in the region is occupied by agriculture, forestry and fisheries, which is higher than the national average of 2 %. The most important agricultural products of the region are industrial crops, such as silage corn, wheat, grass and barley for feedstuff as well as pigs, poultry, pelts and milk.

Alentejo, instead is still dominated by big family estates, and increasing property concentration that difficult access to newcomers. Other factors that render it essential to better disentangle the current situation of extensive beef production in the region include: i) A great difficulty of access exists for land owners and farm managers to private financial capital and loans, ii) Cattle has low productivity and low-density (extensive systems-0,2-07 animals/hectare), with a minimum farm size of between 400-600 Hectares being frequently cited in SUFISA as necessary to render any farm focused on cattle financially viable, and iii) Low levels of innovation capacity are detected in the sector complicating the future, despite high levels of social, and even political acknowledgement of the many values (mainly social and environmental, rather than economic) and relevance of the sector for regional development. Such values are actually explicitly recognized in the main regional development policies.

Country	Study region	Farm structural change	Value chain org.	Context
Portugal	Central Alentejo	<ul style="list-style-type: none"> Traditional latifundia system is largely unchanged, if not worsened, Access to property and management is restricted to larger (profitable) family farming members. Intensification processes are marginal and even contested, Montado system currently hampered by (quantitative and qualitative) degradation. 	<ul style="list-style-type: none"> Individualistic strategies and attitudes prevail, Associativism is relatively common but bears little market power, Concentration of trade and transformation is dominant, and increasing 	<ul style="list-style-type: none"> Highly marginal rural region, with low economic indicators (even for the S European context), Traditional mind-sets and related management models still largely dominant in the sector, De-population and environmental change (e.g. climate) largely influential.
Denmark	Central Denmark	<ul style="list-style-type: none"> Intensive production of meat for export is a main focus of the rural sector, with smaller agriculture being marginal and peri-urban, This is underpinned by a productivist discourse which permeates policy and industry, Access to farming is limited by (restrictive) access to private credit for investment 	<ul style="list-style-type: none"> Industrial concentration determinant (e.g. slaughterhouses), Financialisation of agriculture is paradigmatic, Specialisation and value chain coordination are ubiquitous in this sector. 	<ul style="list-style-type: none"> Dychotomical amongst Peri-urban (Aarhus) and largely agricultural areas (West), Industrial farming dominates the regional landscape, Still, farming contribute little to regional workforce and GDP.

CONDITIONS/DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

In the late 1990' Denmark experienced several cases of salmonella outbreaks related to chickens. To secure the food security for Danish consumers the government in collaboration with the poultry sector developed a number of regulations. The legislation details the conditions for poultry production, such

as requirements for the stable system, education of workers, animal welfare requirements and hygienic standards, the law is particularly adapted to industrial scale chicken production.

In the 1980-90's food security became a growing concern and a number of action plans to combat infections in poultry meat were implemented first in 1989, and later again in 1998. This was followed by a new action plan in 2008 focusing on *Campylobacter*. The actions plans have had an effect and there has been a significant decline in the number of reported infections. Hence, in general, Danish broilers have a high level of food safety and the use of antibiotics is very low as the production system ensures minimal external exposure of the birds to guarantee a high degree of protection against infections and an efficient management. In the poultry industry, quality is assured by daily data reports to a common database -KIK (The Quality System In Chicken Production) and ACQP (Assured Chicken Quality Programme). The quality assurance scheme guarantees full traceability throughout the broiler production chain, and it is a requirement for all actors in the value chain and close to all birds that are slaughtered in Denmark are covered by a quality insurance scheme. The system is third party accredited and audited, which allows veterinarians, slaughterhouses and key customers to monitor the mass balance and general health of a batch of chicken. Furthermore, the system can be utilized as a benchmarking tool, enabling comparison of efficiency between producers.

Avian flu is increasingly also a concern among poultry producers. Avian flu is a highly contagious viral disease that primarily infects birds, but exposed humans may also be infected. The disease originated from Asia and infection is caused if the broilers come into contact with migrating birds. Any species of bird can be infected by avian flu and with some species the mortality rate is as much as 100 %. Chickens and turkeys are the most vulnerable, while waterfowls generally are more resistant. In 2006 a particularly contagious and aggressive strand of bird flu quickly spread across the different continents (H5N1). Again, in the fall of 2016 a strain of H5N8 spread across Northern Europe and elsewhere. In particular, free ranging birds are in the risk of getting in contact with contaminated birds. It is considered highly unlikely that conventional poultry producers, who keep their birds indoors and put a great effort into reducing any contamination in the stables, are exposed to infections. This recent outbreak affected many of the European countries, but in Denmark only a number of wild birds were found and a few pastime farms with outdoor rearing were infected. However, when infected birds were discovered important Asian markets were closed (particularly South Korea).

The disease has had a profound implication on the market conditions as export markets are automatically shut down for 3 months following OIE regulation, when infected birds are discovered, and therefore an outbreak of vian flu immediately affects the quotation that is given to farmers. Regulatory conditions are a key factor in poultry production, in particular regulation to manage the aforementioned diseases in birds; salmonella and bird flu. Regulations to combat these important threats has been developed in close collaboration with the producers. Furthermore, apart from the mandatory regulation developed at national level a number of private initiatives have also been included along the value chain on a voluntary basis. Regarding the contemporary regulatory conditions farmers' particularly note four aspects that are important in their decision-making: i) Disease management. ii) Hindrances to foreign trade, iii) Organic regulation, iv) Quality assurance in the poultry production.

In Portugal, regulation has played a similarly relevant role in the maintenance and sustainability of the extensive traditional land-use systems that, per-se, are not financially viable under current management strategies and production models. In this sense, CAP and EU-led subsidies have proved essential. However, common perception exists (especially among producers of animals and meat) that CAP policies are not fit for the highly variable Mediterranean conditions, and related extensive and multi-functional systems. In addition to these, it has become apparent along the project that in spite of the good intentions, National and regional policies in place to protect singular elements of the system (e.g. Oak trees-Decreto Lei 155/2004) may not favour the system's multi-functionality, without which extensive cattle production does not make sense. Furthermore, policies in this context do not favour farm and business succession and new entrants. According to most participants in SUFISA, nor pillar I nor Pillar II alone reflect the complexities within the system, thus current CAP structure being considered inadequate (fractured and uncoordinated, and also extremely complex and thus, unclear for producers).

On top of this, it is now becoming gradually more evident that climate change and environmental degradation (e.g. pests) are still insufficiently reflected in the policy framework, despite these are factors that are already strongly affecting the sector. Recently, CAP is shifting towards more market-oriented measures. This is generally welcome by some sectors (e.g. big retailers dominating the market), but bring out generic preoccupation about the future by many farmers and others (too many rapid changes, and decision centres far-away from the land owner and manager). More generically, it could be deduced from the CSP analysis that current policies are considered incapable of incentivizing the many qualities and potentials of the system (alternatives suggested by actors engaged include; spatially targeted Agri-Environmental schemes, Payment for Ecosystem Services Schemes or Incentivizing of traditional breeds of cattle to compete externally). This is added to the fact that extension and advisory services are considered insufficient under current policy conditions, especially given the extreme complexity of policy and funding procedures and requirements.

In addition to the former, more generic, aspects, many regulations are in place in Portugal (see Appendix 3 of the 2nd Draft National Portuguese Report) for livestock-related issues as important as; i) Animal nutrition, ii) Animal identification, iii) Novel exercise of livestock activity, iv) SIRCA (system for the identification and gathering of death animals in farms), v) Animal Protection, vi) Animal transport legislation vii), Support regime, and viii) premiums for suckling cows-continental 2016, among others. In addition, many other pieces of legislation exist to regulate other components of the wider Montado system (Trees, soils, biodiversity, landscape and social components). However, it seems to be a problem that, even if the importance of the system as a whole is recognized as a first-class-territorial asset for the region (see planning legislation already mentioned), no legislation per se exists to regulate the whole silvo-pastoral system. This is in contrast with the neighbouring case of Spanish Extremadura, where the similar Dehesa system has been protected as a whole since 1986.

Country	Policy/regulation	Farmer perspectives
Portugal	<ul style="list-style-type: none"> • Regulations exist that protect single elements (e.g. native tree species) of the wider silvo-pastoral system, but not the system as a whole, • Regional development strategies consider the Montado a regional asset for sustainable development, • Large dependence on CAP policies to survive in its current form. 	<ul style="list-style-type: none"> • Policy is overly complex and extremely unpredictable, rendering the context largely uncertain, and tough to plan for at adequate timescales, • CAP considered as a N European-focused framework, with little consideration for S European contingencies, • Complexity of multi-functional system not matched by policies at any level (EU to local), • Preoccupation with increasingly market-focus of (future) CAP.
Denmark	<ul style="list-style-type: none"> • Disease and quality control are extremely precautionous and strict in the poultry industry, • In the past, this has hindered capacity to export • This is accompanied by many (strict) private initiatives, which have proven to raise competitiveness on an international framework, • Organic largely supported and controlled through numerous regulations, 	<ul style="list-style-type: none"> • The sector is largely conscious of the relevance of strict regulations to secure quality standards and ultimately to improve competitiveness at international level, • Despite of this, the industry actors are largely public-funding-independent, a situation that is largely favoured, • Market re-orientation of CAP may benefit intensive systems, which are highly competitive in the international market, without public funding required.

Markets and market conditions

On a global level, poultry meat is one of the fastest growing meat types. Currently the farm-gate price for poultry hover around 6 DKK (0,8 Eur.-equivalent), but compared with the milk price, in recent years it has not seen similar market volatility. Therefore, poultry producers enjoy a much more stable economic framework than other commodities in the same context. One of the reasons for this difference may be that poultry production varies more than dairy production, and it is possible for producers to adjust production if commodity prices are high or low, hence there is little response time for producers to adjust production rates. The share of poultry meat in the overall Danish meat consumption is currently rising and by the end of 2014 it is the second most consumed protein with a market share of 26.4% of the Danish population's annual meat consumption and the annual per capita consumption is 24 kg. Compared with other product categories poultry meat is a fairly uniform category, almost the entire retail market is composed of fresh standard poultry meat products. Generally, poultry meat is perceived as a cheap and lean meat product that is easy to prepare, therefore it has become an important ingredient in quickly prepared everyday meals. Differentiations in the product category include various brands, various cuts and marinades, but there is little variation in the primary production.

Compared with this stability, overall beef meat production in Montado systems in the Alentejo (and Portugal) has been steadily increasing over the past few years along with farm property concentration, although the Montado system itself has been declining, both quantitatively and (mainly) qualitatively. However, the financial profitability of the farms following current management options is still low. This bias is lately driving changes towards intensification and specialisation, thus resulting in the further degradation of the traditional system. As aforementioned, for this commodity and region, new international markets have been only recently opening (e.g. N Africa and Middle East).

Despite of this, traditional breeds, which are strongly supported through DOPs and producers associations (e.g. www.mertolenga.com, and www.bovinoalentejano.pt/) are still non-competitive, either financially nor productively when compared with foreign ones (e.g. from Argentina or Aberdeen Angus). Furthermore, the recent financial and economic crisis strongly hit National consumer's capacity and options for more quality produce (including meat from regional breeds, such as Mertolenga and Alentejana) to be competitive.

In Denmark, the poultry value chain is composed of only very few and specialized actors on both supply and processing, which are primarily dominated by private companies, obligated to make a profit for their investors. Furthermore, this organisation of the value chain also means that there is virtually no competition among the actors, as there are no redundant actors in the value chain. This leaves very little room to manoeuvre for the farmer, whom is also put with strong pressure to fulfil his particular role in the chain. Furthermore, since there are barely no cooperatively owned actors on the supply and demand side of the value chain, farmers have little influence on how the value chain is assembled (market power) and only a few options for negotiating more convenient prices than what is automatically given. In the case of beef meat production in Portugal, a similar oligo-poly of the main commercial/trade and marketing agents at the National scale (e.g. big supermarket chains-e.g. Pingo Doce) has determined a similarly low market power of Montado producers. Because of this and other factors, the prices paid to the producer have kept its levels (low) over the few last years, thus being constantly undermined by increasing inflation rates, consequently diminishing competitiveness of an ever-expanding market. This is added to the fact that workforce availability and capability is clearly insufficient, thus resulting in an overall inefficient production-end of the market

Regarding organic production, although the Danish organic market is important with an average market share of 8 %, less than 1% of the chickens that are produced in Denmark are certified as organic. There are a number of reasons for this market lag. 1) The industrial and hygienic standards in the regulation for broiler production are adapted to large-scale industrial production, and therefore imply high costs per unit, turning it financially unviable to slaughter the small flock sizes that are common in organic production. 2) Technically, it is difficult to move from conventional into organic, as organic birds require access to outdoor areas and the central location of the chicken houses on the farm tend to collide with the need for outdoor rearing. 3) The abattoirs are highly mechanized in their setup and they are adapted to the large volumes that are common in conventional poultry production. However, as the organic flocks are considerably smaller than standard ones, the slaughtering costs for organic chickens are significantly higher. Furthermore, it becomes difficult to manage many of the qualities that are associated with organic poultry production in the mainstream marketing channels, such as uneven size of birds. Selling organic broilers as frozen food, to some extent, would alleviate the problem by allowing for larger quantities at a time rather than continuous small-scale supply, lowering the abattoir costs. However, the quality conventions in the Danish broiler market dictates fresh meat only as the retail sector prefer customers who purchase fresh produce, due to the added value of fresh produce and because customers who prefer fresh produce shop more frequently, thus purchasing more in total. Furthermore, customers who purchase frozen food are perceived as poorer, and thus unattractive customers for supermarkets. Therefore, the retail-sector has gradually removed frozen food from their product ranges in favour of fresh food. 4) As an effect of the above the retail price for an organic chicken is considerably higher, at least double price, compared with a conventional bird which may be seen as a major barrier for a market-driven increase of the organic market share.

One of the issues is that organic broilers are in a deadlock, as prices are high because volumes are low because prices are high. In spite of the relatively low market share of organic poultry meat, the market is currently evolving quite rapidly and the chicken market is differentiated slowly. Furthermore, the product category is expected to grow even further in the future, because poultry is a cheap lean meat product and therefore is well aligned with some new food trend, such as protein based diets and convenience and because consumers increasingly request differentiated products.

Concerning beef meat production in Portugal, (formally or informally) organic production copes the practice totality of the Montado-based production system. However, various issues hamper the potential added value of this organic predominance in the sector: i) associativism (despite presence of some valuable organisations for specialized producers in, e.g. local breeds of cattle such as Mertolenga and Alentejana, but also others exogenous to the region, such as Limousine and Charolais) is clearly much lower than ideal, and also lately declining, with many producers gaining suspicion on the worth of associations for them, their businesses and households, ii) a traditionally internal (National and Regional) market orientation of extensive producers, although this is also now beginning to change, iii) the lack of capacity of compete internally with other cheaper imported products (e.g. from Argentina), especially in the context of a country and region that were hit hard by the recent crisis, a common feature for European Mediterranean countries (although this is also now starting to resolve following the country's recent economic recovery), and last, iv), culturally, the lack of tradition of local producers in entering high-quality-demand international markets (a fact that is partly blamed by many on the dependence of EU subsidies that halt the competitive spirit of the sector externally), and in parallel the reticence of regional and national consumers to pay higher prices for a high quality produce (mainly cultural, according to results from the FGs and PWs and also now being partially shifting, but mostly still concentrated in urban nearby contexts, especially Lisbon).

In Denmark changing consumer preferences and a diversifying poultry market is not just an opportunity for the producers of poultry products, but they also constitute a threat for the producers who have invested in a particular production. These producers depend on an ability to produce at full capacity to repay their investments so once started production relies on stable or more favourable market conditions. Hence, many poultry producers have begun to worry about the stability of the market conditions since nearly all supermarkets in 2016 have stopped retailing eggs from battery chickens. The decision came as a big surprise to the production industry, as numerous producers have reinvested in an upgrade of their production system due to new animal welfare standards in 2014. However, these investments will not be viable when phasing out this branch of production, and leaving producers in a precarious position. Poultry meat producers and the producer association attempts to prevent a similar thing to happen for standard chicken products, via a continuous dialogue with the retail sector, concerning production development, but the situation is challenging.

