



APPLE AND PEAR FARMING IN BELGIUM AN EXTENDED SUMMARY

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KU LEUVEN



Avermaete, Tessa

Bonjean, Isabelle

Lievens, Eewoud

Mathijs, Erik

(authors ranked in alphabetical order)

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1. Introduction

SUFISA aims to identify practices and policies that support the sustainability of primary producers in a context of complex policy requirements, market imperfections and globalization. Knowledge on market conditions and other driving forces exists, but in a fragmented way: relevant producer groups and regions have not yet been analysed or framework conditions and driving forces have changed in the meantime. More information can be found on the [SUFISA website](#).

This summary report focuses in particular on the key market and regulatory conditions that potentially impact top fruit farming businesses, including price volatility, and the key strategies emerging to manage these risks and pressures. The report is part of the EU-funded Horizon 2020 project, SUFISA (Sustainable finance for sustainable agriculture and fisheries). This is an extended summary based on the full report, available [here](#).

1.1. Structural change

In 2015, Flanders counted 949 farms cultivating either apple or pear (jointly referred to as “top fruit”). This number is declining each year (Van der Straeten, 2016). Over the period 2001-2012, the number of Flemish open-air fruit production firms¹ decreased by 43%, from 2,973 to 1,700, while the total acreage of apples and pears combined has remained relatively stable. This indicates an **increase in concentration and scale**. Moreover, the horticultural sector had reached a specialization rate of up to 90% already in 2005 (Platteau et al., 2014). Flemish firms account for 92.8% of the Belgian acreage, with most of the production being located around Sint-Truiden. Top fruit farms in this region are on average larger than farms in other provinces (16 ha on average, which is 5-6 ha larger than in other provinces) (Van der Straeten, 2016). Overall, revenues of top fruit farmers are quite high compared to their horticultural peers: 75% of them earns more than 150,000 EUR a year while slightly more than 20% earn more than 500,000 EUR (Vervloet et al, 2015). In 2014, the total fruit sector was worth 370 million euros, of which apples represented 74 million euros and pears 151 million euros, that is 60.8% of the total sector for the sum of both commodities (Department of Agriculture and Fisheries, 2016a).

An important characteristic of orchard fruit production is the **long rotation period** of the trees, which is approximately 10-14 years for apple trees, while for pears it can run up to 25 years or even longer (Van Bogaert *et al.*, 2012; Demeyer *et al.*, 2013). Currently, Flanders sees a **shift from apple to pear** production: the apple acreage incurred a relative decrease of 24% while the pear acreage increased by 49% over the period 2001-2014. This trend started around 1995. Since 2007, the pear acreage is higher than the apple one (Demeyer *et al.*, 2013; Department of Agriculture and Fisheries, 2016a). Regarding apple cultivars, the three most planted ones are *Jonagold*, *Jonagored* and *Golden*, covering 79% of the population of trees in Belgium.

¹ Note that this larger number is due to the wider definition of open-air fruit farming as compared to top fruit farming.

Many other cultivars are planted on a smaller scale. Regarding pears, the level of specialization of the Belgian sector is even more accentuated: the *Conférence* cultivar accounts for 87% of the acreage in 2015 (Statbel, 2016a).

Lastly, a **major shock** in the top fruit sector of Europe in general that cannot be overlooked is the Russian ban on European F&V that was installed in 2014, and is still in place. Being a major export market², 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%³ for pears and 11.06% for apples. Temporary crisis prevention measures were introduced. In particular, it was allowed to withdraw from the market 85,650 tonnes of apples and pears from the Flemish production⁴, in exchange of compensations. However, only a slight percentage of the allowed quantity was actually withdrawn. The dramatic price drop of apples in the Belgian market appears to have been the result of mainly the influx of Polish apples that year, who traditionally were exported to Russia. Apple prices on the Polish market were significantly lower than on the Belgian market up to then (and still are today). Yet, a direct market connection and possibly a preference for Belgian apples seems to have been protecting Belgian apple producers. Top fruit farmers thus incurred losses for two reasons: a direct negative effect on the price of pears and an indirect effect on the price of apples due to increased competition with Polish apple exporters.

1.2. Context: Policy and regulatory conditions

The main producers of both apples and pears in the world are China, the US and the EU, with the Chinese production having gone up steeply during the last two decades and conferring to this country a long-lasting position of top leader. Even though it benefits from huge production capacities and low costs, China is not a main direct competitor for apples. On the contrary, Polish production is closer and very similar to the Belgian one in terms of quality while it does benefit from lower costs and higher production volumes hence price influence in the Northern EU. Belgian apples, and in particular *Jonagold*, are of rather similar quality to the Polish production but they suffer from higher production costs. Hence, Belgian farmers are not competitive on this market. In Belgium they seem to survive because of direct connection to the market, and maybe, consumer preferences for local products. To the contrary, pears are rather rare and high value products for which Belgian farmers are more competitive.