Regarding the contemporary market conditions farmers' particularly note five aspects that are important in their decision-making: 1. Vulnerable market position., 2. Fragile production with marginal gains and high risks., 3. The future of poultry farming in Denmark., 4. The organic poultry market., 5. Commodity markets.

Previously banks have classified poultry production as a specialty production, which is generally a hindrance to access private finance as the mortgage providers are reluctant to provide farming entrepreneurs with a full mortgage, and hence producers must finance investments with their equity

or borrow money from the banks, which is lent at a higher interest rate. Therefore, poultry producers have not had an easy access to investment capital prior to the financial crisis and therefore have not overinvested to the same extent as other production sectors. Furthermore, the financial crisis in the agricultural sector and the new banking regulation has resulted in a declining willingness from banks and mortgage providers to invest in agricultural production, due to a dwindling equity behaviour. However, poultry producers generally do not have a high share of investments in farmland and therefore they have not experienced the same equity loss as pig and dairy producers when the land prices have dropped 40 %.

Due to the difficulty of producers to access investment capital and in the fear of declining production supply, the abattoirs in the value-chain have taken on the task of providing bank guarantees and ensuring a fixed minimum contribution margin running for 7 years to enable new investments. For example, in 2012 Danpo introduced a “growth package” in which they offered a bank guarantee, subsidy for environmental approval, contribution margin guarantee and investment surety for 1,5 million DKK (approx. 200000 Eur.) for each new production facility, in addition they provide a surplus for all chickens produced in the new houses in the first 7 years of operation. In addition, other policies also ensure the economy of the poultry producers, for instance, postponed payments to the supply industry, price guarantee and insurance funds for farmers whose animals are infected with salmonella (which is a significant decline in the stock value).

These types of collaborative investments in the value-chain are a rather new and interesting feature in the Danish foodscape, as they ensure the farmers economy via a form of partnership between the different actors in the value chain. It creates a bit more stability in the economic conditions for the producers and underscores the mutual dependence of the actors in the value chain; furthermore, they illustrate the strong coordination of production between the actors.

Generally, the poultry producers that were interviewed did not express many financial concerns at present, as the economy of poultry producers is doing fairly well. However, there are also aspects that are problematic in their decision-making. Regarding the contemporary financial conditions farmers’ particularly note two aspects that are important in their decision-making: 1. Financial status of poultry producers. 2. Commodity chain finance.

Regarding the case study examining beef production in Portugal, the main financial condition that arose throughout the various SUFISA events was the difficulty, and at times even absence, of possibilities to access to private credit for new entrants or more innovative producers. This is mainly due to the fact that these actions are associated to long-term investment return periods and high risks which in both cases determine the lack of interest by financial actors in the sector (especially in contrast with other arising and competing crops such as super-intensive Olive oil and Almonds, where much private investment is being placed).

Country	Market conditions	Farmer perspectives
Portugal	<ul style="list-style-type: none"> • The high standard of quality of beef produced in the Montado regional system is not yet matched by their market recognition and capacity to compete in International arenas, • This adds up to the lower relative cost of other imported products (e.g. from Argentina), • Other limitations are posed by the preferences of national and regional consumers and by their relatively low purchase power, • However, new markets and opportunities (e.g. N Africa and Middle East) which are linked to certain infrastructural operations in the region (e.g. new ports), • The low capacity of processing and transformation in the region nevertheless hampers its strong productive rates. 	<ul style="list-style-type: none"> • Farmers generally admit the weight of traditional attitudes and approaches (mainly individualistic) that limit innovation, cooperation and coordination, • Despite of the existence of multiple market and sales channels (local auctions and others), many farmers see themselves partly determined by the market power and stability provided for larger retail chains (e.g. Pingo Doce), • Also, many farmers expressed their frustration by the fact that although associations and cooperatives exist (e.g. linked to regional breeds), the cultural trend is against associativism and common tasks, limiting the market power so such institutions, • Farmers also in many cases express their intention to become more creative and independent in commercial terms, but see their potential limited by their dependence on public subsidies that largely dictates their actions.
Denmark	<ul style="list-style-type: none"> • Lower price volatility and high international demand for consumption render the chicken industry highly competitive, • The concentration of production and strong intensification turns this industry into a secure value for investment and stability in the longer term, • However, some problems are arising for producers not complying with increasingly demanding requirements for quality and production control, • Access to private financial credit is (relatively) unequal, and is now recovering following the global economic crisis, thus having affected some producers and investors less capable to adapt. 	<ul style="list-style-type: none"> • Central Denmark's poultry producers are largely market-and short-term profit oriented, thus seeing risk and volatility as the main potential threats with which they need to deal with, • In general, they act and see themselves and adaptive entrepreneurs with actions and strategies largely dictated by the requirements of market trends (e.g. organic branding seen as a niche of opportunity more than as an ethical option), • Prospects for the future are therefore seen largely as bright, with very few financial concerns, and with alternative options regarded as potential solutions to various scenarios, • Key market elements such as access to credit for investment, expansion and innovation, although this varies slightly within the sector.

Drivers influencing future performance

In Central Denmark, the poultry breeds serve as an important condition for the poultry producers. Poultry breeding is extremely complex, specialized and expensive, hence there is currently no breeding activities taking place in Denmark or the rest of Scandinavia for that matter. Therefore, the Danish bird suppliers import eggs from their partners abroad (most importantly the Ross 308 breed). The birds that eventually end up in the supermarkets are the fourth generation of the birds that are bred and the initial 11 chickens end up parenting 39,5 million birds with an almost identical genetic mark-up. This is a necessity in the industrial poultry production where standardisation and uniformity is a key quality criterion. The birds are bred based on a set of breeding goals, which code for a particular behaviour and a corresponding impact on environment, animal welfare and production system. The breeding companies are huge multinational companies and Danish farmers have very little influence on how they operate or which breeding goals they adopt. Therefore, these breeding goals code for a particular production system, and it is impossible to alter the production strategy (for instance emphasising animal welfare by slow growth or outdoor rearing), without also adjusting the genetic mark-up of the birds. Hence, it also implies that poultry production is highly locked in to a

particular production pathway. Furthermore, any changes to the genetics of the birds will only appear in the stables after a time lag of five years.

Beef production in the Portuguese Montado, the main drivers influencing the future of the system include: i) The capacity of the CAP and public funding system to recognize and reflect the multi-functionality of the silvo-pastoral system and its multiple values for sustainability, ii) the will and capacity of farmers to engage more strongly with each other and gain power along the production chain, and iii) the appearance of private (e.g. financial) and public (e.g. support through extension services) to support young farmers and their capacity to access land. These are all issues expressed (almost in the form of a wish-list) by the various actors engaged in SUFISA. However, the level of complexity required for these issues to become enacted makes it equally difficult to indicate by experts consulted what is really the best formula for success.

STRATEGIES FOR SUSTAINABILITY

Regarding the strategies and institutional arrangements for Poultry production in Denmark, there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into four categories:

1. Managing world market volatility: The costs of purchasing fodder is one of the most important costs for the producers and prices at the world market fluctuates significantly, therefore the producers need some strategies to manage this uncertainty and market risk. Hence, the decision to purchase fodder is very important for the overall farm economy and it is one of those ongoing decision-making situations that the farmers are spending a lot of resources to get right. However, there are different strategies at play depending on the temper of the farmer, some farmers have outsourced all their purchase of fodder to a purchasing club. Others conduct all the purchasing themselves, perhaps with the assistance of salesmen from the fodder companies, their colleagues and friends, or professional advisors. Furthermore, there are different time horizons in play, some farmers purchase fodder for a full year whereas others only purchase small amounts at one time or invest in futures on soy meal and transport, others just purchase when products are on the market. Hence, there are many different strategies in play to manage the world market volatility.

Regarding this same aspect for beef meat in the Portuguese Montado, the main issue is that the sector has been yet too isolated from the global markets, with little market power or even market information of producers from the wider market mechanisms. This has been accompanied by an oligopoly of various big retail players dominating the vast majority of exports and control, leaving little space for producers' associations and local breed-focused farmers and actors.

A main issue that came back regularly during the SUFISA tasks is the generic consideration (by producers, public and private entities consulted) of Montado as a highly sustainable (and resilient) system in environmental terms, with cattle being an essential piece, but with this being viewed as an economic competitive disadvantage in European and even global terms. In general, social and political recognition of the system's many values (including, but unrestricted to beef meat) are not matched by the social capacity (or interest) to invest in its products (generally more expensive than other lower-quality competitors). The sustainability of the system necessarily demands a degree of (social,

technological, institutional, political and environmental) innovation that currently is mostly absent under current farming practices (with conservative discourses and attitudes still largely influential).

2. Coordination in the commodity chain: The Danish poultry meat chain is highly coordinated and all activities are carefully planned. This is quite important for the poultry producers as they always know that they have a market for their produce, so they never have to think about the sales process and are able to focus entirely on managing their flocks. On the other hand, they are also closely tied to the suppliers and the abattoirs and they do not have other options, but to quit farming (if that is even an option for them), if they are discontent with this network. The cooperation among the abattoirs and the farmers is framed in two different contracts, the first is between the individual farmers and their abattoir. This contract usually runs for two years and specifies how much produce the farmer should produce. However, the quotation is variable and is defined by the abattoir depending on the particular market conditions that prevail at any given time. If prices are below the cost of production for three consecutive flocks, then the farmer is able to abandon the contract, but otherwise contracts are extremely stable. The second contract is between the abattoir and the supplier association consisting of all the suppliers to the abattoir. It specifies the general terms of collaboration between the suppliers and the abattoir. Furthermore, the supplier association is the main dialogue partner representing the suppliers in the debate with the abattoir, for instance concerning how the quotation and discounts are set, disease management and gives input in relation to the quality development in the value-chain. In the case of the Montado system, the main problem is the perceived sense by farmers of failure of both horizontal and vertical coordination in the regional production system, with regional-breed associations incapable to act at their full capacity to improve competitiveness. However, paradoxically, a greater worry is related to the doubts that exist over whether any novel IAs in place might secure the systems current levels of sustainability, beyond (or even at the expense) its main financial aspects; resuming, the system (again) is still largely considered as a regional (and even National) asset that should be preserved regardless of its capacity to cope with economic competitiveness.

3. Succession: Whereas dairy producers plan for a future where the farm is continued either by a new young farmer or a natural successor, poultry farmers do not necessarily plan for succession. Poultry production is a niche form of production and farmers cannot be sure to sell the property on the market and it is difficult to obtain a mortgage. Hence, the interviews indicate that many poultry producers plan for their farms to be worn down prior to their retirement. This wearing down strategy imply that the new owner either reinvests in the production system or demolish buildings and start a new production. As poultry farmers, like Danish farmers in general, have a rather high average age, this strategy implies that production facilities also have a relatively high average age, allegedly around 26-28 years. Succession is largely complicated in the case of Montado, especially for smaller producers, and young entrants. Although specific policy measures and programs have been put in place to facilitate access to new and young entrants, still private credit is extremely difficult to gain for those out with the families already owning and managing the farms. This adds up that profitability is only secured over a minimum farm size of 400-660 Hectares, which along with the long return-periods required for meeting profit margins following initial investment, make it extremely difficult for new entrants to access credit, and ultimately, land. The process of land property concentration is a clear consequence of this, and is perhaps one of the ways in which young farmers are somehow being able to expand their family farms. Furthermore, the higher profitability of other crops in the region (especially olives, almonds and others irrigated) turn too risky for young farmers and financial

entities (both private and public alike) to consider traditional farming systems, such as the Montado, as a valid option.

4. Optimization of field economy: The poultry producers who own farmland are considering how to manage this farmland as arable farming, and that currently, this is not a very good business. Farmers also employ different strategies, that are in a sense unrelated to the poultry commodity, but that are very important for the farm economy as a whole. Some of the farmers note that it is not so important for them what they earn from their fields, because when the grain prices are low so too are the fodder prices and that is much more important for their farm economy. Another farmer noted that he is working towards establishing a potato production as this is a high value arable crop that will reduce his reliance on the income from the poultry production. Furthermore, he needed to commence a new activity as he had just partnered up with his father and they needed new revenue streams to generate value for both of them. A farmer, with a larger acreage of leased land was pressed by his bank to give up these lease contracts because he was losing money on the arable farming. However, he was reluctant to give up these leaseholds as his environmental approval depended on an access to a particular spreading area for his manure. These examples tell an interesting story about the way that poultry farmers think about their strategies. Farmers do not think about their strategies strictly in terms of particular commodities, but rather consider their strategies in holistic terms that include all the operation on the farm.

In the case of the Montado, a recent (and yet still not too widely expanded) process of intensification has been noted, at times accompanied by a simplification and specialization of an otherwise multi-functional system (e.g. focusing on trees almost exclusively). This has been somehow promoted under the generic term of “sustainable intensification”. However, many doubts remain about the sustainability of a process that is shifting the character, resilience and ultimately, the sustainability of the system as a whole. Although it is naturally out of the scope of the debate at the farmer’s arenas, the current academic and policy discussion between weak and strong sustainability would be of direct relevance for this case. Other relevant issues concerning beef production in the Montado necessarily start with the sheer difficulty that is commonly encountered to engage private and public actors beyond usual suspects (especially those acting at levels higher than the local), which might be reflective of the (generally low) engagement of farmers in horizontal cooperation and coordination mechanisms. This has been noticed even despite of the long and consistent trajectory of frequent interaction from the SUFISA Portuguese team with stakeholders in the sector (e.g. tertuliasdomontado.blogspot.com/). However, original pre-conceptions of traditional vs innovative management practices could be largely dismantled during focus groups (both specialized and mixed, with the various typologies of approaches- i.e. more traditional vs more innovative). In this sense it was detected that underlying discourses for different types of producers are much fuzzier than were originally assumed.

Overall, there seems to be a coincidence on the views from producers, public and private sector on the strategic and holistic nature of Montado (beyond cattle) and on the (already noted) inadequacy of current European policies to support its multi-functional nature. In general, it was learnt in SUFISA that current attitudes and strategies from producers are based on individualistic mind-sets and criteria (according to participants, a cultural bias), and thus not useful for implementing more innovative strategies, including alternative institutional arrangements (e.g. more effective cooperatives of

producers that grant them more bargaining power along the wider supply chain). Another important lesson learnt was that the transition of CAP towards more market-oriented mechanisms will be difficult to implement by the sector unless better training, technical and advisory services are put in place. Last, it was deemed that vertical coordination is somehow hampered by the lack of common spaces to meet and discuss on an equal basis for all actors in the market and policy spheres. Academia could play (at least part of that) that role potentially (current efforts by the team at the University of Évora in tertuliasdomontado.blogspot.com/ are an example of this).

Country	Farm-level	Collective	Regional/strategic
Portugal	<ul style="list-style-type: none"> • Beef farmers in Montado contexts aspire at family succession. However, this is mostly an ideal and many barriers are detected, both financial and even regulatory. • Entrance to new comers is seen as extremely difficult, and strongly limited by its volatility and consequent high risk and low access to credit. • Regarding the optimization of the field management strategies at the farm level, a process of simplification and intensification is slowly entering a system which main value is precisely its multi-functionality and derived sustainability. This is however strongly contested. 	<ul style="list-style-type: none"> • Coordination of the food supply chain is largely problematic, with producers considering themselves to bear very low market power and bargaining capacity, and with several retail oligopoly-driven institutions increasingly dominating the market. 	<ul style="list-style-type: none"> • Managing world market volatility is a key challenge that is largely out of scope for the sector of extensive beef production in the Alentejo.
Denmark	<ul style="list-style-type: none"> • Poultry farmers do not necessarily plan for succession. Poultry production is a niche form of production and farmers cannot be sure to sell the property on the market and it is difficult to obtain a mortgage. • In general, it is important to indicate to how Danish farmers do not think about their strategies strictly in terms of particular commodities, but rather consider their strategies in holistic terms that include all the operation on the farm. 	<ul style="list-style-type: none"> • The Danish poultry meat chain is highly coordinated and all activities are carefully planned. This is quite important for the poultry producers as they always know that they have a market for their produce. 	<ul style="list-style-type: none"> • Managing world market volatility is a key objective at the regional and even National level, and a challenge that is currently under control, according to many actors.

THE FUTURE SUSTAINABILITY OF THE SECTOR

The poultry value chain is composed of only very few and specialized actors on both supply and processing, and they are primarily private companies, primarily committed to make a profit for their investors. Furthermore, this organisation of the value chain also means that the value chain is quite well coordinated. For instance, the bird suppliers have coordinated their breed selection with the feedstuff producers and the abattoirs to fine tune product. This leaves very little room to manoeuvre for the farmer and a pressure to fulfil their particular obligations. Furthermore, when there are no cooperatively owned actors on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and also few options for negotiating other prices than what is automatically given. Strategically, the Danish poultry market is undergoing a differentiation these years, as there are new actors and production concepts emerging. For the producers this means that there are opportunities for developing new kinds of products with added value, but it also means that the different production concepts are competing with each other for market shares. Hence, currently it is difficult to predict where the market will go and which production strategy that will

eventually prevail. Particularly, the organic producers currently feel they are under pressure because the retailers have begun requesting very small birds to keep the retail price low and it is difficult for the producers to make a living out of this type of small scale production.

However, there are a few aspects that may be used to create a general image of the future of poultry the industry in Denmark. Currently, the primary production is dominated farmers who are close to retirement and produce in relatively old production facilities. Hence, there is a need for new entrants and in time also investments in the modernization of the production facilities. Producers expect that the current production will be maintained, as the abattoirs previously have demonstrated a willingness to create favourable incentives for investments. If so, the incentives will be structured to produce largescale modern production facilities fit for meeting the demands of the abattoirs. Making new investments is also an opportunity to develop new production systems and producers' expectations is that future production will be more differentiated than the current standardized products. One of the reasons is that the retail sector have an interest in moving away from standardized products towards the specialty market, as there is only small marginal gains of cheap standard poultry products. The Danish market has already seen the exclusion of eggs from battery hens from the retail sector as an example. Hence, we can expect that the future will entail an increase in various kinds of differentiated products. The question is whether the actors that are currently dominating in the supply chain have a setup, which is equipped to meet this demand or whether new actors will take over.

In terms of the beef meat production in the Portuguese Montado, the following key points could be gathered across the various SUFISA tasks (especially, over the Participatory Workshop with multiple actors, where especial sections of the discussion were devoted to this specific issue):

- Policies (especially public funding schemes) will gradually become more targeted. In such novel context there should a stronger consideration of the uniqueness, singularity and contingencies of individual commodities and their related regional, cultural, bio-physical and socio-economic contexts underpinning production and its sustainability. This is deemed to be key (but not exclusive) for extensive Mediterranean land-use, farming and production systems, such as the Montado.
- Less public funding will gradually become available (this is already visible in the latest proposals for the reform of the PAC, which are essentially becoming increasingly market-oriented). This problem should be counter-balanced by a higher effectiveness in its use (more targeted and clear funding schemes, with much more simplified procedures and mechanisms, but with a better control of compliance and targeting of financial resources).
- The sector urgently requires securing that (legal, financial, institutional and educational) succession and access to young farmers to land for traditional farming system, including beef production in Montado is improved. Otherwise, it will keep declining, and ultimately it might become marginal.
- Sustainable intensification is potentially a valuable pathway for the sector, but firstly there is a need to more clearly unravel what it really means in practice, and the requirements and drawbacks (social, environmental, economic and territorial) it entails, especially in over-simplifying complex systems, such as the Portuguese Montado.

Commodity: Meat				
Country	Context	Conditions	Strategies	Future
Denmark (Intensive Poultry)	<ul style="list-style-type: none"> Dichotomical situation amongst Peri-urban (Aarhus) and largely agricultural areas (West), Industrial farming dominates the regional landscape, Still, farming contribute little to regional workforce and GDP. 	<p>Policy and regulatory:</p> <ul style="list-style-type: none"> Disease and quality control are extremely precautions and strict in the poultry industry, In the past, this has hindered capacity to export This is accompanied by many (strict) private initiatives, which have proven to raise competitiveness on an international framework, Organic largely supported and controlled through numerous regulations, <p>Markets and marketing:</p> <ul style="list-style-type: none"> Lower price volatility and high international demand for consumption render the chicken industry highly competitive, The concentration of production and strong intensification turns this industry into a secure value for investment and stability in the longer term, However, some problems are arising for producers not complying with increasingly demanding requirements for quality and production control, Access to private financial credit is (relatively) unequal, and is now recovering following the global economic crisis, thus having affected some producers and investors less capable to adapt. 	<p>Farm-level:</p> <ul style="list-style-type: none"> Poultry farmers do not necessarily plan for succession. Poultry production is a niche form of production and farmers cannot be sure to sell the property on the market and it is difficult to obtain a mortgage. In general, it is important to indicate to how Danish farmers do not think about their strategies strictly in terms of particular commodities, but rather consider their strategies in holistic terms that include all the operation on the farm. <p>Collective:</p> <ul style="list-style-type: none"> The Danish poultry meat chain is highly coordinated and all activities are carefully planned. This is quite important for the poultry producers as they always know that they have a market for their produce. <p>Regional/strategic:</p> <ul style="list-style-type: none"> Managing world market volatility is a key objective at the regional and even National level, and a challenge that is currently under control, according to many actors. 	<ul style="list-style-type: none"> Currently it is difficult to predict where the market will go and which production strategy that will eventually prevail. Particularly, the organic producers currently feel they are under too much pressure to adapt sustainably to future changes. Producers expect that the current production will be maintained, as the abattoirs have a willingness to create favourable incentives for investments. These incentives will be structured to produce largescale modern production facilities fit for meeting the demands of the abattoirs. Making new investments is also an opportunity to develop new production systems and produce differentiation. The main question is whether the actors that are currently dominating in the supply chain have a setup, which is equipped to meet this demand or whether new actors will take over.

<p>Portugal (Extensive Beef)</p>	<ul style="list-style-type: none"> • Highly marginal rural region, with low economic indicators (even for the S European context), • Traditional mind-sets and related management models still largely dominant in the sector, • De-population and environmental change (e.g. climate) largely influential. 	<p>Policy and regulatory:</p> <ul style="list-style-type: none"> • Regulations exist that protect single elements (e.g. native tree species) of the wider silvo-pastoral system, but not the system as a whole, • Regional development strategies consider the Montado a regional asset for sustainable development, • Large dependence on CAP policies to survive in its current form. <p>Markets and marketing:</p> <ul style="list-style-type: none"> • The high standard of quality of beef produced in the Montado regional system is not yet matched by their market recognition and capacity to compete in International arenas, • This adds up to the lower relative cost of other imported products (e.g. from Argentina), • Other limitations are posed by the preferences of national and regional consumers and by their relatively low purchase power, • However, new markets and opportunities (e.g. N Africa and Middle East) which are linked to certain infrastructural operations in the region (e.g. new ports), • The low capacity of processing and transformation in the region nevertheless hampers its strong productive rates. 	<p>Farm-level:</p> <ul style="list-style-type: none"> • Beef farmers in Montado contexts aspire at family succession. However, this is mostly an ideal and many barriers are detected, both financial and even regulatory. • Entrance to new comers is seen as extremely difficult, and strongly limited by its volatility and consequent high risk and low access to credit. • Regarding the optimization of the field management strategies at the farm level, a process of simplification and intensification is slowly entering a system which main value is precisely its multi-functionality and derived sustainability. This is however strongly contested. <p>Collective:</p> <ul style="list-style-type: none"> • Coordination of the food supply chain is largely problematic, with producers considering themselves to bear very low market power and bargaining capacity, and with several retail oligopoly-driven institutions increasingly dominating the market. <p>Regional/strategic:</p> <ul style="list-style-type: none"> • Managing world market volatility is a key challenge that is largely out of scope for the sector of extensive beef production in the Alentejo. 	<ul style="list-style-type: none"> • Policies (especially public funding schemes) will gradually become more targeted. In such novel context there should be a stronger consideration of the uniqueness, singularity and contingencies of individual commodities and their related regional, cultural, bio-physical and socio-economic contexts underpinning production and its sustainability. • Less public funding will gradually become available (this is already visible in the latest proposals for the reform of the PAC, which are essentially becoming increasingly market-oriented). This problem should be counter-balanced by a higher effectiveness in its use. • The sector urgently requires securing that (legal, financial, institutional and educational) succession and access to young farmers to land for traditional farming system, including beef production in Montado is improved. • Sustainable intensification is potentially a valuable pathway for the sector, but firstly there is a need to more clearly unravel what it really means in practice, and the requirements and drawbacks.
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Fisheries – UK, Greece and Italy

CONTEXT

The fisheries cluster in SUFISA includes a satellite case study on the fishery sector in Tuscany, Italy; purse seine and small-scale fishers operating in Kavala and its neighbouring ports, in Greece (small pelagic fish in Northern Greece); and the Cornwall inshore fisheries sector in the UK.

Those responsible for fisheries management in Tuscany are concerned by a series of critical conditions affecting the Mediterranean Sea. Together with habitat loss, pollution, eutrophication and the incidental introduction of alien species, fishing represents one of the strongest stressors that have led to increased changes in the ecosystem structure, loss of fish stocks and marine biodiversity. Fishing activity in Tuscany is spread among 27 ports (European Parliament, 2008) with 600 registered vessels and 1053 active fishermen (FAO, 2015). In 2012 fishing activity in Tuscany represented 8% of total Italian landings (FAO, 2015). The Tuscan fleet is mainly engaged in small-scale fisheries, fragmented into a number of ports and harbours and is extremely heterogeneous in terms of structure and size. Furthermore, the fishing activity in Tuscany - as throughout Italy and the Mediterranean - is conditioned by the large presence of multi-species stocks and by the possibility of using vessels of different sizes for fishing in the same areas with several different types of fishing gear (Strategy: the idea of polyvalent strategies). Many ports and harbours also function for other purposes such as commercial, industrial, energy (fuel), passenger transport, tourism and pleasure.

Over the last decade, the economic crisis, coupled with poor infrastructure, has increased production costs and a reduction of certain stocks, which has led (together with EU incentives for the decommissioning of vessels) to a continuous decrease in the fishing fleet and in the number of fishermen in Italy (Condition: crisis; Response: Abandonment of vessels and fishers). At the same time, increasing marine tourism has decreased the number of mooring facilities and the attendant infrastructure for fishers. According to the Italian Decree 1639/1968, the fleet is divided into coastal, Mediterranean and Overseas vessels (beyond the Mediterranean Straits). Generally, small-scale - or artisanal - fishing activity is practised with small boats (less than 12m long) and passive gears, involving mainly day trips with a crew of one or two fishermen. About 67% of the fleet is highly heterogeneous small-scale fisheries (i.e. 8479 vessels).

The Greek fishing fleet is characterised by a large number of fishing vessels (15,385 in 2015). Significantly, 95% of the fleet consists of vessels fishing with polyvalent passive gear in the coastal zone. The fishing fleet operates almost entirely in the Mediterranean Sea. There are three types of vessel: vessels with static gear, which are coastal vessels; vessels with towed gear; and vessels with purse seines. The sector employs 27,558 people (2014). Decommissioning schemes have reduced both employment and vessels across all types of vessel, although inshore fisheries have retained 75% of total employment. Overall, fishing represents less than 3% of Greek GDP, yet it can be important in employment terms at a local level. Greece has the largest coastline in Europe, with a rich biodiversity. However, coastal ecosystems are threatened by large-scale fishing, eutrophication and pollution (mainly from fish farm operations). It is estimated that 65% of stocks are overfished. There are also problems with anchoring, mainly by recreational boats, but also by small-scale vessels. Climate change is also having an impact in terms of changing seawater temperatures and salinity that are affecting

fish migration routes. As in the other countries in the fisheries case study cluster, the Common Fisheries Policy (CFP) plays an important part in the management of fishing in Greece. This has included the decommissioning of more than 5000 vessels over the last 20 years, as a result of (Regulation (EC) no. 2371/2002) on the conservation and sustainable exploitation of fisheries resources. Those fishing vessels remaining have in many cases been modernised, especially the larger purse seiners and trawlers, notwithstanding that the smaller inshore vessels have in many cases degenerated. The modernisation process has helped preserve traditional shipbuilding. By contrast, there are significant deficiencies in terms of basic infrastructure, such as fishing ports, fishing shelters and road infrastructure. Similarly, the capacity of the Italian fleet has decreased over the last two decades due to EU adjustment measures aimed at preventing a further decline in fish stocks. There is also a corresponding increase in the age of vessels, wherein older vessels are more costly to maintain and more difficult to technologically innovate.

The issue of international waters is an important issue in Greece, whereby they have not adopted an Exclusive Economic Zone. As such, their territorial waters are limited to 6 nm, because Turkey has not signed the International Convention on the Law of the Sea (UNCLOS), which would have given Greece an expansion of their territorial waters to 12 nm. A collapse of the Black Sea fisheries has also meant that there are many more Turkish fishing boats sharing waters with Greek fishermen, hugely increasing competition for resources. This competition is mainly for the purse seine fishermen, whereas the inshore fisheries are facing another, internal, competitor – recreational fishermen. Recreational fishing is highly regulated in terms of gear, quantity and that the fish caught should only be for personal use, but it is inefficiently controlled. As such, inshore fisheries see recreational fishers as competitors in that they fish in the same areas, for the same species. In discussing conditions *internal* to the seafood sector in Greece, two in particular are mentioned. First, difficulties in acquiring skilled labour due to the seasonality of operations and harsh working conditions. Second, production costs, principally energy/fuel. In addition, there are pressures on fishing resources resulting from excessive, illegal, unreported and unregulated fishing. The principal *external* condition in Greece relates to the financial crisis. In this respect, a lack of credit provision and liquidity, with banks refusing both long and short-term loans. The financial crisis is also exerting downward pressure on household income and consequently a reduction in the consumption of both fresh and processed seafood. There are also *processing* issues, wherein there are increasing delays in paying fishermen as well as bad debts. Small processors also find it difficult to access the market, not least due to increased competition from imported smoked and conserved products. There are significant power imbalances within the value chain.

In 2014, there were an estimated 11,845 fishers in the UK, down 12% since 2004. In the same year, UK vessels landed 756,000 tonnes of sea fish (including shellfish), 60% of which was landed in the UK and 40% abroad, with a total value of £861 million. In 2014, fishing accounted for 4.1 per cent of gross value added for the agriculture, hunting, forestry and fishing sector. The focus of this case study is on inshore boats which are less than 10 m long. Although some issues are common to all fishers within the UK, the inshore fleet faces particular issues, not least in terms of its continued existence and contribution to the socio-economic contexts/communities within which it operates. In this respect, Cornwall represents one of the areas where inshore fishing remains a key part of the rural community, both economically and culturally. Cornwall is one of the poorest parts of the UK in terms of per capita GDP, with relatively low average earnings and relatively high unemployment. In 2011, Cornwall's

wealth was a little over 60% of the EU average per capita. As such, the county is a European Convergence area, meaning that it has access to both ERDF and ESF funds.

Tourism is the most important industry in Cornwall, representing about 25% of the county's GDP, with 4.5 million visitors to the county every year. The presence of a fishing industry is an important part of the tourism appeal of Cornish coastal towns. As such, the continuation of the fishing industry within Cornwall is important to the county's future prosperity. There are over 600 registered fishing vessels in Cornwall, of which almost 90% are U10m in length. It is estimated that the Cornish fishing industry employs approximately 3300 people, based on 900 active fishermen, plus an estimated 2.75 jobs on shore for every fisherman. When tourist jobs created as the direct result of fishing are also considered, it is suggested that the multiplier is 4:1 (Morrissey and O'Donoghue 2012). (In other words, there are important links between fishing and tourism. This is also the case in Tuscany, where pesca-tourism is becoming increasingly important. By contrast, the links between fishing and tourism are not important in Greece). Any discussions about the future of fishing in the UK inevitably involve looking at what the Brexit negotiations will result in. This is discussed in more detail in the 'future sustainability' section of this report.