² Russia used to be the most important non-EU fruit export destination with 25% of the fruit exports in 2013, and even up to 40% for pears.

³ Which is calculated as 83.5% of 47.1%

⁴ This was decided in the last round of support which started August 8th, 2015



Even though the Belgian production of apple and pears is rather similar in terms of value and production capacities, the rank of both products on the **international market** is very different. Indeed, while Belgium ranks 11th on the world production of pears in both value and quantity produced, it has never appeared among the most important apple producers in the world, which reflects a much stronger competition and a weaker Belgian position on this market. In 2012, Belgium produced 10% of the European pear production while this share was only 2% regarding apples (Delombaerde and Lambrechts, 2014). 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 towards negative export shocks.

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. These requirements bring about operational costs for the farmer if the apples are sorted and packed on the farm, since fast and correct sorting by colour and size requires sophisticated machinery. This partly explains why packaging and sorting operations are often transferred to the cooperatives.

The main **quality standards** that apply for Belgian fresh fruit production are the sector guides for auto-control developed by the Federal Authority for the Safety of the Food Supply Chain (AFSCA-FAVV), that safeguard food safety and traceability, and the Integrated Pest Management (IPM) standard that is not obligatory, but taken up by nearly all tree fruit producers. Farmers that comply with the IPM standard generally opt for a certification according to the GLOBAL G.A.P. standard, the most well-known international private standard in this domain. Other private standards⁵ have been raised that combine the sector guides for auto-control and IPM with requirements of either the retail sector, international markets, cross-compliance requirements for CAP direct payments, ... Currently, the main trend with respect to quality standards is the introduction of retailer-specific Maximum Residue Levels (MRLs). German retailers, quickly followed by British retailers, started introducing MRLs that are lower than those specified in the GLOBAL G.A.P. standard. Farmers and cooperatives face a huge challenge as the maximum number of residues and the maximum amount of each residue can now vary for each customer. The Belgian coops (POs) provide guidance on how to comply with the MRL requirements prevailing in major export destinations.

The most important **innovation** in the fruit sector with respect to marketing is probably the introduction of new varieties. This was already pointed out by Deuninck et al. (2007). These are very often marketed under a private label; in this case these varieties are “club cultivars.” The most successful and well-known club cultivar is Pink Lady, which produced and sold all over the world. Usually the strategy of a club relies on the control of supply, in order to maintain prices at a relatively high level, combined with extensive advertising campaigns to raise consumers’ interest.

⁵ E.g. Vegaplan, Responsibly Fresh, Truval, ...

However, developing the demand for these new varieties is usually a slow process, and the marketing budgets needed are very high. Hence, developing new varieties is a risky business.

For many years, the apples and pears sectors have been characterized by an **oversupply**, resulting in stagnating or even decreasing prices because of the combined effects of an eventual decreasing demand and an inelastic supply. The difficulty for farmers to adapt their production to the new market conditions is due to the long rotation period of their orchard, and for some of them, to the well-known mental models which are proven to be particularly difficult to change.

Firm **concentration at retail level** is very high in Belgium: the three largest firms now have a market share of more than 70%. This inevitably gives them market power. The bargaining power of tree fruit producers is reduced as well by the high adjustment costs that are inherent to this type of production. The answer to oligopsonistic⁶ market power has traditionally been the pooling of supply by cooperatives. As will be discussed below, an important topic in Flemish top fruit farming today is the emergence of individual arrangements between farmers on the one hand and retailers (and less often wholesalers) on the other hand. This is enforced by the increasing heterogeneity of (even specialised) fruit farmers, both in terms of farm size and quality of the produce.

An important level of the European Common Agricultural Policy (CAP) for the fruits and vegetables sector is the **support to cooperatives**. The main motivation to target those organisations is not only to incentivize growers to join a Producer Organisation (PO) but also to support common innovation processes and collective marketing. In other words, the EU subsidises collective action and pooled risk management. One of the expected impact of the reinforcement of such organisations is the increase in farmers' bargaining power in order to create a level playing field in the supply chain (Gijssels & Bussels, 2012). POs can develop an "operational programme" which outlines actions for the PO that help to reach the goals set by the EU.

The apple and pear sector has a high need for **seasonal labour** in the harvesting season, starting around September-October. This third-party labour took up 21% of the total orchard production costs in 2013, according to data from the Department of Agriculture and Fisheries (2016b). For seasonal work on fruit farms, this wage was fixed at €8.55/h for an adult in 2015, which is much higher than is the case for their Polish competitors. Yet, seasonal labour is regulated by daily contracts, and the employer of seasonal workers has the advantage of a lower social insurance tax rate than the one prevailing in other sectors.

1.3. Key features of the Belgian top fruit supply chain

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

⁶ Market power of buyers due to a small number of buyers.