Summary

- The small-scale fishing fleets of the EU are enormously diverse and heterogeneous.
- Small-scale fishers make a small contribution to the overall economy, but can be locally significant.
- In all three cases, there is an acknowledgement that the needs of small-scale fishermen often clash with recreational boats.
- There is a general perception that there are less fish available than previously, and that many fish species are overfished. (We should corroborate or refute these perceptions with hard data, when possible. The second interesting thing is to examine the perceived causes of the problem (e.g. less catch availability, more overfishing).
- Illegal and foreign fish imports are raised as issues in Greece and Italy, although not in the UK.
- In Greece, it is evident that there is significant competition from Turkish fishermen, not least because Greece's territorial waters are restricted to 6nm.
- CFP attempts to reduce the number of fishing boats, in order to reduce the fishing effort, has significantly reduced the fleets of Greece and Italy, in particular.
- The infrastructure is often seen as being inadequate for the needs of small-scale fishers.
- The smaller, inshore boats are generally ageing and becoming less efficient.
- While the economic crisis is having an impact in all three case studies, it is particularly pronounced in Greece.
- Any discussions about the future of fishing in the UK inevitably involve looking at what the Brexit negotiations will result in.

CONDITIONS/DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

The Common Fisheries Policy (CFP) sets out the overarching regulatory conditions and incentive measures for all fishers within the EU. First implemented in 1983, it has subsequently been reformed three times: in 1992, 2002 and 2013. The main challenge for the CFP is to manage a highly

heterogeneous fisheries sector, and to design optimal policies for multi-ecosystems, multi-species and multi-fleet fisheries (Frost and Andersen 2006).

The European Union sustains and regulates the fisheries sector through the CFP. According to the Commission: *“CFP aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. Its goal is to foster a dynamic fishing industry and ensure a fair standard of living for fishing communities”*. One can distinguish four elements in the CFP: conservation - focusing on environmental issues; structural - placing emphasis on efficiency; market regulation; and external policy measures. Due to the nature of fishing and the legal framework concerning maritime activities, all four elements are of interest in the following analysis. Management measures take the form of input control (such as rules on access to waters, fishing effort controls and technical measures) and output controls (consisting mainly of total allowable catches or quotas). Concerns were expressed in Cornwall that a combination of restrictive licensing, individual vessel quotas, days at sea allocation and catch composition rules significantly reduce the flexibility of fishing operations that might otherwise enable individual fishers to adapt to changing conditions. Decisions on what, where, when and how to fish are now very tightly circumscribed, affecting both short-term and longer-term business planning (Symes *et al.* 2015).

In 1983, as part of the CFP, a system of allocating Total Allowable Catches (TACs) for each EU Member State (MS) was introduced, as a means of conserving fish stocks and sharing access to EU fisheries resources between member states. The TAC is set each year by the Council of Fisheries Ministers following negotiations on catch options that are provided by the Advisory Committee (ACOM) of the International Council for the Exploration of the Sea (ICES). Greater transparency is required to determine what takes place during the closed door negotiations at the Council of Fisheries Ministers (Carpenter *et al.* 2016). Anecdotally, many of those involved in fishing in Cornwall are concerned that the science is always behind the reality, in that fish stocks fluctuate dramatically from season to season. Concern was also expressed in Cornwall that the main focus of both research and policy in the CFP is on the biological and economic aspects of fishing, with scant attention paid to the social and cultural impacts of the pressures faced by fishers.

Similar concerns were expressed in the Greek case study, since in the Mediterranean generally, and in Greece specifically, management of fisheries resources are seen as being based mainly on technical measures (such as a fishing ban on specific areas or periods, and minimum landing sizes). These measures were seen as largely not being based on scientific evidence as well as being overly static in terms of what they are trying to achieve; it was argued, furthermore, that lobbying by individuals or interest groups can have a decisive role in policy-making and that there is a need for more transparent and participatory procedures in the design of specific management plans and policy-making at different levels. A common concern, therefore, for both Cornwall and Greek fishers is the issue of transparency and the scientific robustness of measures applied, whether related to output or input controls.

An ongoing measure that is designed to help ensure the long-term sustainability of fishing is the gradual introduction of a landing obligation, between 2015-2019. The focus is on sustainable fisheries and in this respect the CFP is intent on significantly reducing discards, as well as providing more accurate records of the fish that are caught and hence underlying populations. The phased

implementation is to allow time for fishermen to adapt their fishing practices. At the time of this research, the implications of the discard ban had not really been experienced by those involved, in any of the case studies.

Market conditions

Logistics and distribution are weakly developed for small-scale fisheries products in some ports, in Tuscany. This is seen as being partly due to competition between fisheries and the marine tourism sector. Public fish markets are also seen as being inadequate. The administrative burden on small-scale fishers is also seen as being disproportionate, particularly in terms of access to public funding.

Both Italy and Tuscany are importers of fishery products. The most important wholesale markets for fishery products are the large cities. Supermarkets and hypermarkets represent the largest share of retail sales, however traditional channels such as fishmongers and municipal retail markets have done better than most other European countries. The EU-28 is the most important partner for both imports and exports: 58% of imports and 77% of exports. Fish wholesalers distribute most of the fish, with only a minor percentage being sold directly by fisherman. This has a downward impact on the prices received for fish. The economic crisis over the last decade has impacted the local fisheries sector in terms of price levels, demand and volatility. It has also increased production prices, most particularly higher fuel costs. Fuel is the main production cost in fisheries activity, especially for trawlers. This has led the Italian fishery sector into a period of stagnation. The profit margin of fishing enterprises has decreased significantly. Domestic consumption of fish products has decreased by 2%, although 'Italian' fish is still considered safer than imported fish (as is 'Greek' fish in Greece).

There is strong competition between small-scale fisheries and trawlers in Tuscany, generally in favour of trawling, for both marine resources as well as sales prices. Trawlers are better able to compete on the basis of quantities. In the process, they lessen sales prices. Small-scale fishers generally do not feel protected by institutions against the intensive fishing activity of trawlers or from recreational fishing. In this respect, recreational fishers are considered competitors by small-scale fishers, not least because they sell their catches at lower prices (similarly in Greece). Experts also highlighted the need of local quality and traceability labels for small-scale fisheries in order to better valorise fish products and to increase sales prices.

In Greece the main limitations on fishing activity are to do with environmental conditions, fishing effort and the availability of suitable markets. In terms of markets, there is imbalance between domestic demand and the availability of fresh fish, resulting in relatively higher price levels than those observed in other member states. This has its roots in cultural and socio-economic factors that create a high demand for seafood products. Having said that, domestic sales have dropped in recent years as the consumption of fresh fish has dropped, attributable to the economic crisis. Fish are mainly sold domestically, in that the quantities are not sufficient to warrant export. The best prices come from retail sales, followed by wholesalers. The lowest prices are received for frozen sardines and anchovies sold to processing units. Inshore fishers sell most of their fish locally. Their clientele are mostly restaurants, shops or individuals buying directly from the vessels, and this is where they get the best prices for their catch. Furthermore, they are not obliged to issue invoices for individual sales, hence

they are not taxed for these. Where there are larger catches, they are sold to wholesalers or to the fish auction.

The majority of fin fish landed in Cornwall goes to the harbour markets in Newlyn, Brixham, Plymouth and Looe, whereas Crustacean and Mollusca go either to processors or more usually are sold abroad (mainly to France and Spain) via Vivier lorries (that are able to carry live crab and lobsters), with little value added locally, although this is starting to change. Overall, approximately 80% of the fish caught in Cornwall are exported. There was a strong sense amongst fishers at the FGs that you have to have a strategy in terms of marketing your fish: "otherwise you are at the mercy of what the buyer is going to give you" (Newlyn FG). In this respect, that a degree of entrepreneurship is critical and it is no longer enough to be simply good at catching fish. A key issue in developing the (domestic) markets for fish in the UK is to educate the British public about eating a wider variety of fish species. This led one interviewee to suggest that: "A huge amount of fishing economics is around the marketability of the product, rather than the catchability of the species" (something that is common to all agricultural products to some extent).

It is critical to note that the economic and market performance of the fisheries sector in Cornwall is not only important to the fishers themselves, but also to the wider communities in which they operate. It has been estimated, for example, that every fisher at sea creates a further four jobs on land. These jobs include processing, transportation and perhaps most critically, tourist jobs. In other words, the fishing economy at a local level involves more than simply the value of fish caught (Morrissey and O'Donoghue 2012); similarly in Tuscany, fisheries have always been important contributors to the local economy in harbour areas. As such, the reduction of fishing effort between 2004 and 2010 significantly impacted the economies of some local / localised communities.

Summary

- EU regulations through the CFP have reduced the flexibility that small-scale fishers traditionally have employed.
- In terms of allocating Total Allowable Catches, there is a need for greater transparency as well as improved scientific accuracy.
- The CFP mainly involves technical measures, with scant regard for the social. This was particularly highlighted in the UK case.
- In relation to market conditions, a poorly developed infrastructure was highlighted in the Greek and Italian reports.
- In Italy, only a small percentage of registered sales are direct. The main outlet is through wholesalers.
- In Greece, small-scale fishermen try to sell their produce direct, with the larger boats selling through auction markets.
- Most sales in Greece are to the domestic markets, where there is traditionally a strong demand due to a culture of eating fish. The reverse is the case in the UK, where 80% of sales are exported.
- In the UK, the majority of fish are sold at harbour markets, although increasingly small-scale fishermen are trying to develop direct sales links.
- There is a recognition in all three case studies, that direct sales have the potential for the greatest profit margins.

- Small-scale fishermen often do not feel well represented in terms of lobbying. This was particularly highlighted in relation to Brexit.
- In all three cases, fishing represents a small economic return at a macro level, but can be very important at a local level, both directly and indirectly in terms of socio-cultural integrity.

STRATEGIES FOR SUSTAINABILITY

The fishing sector in Tuscany is highly fragmented and therefore small-scale fisheries are isolated and not powerful in the marketplace. There is also competition between small-scale and trawling fisheries. Also rising competition from external and cheaper markets. Some attempts at producing a regional label have been tried, but this has proved problematic. Fish wholesalers in Tuscany have important market power and influence over the price of fish. Restaurants can be an important market channel for small-scale fisheries but, as with the wholesalers, low prices and the transaction costs associated with payment can discourage fishermen from selling to restaurants. Fishmongers are still an important outlet for small-scale fishers. Retailing tends only to be a market channel for the few big fishing companies in Tuscany. This has led to a number of adaptation and transformation strategies. For example: diversification activities, short supply chains and direct sales, investing in technological innovation and increasing international sales, selecting more valuable catches, and developing more recreational activities such as fishing tourism. Some fishers have developed artisanal activities such as transformation and processing in order to create added value. Also attempts to create new market channels. For example, small-scale fishermen selling to solidarity purchasing groups, or directly to consumers through a consortium.

In 2014 the Fisheries Local Action Group “Coast of Tuscany” was established with the aim of “supporting fisheries and aquaculture by increasing competitiveness, profitability and employment, through: a) Promoting the area and its local fisheries products; b) Strengthening the links between fishing activities and tourism; c) Vocational training for fishermen; d) Adding value to production through the development of new forms of marketing”. Moreover, in Tuscany 70 fishers were supported for carrying out fishing–tourism activity, which is seen as a good opportunity to help ensure the ongoing viability of small-scale fishermen's livelihoods. According to the regional law (L.R. no. 35/2009) only vessels practising inshore fishing can exercise fishing tourism. These activities allow fishermen to integrate and diversify their income as well as provide an opportunity for new employment, releasing the pressure on fish stocks. From interviews with fishermen engaged in fishing-tourism, it emerged that this activity can represent an important strategy of diversification of the fishery activity for small-scale fisheries.

In Greece, there are frequent complaints about bureaucracy and mismanagement. In terms of the socio-institutional conditions, administrative efficiency, a lack of cooperation, criminality and fraud are key issues that confront both fishing and the wider food production sector in Greece. Illegal practices are seen as being a big problem for fishing, particularly inadequate monitoring by the authorities. This relates primarily to fishing of undersized fish, that may be sold in restaurants or other outlets beyond the fish auctions. The fines for illegal catches are too small in relation to the additional profits achievable through illegal fishing. Data collection in Greece is also seen as being inadequate, due to a lack of funding by the Greek state. In relation to inshore fisheries, most of the production is traded locally and not through the fish auction, meaning there is no data available. Furthermore, there

is no data concerning the catches of recreational fishing; similar to Tuscany, recreational fishers who then sell their catches, diminish further the power of professional fishers in the marketplace.

Purse seiners and trawlers in Greece are obliged to deliver their catch to fish markets, where a daily auction takes place. There are 25 fish dealers operating in Kavala's fish market and each fisher has an informal, typically oral, agreement with a dealer. The dealer usually acts as an intermediary between the fisher and the buyer. The fisher has no control over the price the fish is sold for: fishers are price takers. Increasingly they are only paid after the dealer gets paid by the final buyer, rather than at the end of the month, as previously. Most of the costs are borne by the fishermen. There are concerns amongst fishermen that most of the fish sold in the auctions, up to 90% apart from sardines and anchovies, is imported. Although inshore fisheries are also obliged to deliver their fish to the auction market, this is not the common practice. It is rather the last resort, to be used only when their catch is too big to be traded through the local market.

Access to the multiple retailers is effectively impossible for small scale inshore fishers in Cornwall, in that these retailers almost exclusively use supply chains covered by various (usually expensive) certification processes (often Marine Stewardship Council - MSC). The Fisheries Local Action Group (FLAG) in Cornwall has had a part to play in developing the local fishing sector in coordination with the wider food economy, not least by making investments to improve the quality/qualities of locally caught fish, and to give it a 'story' that is associated with traceability and sustainable fishing practices. However, while diversifying market outlets in this way may help to develop resilience for fishers, it also requires additional knowledge, investment and competence (Doeksen and Symes 2015).

Key to the dissemination of European funds in Cornwall is the Cornwall and Isles of Scilly FLAG. The formal aim of the 2012 FLAG was to "maximise the economic opportunities and benefits open to Cornish fishing communities in a sustainable and cooperative environment". In the second round of FLAG, which started in 2016, a key focus is on innovation and adding value to the fish caught, not least in response to the landing obligation (see below), as well as to maximise the tourist £.

In relation to markets and marketing, many observers feel that, especially smaller scale fishers, must add value to their catch if they are to survive. They need to develop a greater sense of entrepreneurialism and to actively develop their own markets. For many fishermen, selling their fish at harbour-side is all they really consider in terms of markets, judging that they do not really have the time to go and market the fish themselves, preferring instead to focus their energy on catching the fish in the first place. Nevertheless, there is evidence that more and more fishers are seeking to access Cornwall's local markets, and to use social media to make direct contact with buyers and to cut out the middleman, with some now selling direct to buyers in London. Selling to London (and indeed other large cities) has the potential to realise considerably greater prices for the fish sold, in that London-based restaurants and fishmongers have more buying power than their Cornish equivalents. In this respect, the catch of inshore fishers was recognised as having the potential to be of the very highest quality available (in that it is usually landed on a daily basis), although this necessitates that the fishers involved look after their fish. Developing sales to local restaurants and to London necessitates developing a good relationship with the head chef or dealer, to the extent of calling them every day to tell them about the catch that is available. In this respect, Cornwall is luckier than most in that there are a number of high-end restaurants and foodie hotspots, such as Padstow. However, it was pointed

out in both the FGs and the workshop that in the UK, and even in Cornwall, fish is generally speaking not part of our culinary culture (unlike France for example). There is scope therefore to encourage domestic demand with the right incentives and policy initiatives.

Horizontal coordination.

In Greece, fishermen in the focus groups stated that they are helpless and defenceless since the state dismissed their federations and the confederation of coastal fisheries. Now their interests are represented through the Union of Coastal Fisheries Clubs, but there are doubts that inshore fishers actually ever make use of this facility. By contrast, the union of purse seiners and trawlers is very active in promoting their interests. Two years ago there was a price drop due to excessive supply, prompting the 18 purse seiners from Kavala (the whole of the fleet) to agree to perform a single landing per day. The hope was to keep prices more stable and at higher levels. The amount of fish delivered to the auction is now about 30% of what it was two years ago. In addition to one landing per day, the fishers of Kavala also decided not to fish on Saturdays. This practice seemed to function amongst the local fishers of Kavala; however, its long term viability is put in doubt by other fishers coming in from other areas of Greece who continue to fish on Saturdays. This being said, one should also bear in mind that for the last two years, purse seiners in Kavala (the whole fleet), have been trying to get MSC certification for their catch of sardines and anchovy. A committee, comprised of fishers, experts, local authorities, an NGO and a retailer, has been formed, who manage and monitor the whole effort. This collective initiative has been received in a favourable manner by consumers and adequately promoted by the retailer.

Cooperatives are widely suggested as being a possible solution to the problems faced by producers within the whole food supply chain in Greece, yet a lack of trust amongst producers has led to a result where it is estimated only 10% of food products and supplies are handled collectively by cooperatives and producer groups in Greece, much lower than the EU average of 60%. This distrust is aggravated in the case of fishing, which is by nature a competitive business, not least because fishermen are hunters rather than simply producers. They openly admit that they do not want other fishermen to know where they fish, what they fish or what money they get for their fish. As such, there is a widespread impression that cooperation amongst fishermen is very difficult, even amongst small inshore fishermen. Similar sentiments were expressed in Tuscany, where small-scale fishermen are seen to be highly fragmented. It is also recognised that there is intense competition between individual small-scale fishermen, as well as between small-scale fishermen and trawlermen.

In terms of developing new *institutional arrangements* (IAs) in Cornwall, it is apparent that there is minimal horizontal coordination between the inshore fishers. Indeed, findings from the focus groups suggest that in most cases fishers are highly independent, and indeed secretive, both in terms of what they catch, but also where they sell it and for how much. Where coordination does take place, it is likely to be within families. Similarly, in terms of vertical coordination where, despite some evidence of fishers working with local processors, most of the inshore fishers in Cornwall sell their catch directly through the harbour markets.

In Tuscany, there are a number of fishing cooperatives. These have been established mainly to develop stronger market power and to organise sales through their own auction markets. In other cases,

smaller cooperatives do not dispose of their catch their own auction markets, but instead have developed direct sales through purchasing groups or through proper outlets at the harbours. In some cases, these cooperatives diversify and vertically organise themselves into non-fishing activities such as marketing, processing, distribution, catering as well as tourism.

Summary

- Small-scale fisheries tend to be highly fragmented; something that is exacerbated by the highly individualistic attitude of most fishers.
- They are innately competitive with one another, as well as with trawlers and recreational fishermen.
- Retailing, especially to supermarkets, is really only for very large-scale fisheries.
- Attempts to develop a local label have been tried in Italy, but have proved to be problematic. Some attempts have also been made in Cornwall. The idea of trying to develop a local story is considered important.
- The development of fishing tourism has been particularly important in Italy, where it has been supported by the local FLAG.
- Poor management and regulation leading to fraud and illegal fishing is reported as a key problem in Greece. It is also contributing to inadequate data collection.
- Small-scale fishermen are price takers. Increasingly many are seeking alternatives, such as direct sales, but in many cases better local infrastructure is needed.
- The necessity of adding value in order to remain viable. This requires greater entrepreneurialism amongst fishermen.
- Small-scale fishermen have minimal power and in many cases feel they have poor representation, and yet there is a distrust of working together. Small-scale fishermen are inherently competitive. This seemed to be the case across all three case studies.
- Some minor examples of cooperation starting to happen, with the aim of increasing profitability. This is both vertically and horizontally. There are some good examples in Cornwall and a hopeful initiative in Kavala, Greece

THE FUTURE SUSTAINABILITY OF THE SECTOR

Individual fishers and their families often struggle for regular income, in that they face a range of risks and uncertainties, many of which are beyond their direct control, including seasonality, severe weather, market instability and variability in terms of fish stocks. The risks faced by fishers have been compounded by management restrictions imposed through the CFP. In this respect, policy-making is often associated with being 'top-down, distant, centralised and lacking local specificity', thereby alienating many inshore fishing communities who tend to be suspicious of 'policy' and 'science', which are perceived as external or outside interference. Flexibility is seen as a key attribute of fishing sustainably and regulation is seen as "reducing the scope for fishermen to practice many of the attributes associated with being a good skipper, such as using local ecological knowledge to determine what to fish" (Ross 2015, p. 319).

There is a widespread perception that fisheries management in the EU, via the CFP, has failed to deliver sustainable fisheries and economic vitality, with one of the generally accepted reasons for this being a lack of transparency and the failure to include a wide range of stakeholders and perspectives. Frustration that much of the regulation developed at the Commission is not necessarily appropriate at a local level, not least due to the diverse range of fisheries in the EU. In this respect, that 'one size

does not fit all' and that there is a need for more appropriate bottom-up regulation that has been developed at a local level.

Intergenerational continuity is a key issue when addressing the sustainability and resilience of inshore fishing across Europe. Traditionally, many fishers came through the hereditary pathway. However, fishing is no longer seen as the occupation that it once was in terms of status, financial rewards or job security. There is no longer the same pressure within families to persuade sons to follow their fathers, with the result that aspiring fishers increasingly come from outside the fishing community. This creates an additional problem for aspiring fishers, both in terms of finding the necessary finance to purchase a boat and license, but also in terms of gaining experience through working on boats and 'learning the ropes'. This is leading to an ever increasing average age of fishers, with less than 20% being under the age of 30 and the average age approaching 60 (White 2015).

There are emerging demand patterns that are seen as having the potential to positively influence the future viability of small-scale fishermen, in Italy. In particular, a growing interest around fishing tourism which opens up new pathways, diversification and multi-functionality. Yet at the same time, these opportunities risk a loss of identity around the core activity of catching fish. Generational renewal is another key issue mentioned in Italy, with young people finding it increasingly difficult to get into fishing. Migrant labour in this respect is also recognised to be important. Issues that go beyond the Italian border, such as global warming, sea warming, extreme weather and eutrophication are important issues going forwards. In addition, the fishing vessels in Tuscany are increasingly old and unsafe due to a lack of investment. It is very hard for fishers to access credit from banks. In Tuscany there is an observable decline in productivity and profitability amongst fisheries due to an EU-driven effort to reduce the size of the fleet in terms of the number of vessels, engine power and so on and a consequent rise in the age the fleet. This process is also seen as an obstacle to innovation (this is also a common perception with Greek fishers).

A lack of liquidity in the Greek economy due to the economic crisis, is of critical concern. Most of the fishing businesses are family-owned, with the family providing the necessary means for younger members to get into the business. This is considered easier than getting a loan from a bank, in that there is much less paperwork. All purse seine vessels are under co-ownership. It is common practice, especially for purse seiners and trawlers, to finance their business through cooperation with the dealer. Financing of operational costs is available on a short-term basis through the auctions' dealers. Occasionally, dealers will function as money lenders, although this has been reduced due to the ongoing financial crisis and a shortage of funds. For larger investments, capital has to be sought through a bank loan. Where a fisher and their family do not have the requisite collateral for a loan from the bank, resorting to collaborations is common practice. In such a partnership, the fisher contributes knowledge and experience, and the other party money. Investment supported by EU or national funds through co-funding arrangements is problematic for inshore fishermen; financing loans through a bank in order to raise sufficient capital is almost impossible due to inadequate collateral, especially for those vessels under 12 m.

The ageing of fishers, their educational level and urbanisation are three key factors affecting the future of fishing in Greece. Young people are reluctant to engage with fishing and many feel there are insufficient incentives to encourage them. Most of the employees on trawlers are foreign fishermen,

in that Greeks are unwilling to take on a job with such difficult working conditions. The ageing of fishermen, coupled with relatively low educational levels, means that fishermen are unable or unwilling to adapt new concepts and ways of fishing, potentially constraining its future viability and sustainability. Similarly, in Tuscany, there are concerns that there are insufficient people coming into fishing, with a lack of human resources being trained or willing to become fishermen since it does not fit with 'modern life habits'.

The key issue discussed in the Cornwall FGs in relation to policy and management was that legislation and bureaucratic necessities need to be better tailored to the needs of smaller boats. There are also concerns that the 'voice' of inshore fishers is not being sufficiently heard and that their access to policymakers is restricted. Even though they may have nominal representation on a number of bodies, other lobby groups are seen as having more impact (most notably trawler fisherman). Of particular concern to fishermen is that they are insufficiently represented at the ongoing Brexit negotiations: "These big players, like CFPO (Cornwall Fish Producers Organisation) the other North Eastern POs, they are going to be around the table and we don't have any representation, it's hopeless, we have no salt in the river" (Helston FG).

The innate passion of fishers means that they are likely to be inherently highly resilient and to continue in fishing beyond the time that makes economic sense. Although there was optimism in the Cornwall FGs about those currently fishing, remaining in fishing, people were much less sanguine about the ability of future generations to get into fishing:

"The people that are in the game, who have been in it for many years are resilient and will probably see it through to retirement. But when it comes to succession... I think we are going to see some ports peter out to nothing. In the future, it's hard to see what will attract enough people. It's never going to be making your fortune – it's a lifestyle choice and it's probably not as popular a lifestyle choice as it was" (WSP 2).

Any discussions about the future of fishing in the UK inevitably involve looking at what the Brexit negotiations will result in. As such, Brexit was discussed at length in both the FGs and the workshop. Two of the workshop participants, in particular, were adamant that the CFP was not fit for purpose and that Brexit offered the opportunity for change: "We need suitable management through fisheries legislation which we haven't got at the moment". Apart from access to more quota, the key issue discussed was to try and extend the limit of waters that are exclusive to UK fishermen. At the moment, EU vessels with 'grandfather rights' are able to fish within the 6-12 nm range (in Cornwall this is mainly French and Belgian boats). When asked what would be the impact on the inshore fishing sector in Cornwall should the UK Government fail to get the 12 nm limit imposed, the response was: "Disastrous really: we've got to get that 6 miles back", to the extent that it will be key to the inshore fishing sector remaining viable in the future.

Whatever happens in terms of the negotiations, several of the participants emphasised the importance of having accurate science in terms of fish stocks, otherwise it becomes impossible to determine whether something is sustainable or not. In this respect, there was recognition that there will still need to be coordination with those countries fishing under the CFP, or there is a danger that there will be overfishing. This will require negotiation between the UK and the EU in terms of what the stocks of a particular species are, as defined by ICES, notwithstanding that the advice they give is invariably watered down by political processes.

Despite a general sense of optimism (or at least hope) that Brexit will result in positive change for the inshore fishing sector, there was also concern expressed at the Helston FG, in particular, about the dangers of the Brexit negotiations, especially in relation to the export markets for fish. For example, that the EU may impose significant tariffs on UK exports of fish, or perhaps even withhold access to certain markets. This could be devastating, in that between 80-85% of fish caught in Cornwall is sold to Europe. Similarly, instinctive enthusiasm for Brexit was tempered by a concern that nothing much will change in reality, not least because fishers are unconvinced that the UK Government will fight their corner. “Our Government doesn’t really seem to give two hoots about the fishing industry. I think we will be used as a bargaining chip for something else, like farming” (Padstow café).

Summary

- The need for more bottom-up policy, developed as a result of more participatory approaches. This would help with flexibility and place-specific conditions.
- Currently, there is a lack of transparency and a feeling that 'one size does not fit all'.
- Intergenerational continuity is a critical problem across all three case studies. It differs slightly between the three, but generally is leading to the same issues.
- Fishermen are innately resilient, but there are concerns about insufficient numbers of people coming into the industry
- Ageing of fishermen is common to all three case studies. There are concerns this will impact the ability to be innovative.
- Fishing tourism is a particularly important opportunity in Italy.
- Liquidity is a particular problem in Greece, following the economic crisis.
- There is a need for greater accuracy in terms of fish stock availability. The landing obligation is intended to help with this, but currently is not having much impact at a local level.
- In the UK, there are issues around the Brexit negotiations. This includes both access to fish, but also to markets.
- The CFP sets out the overarching regulatory conditions for all fishers within the EU. Decisions on what, where, when and how to fish are now tightly circumscribed, affecting both short-term and longer term business planning.
- Cooperation is expressed in all three case studies as a possible solution, either horizontally or vertically, yet inshore fisheries are recognised to be highly independent and competitive, unwilling in most instances to cooperate with other fishermen. There are one or two exceptions to this, most notably in Cornwall.

Commodity: Fisheries				
Country	Context	Conditions	Strategies	Future
Italy (satellite)	Concerns about habitat loss, pollution, eutrophication. Loss of marine stocks and marine biodiversity. The Tuscan fleet is mainly small-scale fisheries, which are highly fragmented and heterogeneous. A reduction in the size of the fleet due to CFP reforms.	The CFP sets out the overarching regulatory conditions for all fishers within the EU. Logistics and distribution are weakly developed for small-scale fisheries in some ports in Tuscany. Wholesale markets are the most important outlet for fishery products. Only a minor percentage is marketed directly, even though this provides better returns.	The fishing sector in Tuscany is highly fragmented and therefore vulnerable in the marketplace. Access to large-scale retailers is unfeasible, except for few strong fishing groups and wholesalers. Short food supply chains have been developed, including additional processing at a local level in order to create added value. The most significant strategy, however, is to develop fishing tourism, which has been aided by the local FLAG.	There is a widespread perception that fisheries management in the EU by the CFP has failed to deliver sustainable fisheries and economic vitality. Intergenerational continuity is felt to be an important issue, as is the ageing of the fishing community. A growing interest in fishing tourism is seen as providing the opportunity to open up new pathways, diversification and multi-functionality.
Greece	Characterised by a large number of fishing vessels, using polyvalent passive gear. At a macro level, economically insignificant, but important at a local level. Concern about eutrophication and pollution, and the overfishing of stocks. A reduction in the size of the fleet due to CFP reforms. The significance the financial crisis, principally in terms of access to credit but also reduced demand for fish	The CFP sets out the overarching regulatory conditions for all fishers within the EU. Domestic demand for fish has historically been high, due to a culture of fish eating, although has been a slight softening of demand due to the financial crisis. Small-scale fishermen are recognised to be 'price takers', putting pressure on their future viability.	There are frequent complaints about bureaucracy and mismanagement, leading to illegal practices and fraud. Data collection is also seen to be inadequate. There have been some attempts at cooperation between fishermen in order to improve their bargaining position, most notably in terms of the purse seiners in Kavala. Having said that, there is recognition that fishermen generally are competitive rather than cooperative.	There is a widespread perception that fisheries management in the EU by the CFP has failed to deliver sustainable fisheries and economic vitality. Intergenerational continuity is felt to be an important issue, as is the ageing of the fishing community. A lack of liquidity in the Greek economy following the economic crisis is of critical concern, most notably in terms of financing innovation.
UK	Economically insignificant at a macro level, but critically important at a local level culturally,	The CFP sets out the overarching regulatory conditions for all fishers within the EU. Most of the	Access to multiple retailers is effectively impossible for small-scale fishers. There are attempts to	There is a widespread perception that fisheries management in the EU by the CFP has failed to deliver

	<p>socially and economically. Fears of being underrepresented, particularly in the ongoing Brexit negotiations.</p>	<p>fishermen sell most of their fish via the harbour markets. However they are then 'price takers' and there is a recognition that small-scale fishermen must add value to their catch in some way through being more entrepreneurial.</p>	<p>improve the quality of fish caught locally, and to give it a story, that is associated with traceability and sustainable fishing practices. There is also an attempt to innovate, add value, process locally. Adding value and entrepreneurialism are seen as critical, as part of actively developing new markets for locally caught fish. Selling directly to restaurants both locally and in London are seen as important ways to add value.</p>	<p>sustainable fisheries and economic vitality. Policy needs to be better tailored to the needs of local level fisheries.</p> <p>The ongoing Brexit negotiations are generally seen by the fishers as an opportunity to correct many of the issues associated with fishing, most notably in terms of taking back control of management policy decisions. However, there are also concerns about the market implications of doing this, as well as the UK government's ability to drive a hard bargain.</p>
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Aquaculture – Germany and Italy

CONTEXT

The aquaculture cluster in SUFISA included a case study from Germany and two smaller, less-expansive (so-called ‘satellite’) case studies from Italy. The German case study examined **traditional carp pond farming** in Bavaria (Middle Franconia) and the adoption of **recirculation aquaculture systems** in Northern Germany. The Italian satellite case studies examined **marine aquaculture in Tuscany** and **mussels farming** in Emilia-Romagna respectively.

In Germany **aquaculture has stagnated**. It is practised all over Germany but is mostly concentrated in a few specifically suited regions; production accounts for 3% of total fish consumption in Germany. Small fish farms dominate the industry. Traditional aquaculture species are rainbow trout and common carp. Trout farming in freshwater flow-through-systems is the most profitable branch of production. The farming of carp in natural freshwater ponds is the second major type of aquaculture practiced in Germany. The case study examined carp farms in the north of Bavaria (Franconia). The Aischgrund (in the west of the city of Nürnberg, where much of the research was completed) has international recognition for its carp breeding. Most pond farms in the area are **small, family owned** and operate systems that have a low level of intensity (in terms of production) as part of a traditional system that is closely linked to nature conservation purposes.

The **level of professional education** in respect to aquaculture and/or marketing of fish is relatively low in Franconia – it is an industry built around good practical knowledge that comes from practical experiences and the traditional knowledge of families. Farmers often work **part-time in aquaculture** alongside agriculture and non-agriculture jobs. Most small scale farmers (<1ha) gain most of their total annual income from employment in other sectors. In 2014 the German national strategy for aquaculture highlighted the objective to increase aquaculture production using **recirculation aquaculture systems** (RAS). These are alternative ‘high-tech’ production systems that reuse (warm or cold) water from the fish tanks after purification. They require technical expertise; costs of production are high and they must also comply with various legal requirements so the numbers of farms are still very low. RAS enterprises are usually run by pioneers in the field of intensive fish production. In 2016, Germany had around 48 warm water plants stocked with around 2,200 tonnes of tropical fish species.

Italy has seen a decline in recent years in its traditional fishing which, in contrast to Germany, has been counterbalanced by a **growth in aquaculture**. The sector represents 48% of fish production in Italy and (alongside Spain, France and Greece) is one of the main aquaculture producing countries in the EU. In Italy aquaculture includes marine and freshwater farming, but the current trend is towards **increased production of marine species** both on land and at sea (molluscs and finfish). In 2013, of the 162,600 tonnes of aquaculture produced, 24% was freshwater and 76% was marine and brackish water. Sea bass and sea bream are popular products. Growth in the sector is linked to improved seed production techniques for European seabass and gilthead seabream and the application of new farming technologies. The establishment of aquaculture facilities in the natural environment of coastal brackish areas has led to disputes because of their environmental vulnerability.

The satellite case study in Tuscany focused on aquafarming of saltwater populations and mariculture. Tuscany represents 20% of national production via 12 aquaculture units and 4 mariculture coastal stations. The sector has seen three key **structural changes**:

- Declining numbers of active aquaculture enterprises;
- Consolidation amongst the bigger aquaculture companies; and
- Expansion of mariculture activities

Emilia-Romagna, the focus of the second satellite case study, is the main region in Italy for mussel production (22,200 tonnes were produced in 2014). Mussel production is now an important economic activity in the region, partly to help fishers mitigate the fisheries crisis. Mussel farms in the region developed rapidly in the 1980s because of the development of technology that allowed offshore mussel farms to be established which enabled cultivation to be extended to new areas.

Summary

- Aquaculture has stagnated in Germany but has grown in Italy, especially for marine fish production (to replace declining traditional fishing)
- Small fish farms dominate aquaculture in Germany, mainly in traditional pond farming systems.
- Re-circular Aquaculture Systems (RAS) are high-tech plants that are run on a larger and highly professional level.
- Professional education in German aquaculture is shrinking due to very low and falling numbers of young fish farmers
- Structural changes evident in aquaculture in Tuscany and the growth of mariculture

CONDITIONS/DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

Aquaculture was identified as a sector to be supported through the reformed CFP; boosting the EU's aquaculture industry is one of the key aims of the reformed Common Fisheries Policy (CFP). The **European Maritime and Fisheries Fund** (EMFF) provides financial support for the development of the sector in the 2014-2020 funding period.

In terms of **funding and support**, carp farmers in Bavaria have used European funds (EMFF and RDP) and other sponsors (local institutions, firms) to set up a regional tourist office 'Karpfenland Aischgrund', which promotes the Aischgrund region for tourism, including promoting 'carp kitchens'. Carp farmers' associations and co-operatives also provide advice and support, particularly pond co-operatives. They cannot access certain funds e.g. pond areas are excluded from CAP area payments and compensation payments for less-favourable areas also exclude ponds. For enterprises establishing RAS, producers can apply for funding via farm investment schemes (RDP for rural businesses) and economic business development schemes (Structural Funds). Warm-water RAS are often developed in connection with a bio-gas plant. Policy and funding schemes are important for the development of biogas plants in Germany (linked to the **regulatory framework for renewable energy production**). Under the Renewable Energy Act operators of bioenergy plants receive higher prices if the excess heat is used efficiently, including the production of fish.

For the case studies in Italy, the impact of subsidies on the total value of production in Tuscany is considered low by producers when compared with the current annual turnover of aquaculture enterprises; nevertheless, aquaculture producers in Tuscany have received support for technological innovation from European policies through the regional government. For mussels in Emilia-Romagna subsidies (from the EMFF) cover 50% of the investment. However, because these companies are usually small and medium-sized enterprises they very often do not have the extra resources required to cover the investment and so also need credit access.

In terms of **policy and regulatory conditions**, Germany has a three-tiered system of government (national, federal and local). For aquaculture federal states are responsible for nature conservation and aquaculture legislation. Consequently, legal and administrative rules and regulation for fisheries and aquaculture may differ between regions. As well as **diverging policies at a regional level**, there

can be a **difference between national and local policies** in that national policy aims to encourage aquaculture production for economic sustainability reasons but regional and local level policy and administration reportedly have no interest or are reluctant to allow applications for expansion due to public disputes. These issues were highlighted by RAS producers, who have to comply with a variety of laws, which are irrelevant for aquaculture in earthen ponds. Two other issues were also highlighted:

- **Interpretation of EU legislation:** a big issue for RAS producers concerns the strict legal interpretation of EU legislation in Germany. There is potential for more flexible interpretation but this is hardly used. Moreover, the interpretation at the state or district level seems to be inconsistent. This leads to site-specific conditions that differ between regions.
- **Gaps in technical knowledge:** there is lack of technical knowledge at an administration level around how a fish farm/aquaculture system is managed (in terms of farming, animal husbandry or water related sectors, for example). This lack of professional knowledge within administrative agencies in turn impacts how regulations are understood and interpreted at a farm/local level with little flexibility. Former staff with training in the industry have retired, and younger employees have only received training and qualifications in administration capacities but not fish farm management. Consequently, staff members in administration roles do not fully understand the issues being faced by fish farmers in terms of everyday management, such as water use and compliance with water regulations, as well as approval procedures for new constructions or technical changes due to innovative technologies.
- Landscape and territorial restrictions play a major role in Germany too. In addition, the acceptance of fish produced in RAS is low in the civil society because the image of the end-product is not very good.

In Tuscany, **landscape and territorial restrictions** are the main concern for producers. Tuscany is a tourist area with several protected areas. Industry stakeholders argued that the administration was rigid and it was difficult to obtain permissions to expand aquaculture activities at the sea nearby busy tourist areas. However, in less touristic areas, land-based coastal producers of marine species were recently allowed to expand and then totally moved aquaculture production to the sea. The legal framework related to the authorisation for expanding marine species aquaculture to the sea is complex because it involves decision-making at the local level (municipalities).

For mussels, **environmental regulations** (related to how mussel farming impacts coastal areas) and **sanitary regulations** are big issues. Regulatory sanitary conditions are established at regional level but applied with different protocols at municipality level. The introduction of new EU production and sanitary regulations has been costly for mussel producers in recent years.

Markets and market conditions

German aquaculture markets are complex. Statistics on market structures, contractual agreements and prices do not exist. Farmers' information on demand, prices and emerging trends is based on individual engagement and contacts. For traditional carp producers, access to the fish market outside Franconia is difficult. Locally, farmers depend on a few fish wholesalers who collect, grade, process and distribute the fish. Most fish farmers in the Aischgrund sell to a fish wholesaler or directly to restaurants. Due to competition with large-scale producers in Saxonia and imports from the Czech Republic or from Poland, sales prices are relatively low compared with prices realised in other German areas. Different business models were noted for fish farms using RAS in Germany, including sales through a Marketing Union for Zander, sales to a co-operative, and a producer-processor enterprise which sells to a wholesaler, farm shop and fish trader.

Market competition in Germany was noted for carp farms. The profitability of many carp farms is under pressure because of competition from producers in neighbouring countries (Czech Republic and Poland). Moreover, carp consumption has been declining over a long period in Germany. **Access to markets** and **the ability to add value to the product** was also of critical importance, particularly for RAS. In Germany production costs are high and not compensated by high prices due to insufficient consumer demand. German consumers are very critical about fish quality and production systems due to the negative effects known from intensive marine salmon farms in the North Sea. Due to the negative effects disseminated by the general media, aquaculture systems have lost the trust of several consumer groups in Germany.

In Italy, aquaculture products are mostly sold fresh and whole, especially to big retailers and wholesalers at regional and national level. Tuscany markets are built around **quality and environmental sustainability** in order to be competitive vis-à-vis international markets. In Emilia-Romagna, commercial marketing is difficult because producers lack commercial skills. In addition, the supply chain is fragmented and lacks a producer organisation. The latter is because of the varieties cultivated, which do not require processing treatment before commercialisation, and so a PO was not deemed to be necessary. The businesses deal almost exclusively with the production aspects, while marketing is managed almost entirely by dealers. Producer organization would help producers to trade and would also act as an intermediary with politic institutions. In terms of export, varieties produced in Italy are not much in demand in northern European markets. Italian aquaculture markets face **increasing competition from other countries**, especially for seabass and seabream. Greece has a fast-growing marine cage-farming industry, for example. Key competitors for mussels - because of seasonality in product allocation - are Greece and Spain. Among the market issues identified, better consumer education to make people aware of domestic vs imported product was highlighted as important.

Drivers influencing future performance

Bureaucracy was identified by the European Commission as one of the main inhibitors of aquaculture investment. There is a multitude of decision levels. From the cases presented bureaucracy represents a significant challenge, linked especially to the interpretation of regulations at a local level. The **profitability** of aquaculture producers because of competition from producers in neighbouring markets is another key driver and the need for **collective organisation**, especially for mussel production in southern Italy. The key future driver for RAS producers was the **stagnation** of the sector. A lack of support from local administration was one of the key factors slowing down the development of the sector.

Summary

- In terms of policy and regulatory conditions, the main issue is the way that aquaculture is impacted by restrictions due to environmental regulations, especially in the Italian satellite cases.
- The German case study (RAS) also highlights the influence of the institutional framework (federal states deal with aquaculture and interpretations of regulations, including EU regulations, can vary) as well as the regulation itself.
- Market data on German aquaculture does not really exist; different business models.
- In Italy, Tuscany uses environmental sustainability for marketing; the mussels sector lacks co-ordination, producer organisational models and commercial skills.
- All case studies reported increased market competition.
- Stagnation due to restrictive environmental regulation and access to markets in response to competition are the key issues.

STRATEGIES FOR SUSTAINABILITY

In the German case institutional arrangements are evolving around carp production in Bavaria that use fish farming heritage and the link to place to maintain a market for the fish as part of wider regional development linked to regional tourism ('Karpfenland Aischgrund'). The Aischgründer carp was certified in 2013 using a **Protected Geographical Indication** (PGI) label. An agency ('Karpfenland Aischgrund') has also started to promote the carp from the Aischgrund area and a small but growing network of restaurants foster carp sales outside Franconia. Partner restaurants provide special gastronomy for the typical Aischgrund carp menus. Two organisations are developing regional marketing of typical carp products. The 'Aischgründer Karpfenland' (carp land Aischgrund) association is a marketing and tourism organisation that provides member restaurants with special designations that distinguish them as supporters of local fish. Together with the 'Teichgenossenschaft Aischgrund' (pond cooperative) this enhances marketing of the fish in the area. The carp museum plays a role for tourists and for local dwellers because it offers information and events related to the Aischgründer carp.

For RAS producers, stagnation in the sector linked to administrative problems at the local level and a disconnect between national and local policy was a major problem. A national coordinator was proposed during the drafting of the National Aquaculture Strategy (2014) and the DAFA Strategy for Aquaculture (2014). The idea is to nominate an '**aquaculture representative**' at the national level who could help to coordinate interests and implement strategies by driving relevant processes in research, policy, and networking. **Technological innovations** also play a key role in the development of the sector. In particular, innovations for water purification are very important for authorisation processes for new plants. RAS farms were part of different business models/arrangements. Carp farmers in Germany have strong producer organisations, particularly **pond cooperatives**, who are responsible for the representation of its members' interests on the local level. Cooperatives help farmers to promote sustainable use of ponds, to define standards and, more recently, have supported their registration for a PGI label. Cooperatives are crucial in terms of horizontal integration and cooperation between farmers. On the supra-regional, national and international level, the Union for German Inland Fisheries and Aquaculture (VDBA - Verband der Deutschen Binnenfischerei und Aquakultur) is the most important body for the representation of fish farmers. The organisation has three branches: trout farming, farming of carp ponds, and river and lake fisheries). RAS producers noted that there was competition between fish producers when selling on regional niche markets or to specialised sales companies. **Horizontal integration was limited** beyond specific enterprises. There was recognition that managing a fish farm was challenging, demanding technological and marketing expertise, with farms comprising two or three key persons with different competencies but usually working as individual businesses. In a few cases, farms cooperate for joint marketing. Knowledge exchange and coordination was more open in terms of technologies used, water treatment processes and authorisation processes with local administration. It was unclear if competitiveness and cooperativeness affected the emergence of new partnerships.

Examples of **territorialisation** were also noted in Tuscany. Quality and environmental sustainability is a competitive strategy that producers have used to respond to competition from national and international markets. This involves using the best raw materials, compliance with environmental sustainability and the adoption of internal standards to guarantee a quality product as part of the '**Made in Tuscany**' brand. In response to consumer concerns by aquaculture products, producers in Tuscany voluntarily carry out water analysis and nutritional, chemical and microbiological analysis of the final product to inform retailers and assure consumers of quality, freshness and safety. The '**Friends of the Sea**' sustainability label has also been adopted by Coopam (the main aquaculture retail consortium) to guarantee access to supermarkets and other big retailers. There are also brackish water productions linked to **Slow Food Presidia**. Other strategies of diversification and territorial

integration in Tuscany include vertical integration, short chains and local-based networks; some farmers have also developed new products – local and regional development plans and funds were used, for example, to introduce new, higher value and strongly demanded species such as meagre and oysters. However, this introduction has not been successful – and lasted as long as the development plans financed the experimentation – as consumers preferred seabream and seabass (now the only aquaculture marine species farmed in Tuscany) or brackish water species.

In Emilia-Romagna the adoption of **organic certification** has allowed some Italian companies to deliver their product to a major supermarket retailer (Carrefour). The final price of the product has not changed much but it has provided an opportunity to access this market. The '**Cozza di Cervia**' label has also been developed – this is an organic product that is internationally unique because of the organoleptic flavour and texture of the local mussels. In the mussel case study fragmentation was a major factor impacting product enhancement. Producers did not have sufficient capital to cover new investments. Most companies were co-operatives (but only for tax concession reasons) and did not usually work together for the marketing of the product. Lack of organisation in terms of producer groups was the major weakness of the institutional arrangement and was creating problems in terms of commercialisation. There was collaboration with a political institution in the region to help mussel producers gain **access to credit** but in individual capacities. Insurance was not used in the sector.

Summary

- In response to national and international competition and the need to add value, there are examples of market differentiation as forms of competitive strategy.
- Territorialisation through economies of quality and certification/labels were important ways to develop market differentiation in response to market competition
- Technological innovations play a key role in the development of RAS in Germany.
- Competitiveness and cooperativeness was another important theme. Co-operation well established between carp farmers in Germany, for example, but more limited for producers using RAS, and the Italian mussels case study in terms of marketing.

THE FUTURE SUSTAINABILITY OF THE SECTOR

There is a major challenge now and in the future to **improve consumer knowledge and acceptance of aquaculture products**, particularly those farmed in sustainable ways. The examples studied in the German case study for carp are environmentally sustainable. The evaluation of the three dimensions of sustainability is more difficult in RAS than in traditional pond farming. Positive and negative impacts caused by intensive fish farming require specific investigation. General statements for the sustainability of the aquaculture sector in Germany cannot be identified due to the heterogeneity of businesses and local conditions. Acceptance of carp meals is high in Franconia, while carp consumption was declining in other German areas for many years. Marketing strategies for fish from traditional pond farming avoid the term 'from aquaculture' because in general aquaculture tends to have a bad image because of feeding practices based on fishmeal, fish oil and antibiotics, and the negative impacts on the (marine) environment. However, RAS have positive environmental effects because recirculating systems conserve more water than other intensive aquaculture systems. In Italy too consumers are also not educated about the quality recognition of local/regional mussel products – greater information to consumers about the quality of mussels from Emilia-Romagna can help to protect the local products. Territorialisation strategies can help to inform consumers about sustainable aquaculture production and remind inhabitants and tourists of their local economic importance.

Summary: Need to improve consumer knowledge of aquaculture products

Commodity: Aquaculture				
Country	Context	Conditions	Strategies	Future
Germany	Aquaculture has stagnated and is practiced in only a few areas; rainbow trout and carp are the main species; small fish farms dominate the industry. The industry is built around good practical knowledge; since 2014 attempts have been made to increase aquaculture production using recirculation aquaculture systems (RAS) (these systems require technical expertise and are usually adopted by more intensive fish producers).	Federal states are responsible for aquaculture legislation. Legal and administrative rules may differ between regions. The strict legal interpretation of EU legislation is a concern for RAS producers, as is a lack of technical knowledge at an administration level. German aquaculture markets are complex. Market competition was noted for carp farms. Access to markets and the ability to add value to the product was also important, particularly for RAS.	Carp producers are using fishing heritage and the link to place to maintain a market linked to regional tourism; the Aischgründer carp was certified in 2013 using a (PGI) label. For RAS producers, technological innovations play a key role (e.g. water purification). Carp farmers in Germany have strong producer organisations; in contrast, RAS producers noted that there was competition between fish producers (so horizontal integration is more selective)	A major challenge now and in the future is to improve consumer knowledge and acceptance of aquaculture products. The economic sustainability of traditional carp farming is poor, with many producers surviving via pluriactivity, which raises questions re intergenerational continuity and succession; models were economic results are successful need to be shared to encourage new entrants.
Italy (marine satellite, Tuscany)	Growth in aquaculture nationally. Structural change in the region in terms of declining numbers of active aquaculture enterprises; consolidation amongst the bigger aquaculture companies; and expansion of mariculture activities	Landscape and territorial restrictions are the main concern for producers. The main marketing channels are direct sales, selling to big retailers and wholesalers.	Quality and environmental sustainability is a competitive strategy that producers have used to respond to competition from national and international markets. This involves compliance with environmental sustainability and the adoption of internal standards to guarantee a quality product as part of the 'Made in Tuscany' brand.	The entry of new aquaculture producers in Tuscany is deemed unlikely because of the strong investments needed and restrictions imposed for implementing new plants. However, new authorisations and financial support have been allowed, from the regional government in 2017, for mussel farming. Territorialisation strategies can better inform consumers about sustainable aquaculture production, and to remind

				inhabitants and tourists of their local economic importance.
Italy (mussels satellite, Emilia-Romagna)	Emilia-Romagna is one of the main region for mussel production;	Environmental regulations (related to how mussel farming impacts coastal areas) and sanitary regulations are key regulatory issues. Mussels are a seasonal product in Italy; the supply chain is fragmented and lacks producer organisation. Producers lack commercial skills.	The supply chain is fragmented, so market access is challenging. The adoption of organic certification has allowed some Italian companies to deliver their product to a major supermarket retailer (Carrefour). The 'Cozza di Cervia' label has also been developed.	Greater information to consumers about the quality of mussels can help to protect the local products. There was concern about how mussel producers access credit; a lack of liquidity impacts future plans and the ability to finance new innovations.

Wine and Olives ('Other') – Italy and Portugal

CONTEXT

The 'other' cluster in SUFISA includes case studies from Italy and Portugal. The Italy case study examined **wine** in Tuscany (central Italy), whilst the Portuguese study considered **olive oil production** in both **intensive and super-intensive farming systems** of (Central and Southern) Alentejo. Both commodities have experienced significant changes and challenges; broadly, the **Tuscan wine sector is one of the regional success stories** against the context of national decline, and intensive and super intensive olive oil production has largely **replaced extensive** rain-fed production systems in Alentejo.

In recent decades, the Italian wine sector has been characterised by a progressive decline in the area under vines. Similarly, the number of winemakers has decreased by nearly one quarter since 1982. However, these declines are thought to relate to increases in productivity and efficiency, as despite these declines, wine production in 2015 was 48.2 million hectolitres – 6 per cent higher than the previous decade average of 45 million hectolitres. Whilst the production of PGI and table wines have suffered progressive declines, national production of PDO wines has increased by 4 per cent since 2010, and now account for 40 per cent of wine produced in Italy. Owing to **specialised and diversified production systems**, a strong identity and global reputation, and the region's capacity to export products to international markets such as the UK, Germany and the USA, the Tuscan wine sector has, unlike the broader industry **maintained growth and investment** and overall wine production has increased steadily since 2009. Tuscany currently accounts for 17 per cent of national exports of bottled wine and it plays a significant role in the production of PDO wines, owing to the morphological and climatic conditions which give Tuscan wines a globally-renowned reputation. In terms of the Tuscan wine supply chain, 96 per cent of farms identified as 'wine producers', i.e. those involved in both the 'production' and 'transformation' phases. Thus, the Tuscan sector is mainly characterised by **vertically integrated producers**, which carry out all phases including the sale and distribution. This is opposed to the cooperative model, which is more common in other regions of Italy, i.e. Emilia-Romagna.

Although, like wine production in Tuscany, olive oil production in Alentejo has undergone a period of transition, changes to the sector have followed a much more defined trajectory, triggered in the most part by a recent increase in water availability and comparatively lower land prices in the region, in addition to the inherent bio-physical and ecological conditions. Unlike wine production in Tuscany, olive oil production in Alentejo has closely matched the overall Portuguese trend. Changes in the region have been marked by intensification and super-intensification of olives and olive oil production, which coexist alongside extensive, smaller and more traditional family run properties. Olive oil production in Portugal began with a great expansion along mid-19th century. This was then followed by a National Crisis in the 1960s, which rendered the commodity to remain expensive and unaffordable by the local population. Following both an increase of the life quality standards and the popularisation of olive oil as a healthy food, national demand for the product exceeded supply between 1980s and late 1990s. This trend then shifted between 1998 and 2011 when the availability of water from the Alqueva reservoir project afforded increases in domestic production. Ultimately, both Spanish and other investment in the area and improvement of technology for production and irrigation have allowed Portugal to satisfy internal demand, and become a net exporter of olive oil.

CONDITIONS / DRIVERS INFLUENCING SUSTAINABILITY

Policy and regulatory conditions

EU regulations, along with national and regional laws, define how both the wine and olive oil industries operate. In the Tuscan wine context, EU, national and regional **laws have tightened across all aspects of the supply chain**, becoming, in the eyes of many producers, excessively bureaucratic and overly stringent. Although intended to **protect the consumer from the potential fraud** regarding the origin and quality of the final product, and despite successive rounds to simplify regulatory measures, they are nonetheless considered excessively bureaucratic by wine producers. The EU legislation stipulate rules regarding the:

- amount of new vines to be planted
- oenological practices and treatments
- system of prices and market measures
- agreements for trade with third countries
- movement of goods

European regulations also introduced the concept of quality wines produced in specific regions; merging the definition of quality wine with a system of rules that associates the quality to the origin. This was **intended to stabilise wine supply and to preserve standards**. The EU has subsequently launched a new reform process to support the sector. The reform simplified and unified previous Common Market Organisations relating to wine. At the national level policy sought to simplify and harmonize the national legislation in view of this European legislative reform; most significantly, this merged previous denominations into the PDO categorisation. Notably, it also tightened the list of products that can be used in organic production which guarantees organic status from the vineyard to the bottle. It is also worth noting the role of the RDP at the regional level which offered various support measures for Tuscan wine producers, including packages aimed at boosting investment, as well as to increase farmer cooperation and assist young farmers.

Policy and regulatory conditions are not considered a key factor in the profitability and/or competitiveness of the Alentejo olive oil industry, particularly for intensive and super-intensive systems for whom CAP funding is generally only considered as supplementary income. It is important to note that Pillar I of the CAP does not provide direct payments to olive oil producers. Where it does offer financial support, CAP has been criticised for failing to support for those operating in traditional production systems, or for those wanting to pursue alternative production systems, such as organic. Unlike, financial support, **water and irrigation policies**, which have granted access to irrigation and low land prices to investors, were **fundamental in triggering change** and development in the region's olive oil production. Legislation (specifically, Reg (CE) n. 1638/98), authorized a surface area of 30,000 hectares of new, mostly intensive and super-intensive olive groves in the region to be planted between 1998 and 2006. Achievement of this target meant the rapid expansion and competitiveness of the sector. Although, it is generally agreed that water and irrigation policy have been positive for the development of the industry, key actors involved identified how the wider regulatory and legislative framework imposes an unsustainable workload on the farmer. This mirrors some of the frustrations with the bureaucracy imposed by European policy in the Tuscan wine sector, but was far more explicit

in the Alentejo olive oil industry where it juxtaposed strongly with the successful trajectory of the industry. National and regional quality control policies, particularly those concerning tearing off existing olive groves and plants and those aimed at reducing the varieties of olives grown, have also had a significant influence on the industry. Specifically, the cycles of varieties such as Arbquina and Picual can be harvested sooner than those grown in competing regions of Spain. Broadly, intensive and super-intensive producers feel independent and unaffected by policy. Traditional and organic producers feel insufficiently supported by current policy and in some cases, even victimised by it.

Markets and market conditions

The Tuscan wine producers benefit from the reputation of Tuscany as a tourist destination. The well-known landscapes of Tuscany furnish one of the most suitable locations in the world to create quality wines. The production of wine in 2010 in Tuscany was about 2.8 million hectolitres representing the 6.2% of the national wine production (44.7 million hectolitres excluded must). In the 2014, this level slightly reduced of about the 9% (2.5 million hectolitres), while the region is still among the most productive region of Italy. The 57 designations of origin represent this union between history, territory and quality, making Tuscany one of the most important regions of Europe for its wines. Despite the many PDO labels available to producers, more **producers are tending to choose the PGI label** for their wines, because it is seen as less constrained and bureaucratic. The growing of PGI brands has prompted huge diversification and differentiation in produce across the sector.

Despite the importance of the sector for the regional economy, during the decade 2000-2010 the number of farms and the area under vine decreased 54 per cent and 3.2 per cent respectively, whilst the average grape area per farm has increased by 108 per cent in the region, versus a figure of 82 per cent nationally. This has been attributed to both poor and unstable wine prices in recent years and has required farmers to distinguish their products from the rest of the market. In the highly developed Tuscan market however, searching for a unique competitive advantage based solely on resources and quality is no longer sufficient. Instead, market competition demands wine producers achieve advantages on the strength of investments in R&D, innovation, training, infrastructure, branding and the development of relationships with global distributors and supply networks. This has encouraged a range of **product diversification and differentiation in the regional sector**. In order to achieve desired improvements in quality, producers are choosing a **vertically integrated business model**; allowing them to maintain control over all stages of production and their respective costs.

In the context of markets and market demands, it is important to note **per capita consumption of wine is decreasing**, but what is being consumed is of higher quality. Furthermore, the ongoing concentration of distribution plants favours larger wine producers, means both small and medium producers are often unable to find or access reliable distribution channels and this, coupled with decreasing domestic demand, has led to **significant uncertainty** for many producers in the region.

Another big factor in the Tuscan wine sector, linked to the difficulty producers have in **finding sales outlets for their produce**, is the difficulty of receiving payments by local buyers in a reasonable timeframe. This threatens the economic viability of many producers – particularly the smaller ones – who are forced to remain financially exposed for long periods, involving financial and business risks.

The Portuguese olive oil market conditions are much more clearly defined, owing to the recent opening up of **new international markets**, which previously dominant extensive and family-run production systems were unable to access. As a consequence of such a move towards intensive and super-intensive systems, the cost of production has lowered, however, although this has allowed commodity production to increase exponentially in the region, responsibility for processing and commercialisation is beyond the infrastructure of the region's experience and capacity. Increasingly, the sector is seeing demand from other international markets, including Chile, Brazil, India and even China. Development of a **national quasi-oligopoly**, including two main producer groups, *SOVENA* and *GALLO* which account for 21 and 19 per cent of the market, nationally, is thought to have resulted in low negotiating capacity for local producers aiming at national markets. The increasing **emphasis on bigger, more intensive farms** producing more olive oil has come at the expense of smaller, family-run intensive units, who are increasingly being left with no other option but to abandon the land or sell it to other farmers or industrial groups. By increasing in size it is felt that farms are better positioned to negotiate their market position in the context of the national and international markets.

Common conditions in the sector

In both case studies a **common market condition** is the difficulty smaller producers face in the context of changes to market demand and their relative power in the supply chain. In Tuscany, smaller producers are finding it hard to find reliable channels to distribute their wine following the concentration of distribution plants. In the case of olive oil in Alentejo, smaller extensive units are unable to compete with larger intensive and super-intensive units in terms of their cost of production and their competitive advantage. This is culminating in a move towards bigger farms/units.

Drivers influencing future performance

The following table summarises the key drivers influence the future performance of the Tuscan wine and Alentejo olive oil sectors, respectively.

Country	Drivers influencing/threatening future performance
Italy	<ul style="list-style-type: none"> • Less wine being purchased per person, but increasing emphasis on quality • Increasing need to differentiate to distinguish products on new markets • Quality and transparency increasingly valued • Increasing desire to keep all phases of production 'in house' as to control quality • Access to distributors becoming difficult for smaller producers • Contradictory policy and increasing bureaucracy • Anticipated decrease in subsidy level • Modern trade (i.e. large distributors and retailers) dominate and are able to stipulate stringent requirements in terms of price, quantity and quality
Portugal	<ul style="list-style-type: none"> • Rapid increase in production capacity owing to construction of Alqueva reservoir; expected to continue (albeit at a slower rate) • International demand increasing and international markets opening up • Limited domestic capacity to process and transform produce • Dominance of two main producer groups • Increasing pressure on smaller, extensive family run units to get big or get out

STRATEGIES FOR SUSTAINABILITY

The Tuscan wine sector is increasingly characterised by **greater concentration**, with **vertical integration** operated/facilitated by **fewer but larger** distributors; this allows producers to be entirely in control of quality of the eventual product by having control *throughout* the supply chain. Almost paradoxically to the concentration and consolidation of producers, is another strategy for sustainability of the sector; namely the **growing diffusion of products and high levels of differentiation amongst the wine** produced (PDO and PGI labels). It is also important to note the increasing prevalence of organic production and labelling. Producers are **exploiting the diversity**/individualities of the territory in order to market their products as unique in the aforementioned declining market that is increasingly demanding quality over quantity; despite some success in doing this, producers want better support for marketing from regional policy framework. Specifically, there is need to develop a greater capacity to use modern ICT technologies (i.e. e-commerce platform, web and social skills) to promote and communicate the territorial character of products.

In the highly competitive environment, small and medium-sized Tuscan wine businesses are pursuing **relationships with third party agents**, such as wholesalers or export brokers. 'Middleman' companies that create and facilitate these linkages are becoming key players in the regional industry. Collaborative efforts that can lead to the creation and formation of new sales networks and local intermediaries is a key strategy; although the importance of more qualified staff (i.e. those with marketing skills) to within these networks was highlighted (there is a need for common policy to develop this). The report recognises the rising **importance of collective producer networks** in improving the bargaining power of producers and the subsequent increase in sale prices, and offers two examples of such, namely hyper consortia *AVITO* and the network of organic producers *Biodynamics Lucca*. Although contrasting examples because of their different scales, the networks represent efforts to increase the bargaining power of wine producers. In response to the increasing bureaucracy of the industry, producers in the region have identified the benefit of **collective approaches and action**, and the sharing of resources to reduce the administrative costs and burden of bureaucratic processes.

The strategies for sustainability in Alentejo's olive oil sector are more **differentiated** than in the case of Italian wine where, although smaller units face more difficulties, broadly all producers are facing the same challenges but to different extents. But, in the case of Alentejo's olive oil sector the kinds of strategies adopted and why, depend highly on whether the farm is traditional-extensive, or intensive/super-intensive. This dichotomous industry structure means different farmers/producers are adopting different and even competing sustainability strategies. These different strategies are described in the following table.

The only common strategy amongst extensive small farms and intensive/super intensive farms in Alentejo is the increasing emphasis on marketing strategies. Both types of farming systems are reliant on good marketing strategies to reach international markets, and compete with direct competitors such as Spain and Italy on the global scale.

Country	Strategies adopted for sustainability
Intensive and super intensive farms	<ul style="list-style-type: none"> • Secrecy and competitiveness; work independently of others • Horizontal integration highly unlikely • Financialisation of the sector • Vertically integrating to control all aspects of the business (incl. manufacturing, marketing and export) in order to gain competitive edge/increase market share
Extensive, small farms	<ul style="list-style-type: none"> • Two main strategies: <ol style="list-style-type: none"> 1. Gradual intensification (but this depends on access to resources) 2. Diversification <ul style="list-style-type: none"> ▪ Forced to do one of the above or give up land • Cooperatives are proving a strong and effective institutional arrangement to support extensive, small farms • Work with other extensive, small units; cooperative solutions are imperative

THE FUTURE SUSTAINABILITY OF THE SECTOR

Climate change & sustainability

A significant concern, common to both case studies is concern around **ecological sustainability** going forward. In the Tuscan wine industry, **climate change** represents a major threat to the production of the commodity; in particular producers feared unpredictability (e.g. shorter harvest times, invasion of pests). It was recognised that, in order to face climate changes and preserve the territory where production takes place, producers must invest in research *together* with the Universities of the region and regional institutions. Innovation is needed to address the conservation of the soil, bio-diversity and the development of even better-quality wines. The industry aims to develop what the report describes as a '**rational viticultural system**', defined (here and in the report) as:

A system that is **careful to the territory** and its **social and environmental values**, that cares about the **health** of consumers (i.e. reducing sulphites and chemical inputs), capable of developing innovation and wine experts' coordination through networks or new producers' associations in order to be competitive on markets.

It is characterised by the following:

1. New producer associations focused on changing agricultural and marketing practices;
2. Different producers developing high quality products in accordance with the principles of more rational agriculture and respecting the environment and consumer health;
3. An emphasis on marketing and promotion through specific training;
4. Foreign capital investment accompanied by investments by young local entrepreneurs;
5. Several active producers' associations/networks collaborating with the regional institution to increase sustainability of the sector;
6. Producers will be market driven.

Olive oil producers shared similar fears. Also in the Portuguese context, the increasing role of intensive and super-intensive units has raised questions around the **sustainability of the industry** – which is thought to only be currently operating at 30-40 per cent capacity – from an environmental perspective. It has also raised concerns over the **social sustainability of many of the Alentejo communities**, whose cultures are rooted in traditional, extensive farming systems.

Policy and bureaucracy

Policy and bureaucracy were thought to be significant factors in the future performance of the respective sectors. In Italy, the combination of regional, national and EU regulations were felt to be leading to excessively bureaucratic burdens for wine producers. Although producers understood their intended purposes – i.e. to protect the consumer from fraudulent claims regarding the origin and quality of wine, policy was felt to hinder producers.

Furthermore, there was recognition of the need for **better support for marketing** from regional policy framework and **investment to facilitate technological progress** required for increased efficiency of producers' companies.

In the case of Portuguese olive oil, producers are concerned about the **absence of unifying and clear strategy** and underpinning legislation for the sector – this was highlighted in comparison to the neighbouring region of Andalucia, the direct regional competitor. In particular, traditional and organic olive oil producers felt **insufficiently supported** through the current policy framework; they felt this needed to change if they were to continue to exist in the area, however, they also felt that any future changes would not recognise their plight, and will continue to allow larger producers to have a stronger voice in the political arena.

Demand for produce and market access

The Tuscan wine sector, like other regions of Italy, are experiencing a **sharp contraction demand** for wine linked, in part to the economic crisis, as well as broader changes in consumption patterns and consumer preferences. Although Tuscany, and its strong identity and global reputation for quality wines has thus far maintained growth and investment despite in contrast to the national picture, it will have to continue to market and add value to its produce to ensure demand for its produce. **Export opportunity** is also a significant concern for the future sustainability of the industry. Whilst demand for Portuguese olive oil is thriving, production is exceeding domestic demand, and more importantly, domestic capacity to process and transform produce; therefore, the resilience and continued growth of the sector is thought to be increasingly **dependent on foreign capital investment**.

Socio-demographic

Both sectors across the two countries are potentially limited by current socio-demographic processes and structures. Among the Tuscan wine sector, the issue of **depopulation of the territories**, in particular with regards to **young people** and its impact on production, is a significant concern. Similarly, in the case of olive oil, the **low capacity if young, local people to access credit** and funding to enter the industry is fuelling concern over the future of the industry.

Commodity: Wine and Olives				
Country	Context	Conditions	Strategies	Future
Italy	Tuscan wine sector is a regional success story against the context of national decline; owing to specialised and diversified production systems, a strong identity and global reputation, and the region's capacity to export products to international markets such as the UK, Germany and the USA, the Tuscan wine sector has, unlike the broader industry maintained growth and investment and overall wine production has increased steadily since 2009	<p>EU, national and regional laws have tightened across all aspects of the supply chain, becoming excessively bureaucratic and overly stringent.</p> <p>Dependence on foreign markets due to the strong role of exports in the regional economy.</p> <p>Economic downturn and change in consumption patterns have resulted in a decline in demand for wine; market demanding quality and transparency over quantity. This has created uncertainty for producers in the region.</p> <p>Producers are finding it increasingly difficult to find sales outlets for their produce, as well as receiving payments by local buyers in a reasonable timeframe.</p>	<p>Greater concentration, with vertical integration operated/facilitated by fewer but larger distributors; producers entirely in control of quality of the product by having control throughout the supply chain.</p> <p>Growing diffusion of products and high levels of differentiation amongst the wine produced (PDO and PGI labels). Increasing prevalence of organic products and organic labelling. Producers are exploiting diversity of the territory to distinguish the aforementioned declining market that is increasingly demanding quality over quantity.</p> <p>Small and medium-sized businesses are pursuing relationships with third party agents, such as wholesalers or export brokers. 'Middleman' companies that facilitate these linkages are becoming key players in the regional industry.</p> <p>Collective producer networks are playing an important role in improving the bargaining power of producers and are facilitating better prices.</p>	<p><i>Climate change & ecological sustainability:</i> climate change represents a major threat; in particular producers feared unpredictability.</p> <p><i>Policy & bureaucracy:</i> policy was recognised as a threat and hindrance to producers. There were calls for more coherent policies across regional, national and EU levels.</p> <p><i>Demand for produce & market access:</i> Although Tuscany, and its strong identity and global reputation for quality wines has thus far maintained growth and investment, it will have to continue to market and add value to its produce to ensure competitiveness in the international market.</p> <p><i>Socio-demographic:</i> The issue of depopulation of the territories, in particular with regards to young people and its impact on production, is a concern.</p> <p>The industry aims to develop what the report describes as a 'rational viticultural system'.</p>
Portugal	Alentejo has undergone a period of transition triggered in the most	Policy and regulatory conditions are not considered a key factor in	The strategies for sustainability are differentiated by farm type:	<i>Climate change & ecological sustainability:</i> dominance of

	<p>part by a recent increase in water availability and comparatively lower land prices in the region, in addition to the inherent bio-physical and ecological conditions.</p>	<p>the profitability and/or competitiveness of the Alentejo olive oil industry, particularly for intensive and super-intensive systems for whom CAP funding is generally only considered as supplementary income. It is important to note that Pillar I of the CAP does not provide direct payments to olive oil producers.</p> <p>Water and irrigation policies, which have granted access to irrigation, were fundamental in triggering change. Legislation authorized a surface area of 30,000 hectares of new (largely intensive and super intensive) olive groves in the region to be planted between 1998 and 2006. Following the move towards intensive and super-intensive systems, the cost of production has lowered.</p>	<p><i>Intensive/super-intensive</i></p> <ul style="list-style-type: none"> • Very little cooperation to ensure competitive advantage • Highly financialised • Vertically integrated from start to finish to enable control over all aspects of the business (manufacturing, marketing and export) in order to gain competitive edge to increase market share <p><i>Extensive, small farms</i></p> <ul style="list-style-type: none"> • Gradual intensification and/or diversification (or give up land) • Cooperatives are proving a strong and effective institutional arrangement to support extensive units • Work with other extensive, small units; cooperative solutions are imperative <p>Both types of systems are reliant on good marketing strategies to reach international markets</p>	<p>intensive/super-intensive units has raised questions around the environmental sustainability. It has also raised concerns over the social sustainability of many of the Alentejo communities.</p> <p><i>Policy & bureaucracy:</i> producers are concerned about the absence of unifying and clear strategy and underpinning legislation for the sector. Also, traditional and organic olive oil producers felt insufficiently supported through the current policy framework.</p> <p><i>Demand for produce & market access:</i> production is exceeding domestic demand and domestic capacity to process; therefore the resilience and continued growth of the sector is thought to be increasingly dependent on foreign capital investment.</p> <p><i>Socio-demographic:</i> the low capacity if young, local people to access credit and funding to enter the industry is fuelling concern over the future of the industry.</p>
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Appendix 2: Clustering the SUFISA case studies according to production intensity and the level of integration in the global market (notes for Figure 1)

Arable crops:

- *Wheat, Poland.* Cereal production in the Opolskie Voivodship is intensive, although producers have strong attachment to the land and their family story. Production in the region accounts for more than 6 per cent of the grain produced in Poland. The industry is integrated into the global market and the importing of lesser quality grains from other countries can impact Polish grain prices.
- *Wheat, Serbia.* Wheat production is more locally focused than globally integrated. Serbia exports high volumes of wheat, but it tends not to be competitive regarding quality and price with major export countries. Although Serbian wheat production is intensive, it is at the lower end of the scale. Small farms dominate (<2ha) and production yields can fluctuate significantly.
- *Wheat, Latvia.* Wheat production in Latvia has seen a move towards intensive production systems following its entry to the EU. It is increasingly exposed to prices for wheat on the world market, although its level of global integration is yet to be fully realised.
- *Sugar beet, Belgium.* Belgian sugar beet production is largely intensive and it has benefited from significant technological innovations. There is a clear trend towards further intensification, alongside increasing farm size. Its level of global integration is difficult to ascertain given the recent removal of quota (2017).

Dairy:

- *Dairy, France.* The dairy sector in the Finistère region of France has been through an intense period of concentration and intensification. Whilst the region's dairy sector is best summarised as highly globally integrated and intensive, there is an emerging group of farmers who are using less intensive systems.
- *Dairy, UK.* The dairy sector in Somerset is characterised by concentration and intensification. UK producers are highly integrated into the global dairy market, owing to the abolition of milk quota. This has exposed producers to milk price volatility.
- *Dairy, Denmark.* The dairy sector in the Danish case study is characterised by concentration and intensification. Like those in the UK and France, Danish producers are highly integrated in the global dairy market, owing to the abolition of milk quota. This has exposed producers to milk price volatility.
- *Dairy, Latvia.* The Latvian dairy sector is largely extensive, and although to some extent globally integrated it is significantly less so than the dairy industries in Denmark, the UK and France. The Latvian dairy sector is fragmented with limited consolidation.
- *Feta, Greece.* Small traditional farms. Largely extensive and static. Lacks access to global markets. The financial crisis has shaped the market context.

Fruit:

- *Apples, Poland.* Apple production in Malopolska is globally integrated having been clearly affected by the Russian embargo. Production is extensive but there has been an increase in the number of apples produced per hectare. The prices received are determined by global prices for apples.
- *Pears, Italy.* Italian pear production is intensive because of the requirements for high levels of inputs and labour. The Italian pear sector is increasingly less focussed on the domestic market (where pears are considered old fashioned), and more concerned with global exports, e.g. Hong Kong and Canada.
- *Apples and pears, Belgium.* The production of apples and pears in Belgium is intensive. The number of top fruit farms has declined, but acreage has remained relatively stable. Belgium has a major role in the global supply and demand of apples and pears. The sale of pears was particularly affected by the Russian embargo, but the sector has looked to other global markets to counteract its impacts.

- *Raspberries, Serbia.* Globally integrated with 90 per cent exported (mainly in bulk). The demand from foreign markets is a key issue for the sector. Raspberry production is increasingly intensive but there is still a core group of small farms who are less intensive and struggling to take advantage of economies of scale.

Meat

- *Poultry, Denmark:* production is intensive and prices and the market is globally integrated.
- *Beef, Portugal.* Traditional mind-sets and management models still dominant the sector, meaning it is an extensive production system. It is poorly recognised on the global market and lacks the capacity to compete in international markets.

Fisheries

- *Small-scale fisheries, Italy.* The Tuscan fleet is made up of small-scale fisheries. It is locally focussed.
- *Small-scale fisheries, the UK.* Inshore fisheries are insignificant on the macro level, but important to local markets. Access to multiple retailers is impossible for small-scale fishers. It is extensive due to boat size.
- *Small-scale fisheries, Greece.* Characterised by a large number of fishing vessels (although these are decreasing due to CFP rules); the sector is insignificant at a macro level, but important locally and the production is extensive/traditional.

Aquaculture

- *Mussels, Italy.* Mussel production in Emilia-Romagna is low intensity (with minimal inputs) associated with small and medium-sized businesses. There is an emphasis on quality and local identity, which is driving international demand, but the ability to participate in the global market is limited.
- *Carp fishing & RAS, Germany.* Small fish farms characterise the carp industry. Those using RAS are more technologically innovative and farming is more intensive. Carp production which is very traditional and extensive-local; RAS which is more intensive but markets are mostly regional and national.

Wine and olives

- *Wine, Italy.* Tuscan wine is a globally integrated commodity. Tuscan wines have a strong global reputation. It is not fully intensive, with tradition and heritage continuing to play a role in production, but it is nonetheless produced on a fairly intensive scale, accounting for about 9% of the wine produced in Italy in 2014. Although this is the case for the majority of Tuscan wine, around 10% is organic. Organic Tuscan wine producers are globally integrated, but the wine is produced in a less intensive way.
- *Olives, Portugal.* Olive oil in Alentejo, Portugal is bifurcated. It splits into extensive and intensive production. The intensive/super intensive olive oil is vertically integrated. The intensive part of the sector is more integrated into the global market, and takes advantage of its vertical integration to gain a competitive edge in exporting. The less intensive olive oil is less integrated into the global market.