"I believe that if we decide now to abolish subsidies in agriculture and horticulture, we would be competitive again within three years or so. [...] We are one of the most productive regions in the world for grains, for fruit production, ..."

regard. The majority of coops are recognized as producer organisations (POs)⁷. 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 (Gijssels and Bussels, 2012). Since many years, coops have been merging, up to the point that in 2017 only two 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 dealt mainly with auction sale, administration, product control and logistics such as collection, storage and transport (Gijssels and Bussels, 2012). 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. From the traditionally lively auction however remains nowadays only the relic; that is, auctions are much less crowded than they used to be. Hence, the main role is nowadays the facilitation of market access and the collectivization of marketing costs. 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.



2. Methodology

2.1. Data collection

Apple and pear farming are treated jointly in this case study, as the production of both top fruit crops has always been strongly connected in Flanders. In fact, the production process is nearly identical. The market dynamics of apple and pear however are highly different. Key to the approach taken has been to put the farmers themselves at the centre of the research, in order to get their perspectives on the key issues that need to be considered. First, a media analysis was conducted (which covered national, regional and specialised media from 2006 to 2016), as well as a desk-based analysis of market conditions and regulations (sources reviewed included: academic publications; government and policy documents; market research and consultancy reports; industry reports and NGO documents), supplemented with five interviews with Flemish top fruit farmers and eight interviews with various stakeholders from the sector. Following analysis of the resultant data, two focus groups (FGs) were held with top fruit farmers at two different locations in Flanders followed by a workshop composed of key stakeholders from the sector.

Third, a survey was conducted on top fruit farmers in Flanders, Belgium. The number of questionnaires retained for analysis after the first round of data cleaning is 137. The structure of the questionnaire for this survey is based on the SUFISA framework. Survey results are displayed in the sections 3.4 and 3.5.

2.2. Case study area

Flanders is the Northern region of Belgium, accounting for 57.68% of the Belgian population (Statbel, 2016b). The population density in Flanders is 462 inhabitants' square kilometres, one of the highest in Europe and is rather homogeneous due to the diffuse spread of economic activity on the territory. This does not leave out much space for agricultural land but enables a rather good proximity between the agricultural sphere and the peri-urban population.

At the European level, the Belgian food sector is shaped primarily by its excellent location in the centre of highly populated North-western Europe and having the second biggest⁸ sea harbour, that is, Antwerp, after Rotterdam. From a historical point of view, the current food sector has been shaped to a great extent by two developments that have their origin in the 19th century. First, Belgian horticulturalists and institutions were part of the newest developments in horticulture, as the development of horticulture flourished in the urbanized North-western Europe. Second, following the imports of cheap cereals, Flemish farmers followed the example of Dutch and Danish farmers taking opportunity of cheap imported feed to specialize in intensive livestock production. These historical stylized facts still shape

⁸ On the basis of gross weight of commodities handled.

the specialization of the country as in 2015, 88% of farmers were specialized in one of three subsectors: livestock farming, arable farming or horticulture (Statbel, 2016b).

In 2013 total agro-food imports in Belgium were estimated at €19.508 million, while Belgian agro-food exports were valued at €22.131 million (FEVIA, 2013). These figures point to the very open nature of the Belgian agro-food sector. Belgium is the EU's fourth largest food exporter (following Germany, the Netherlands and France) and Flanders represents 82% of its trade. Respectively 62% and 68% of imports and exports relate to neighbouring countries, although products such as beer, chocolate and potato products are traded worldwide (Samborski and Van Belleghem, 2016). According to *FAO* statistics, Belgium ranked eighth in the list of top food importing countries in the world, and ninth as far as food exports are concerned.

Nevertheless, the share of agriculture in the Belgian GDP decreases continuously and is anno 2015 below 1%. Moreover, the main trend characterizing the Belgian agricultural sector is the structural decline in the number of farms and the overconcentration of land (Statbel, 2016b). This is similar to the overall European trend. 68% of farms has disappeared since 1980 while the land area of each farm has tripled up (Statbel, 2016b). More concretely, in 2004, the average farm size was 17.9 ha whereas anno 2013 it was 25 ha (Department of Agriculture & Fisheries, 2014). The labour share associated to agricultural activities is characterized by a similar contraction. However, since 2013, the overall situation seems to have stabilized. Indeed, the share of agriculture in the GDP was 0.70% in 2015 (Statbel, 2016a), which is very similar to the situation the two previous years. The same applies to the area of land used for agricultural activities and the number of farms.

Belgium is lagging behind in the conversion to organic agriculture as compared to the rest of the EU. The number of organic farms has increased every year during the last years, i.e. 9.3% since 2010, while the total cultivated land has increased by 41.2% since this same year. In 2015, 5.12% of the land under agricultural use was cultivated according to the principles of organic agriculture in Belgium, whereas the European average was 5.9%⁹ already in 2014 (EUROSTAT, 2015).

3. Results: key themes

3.1. Viability of top fruit farming

Farmers unanimously consider their sector to be “in a crisis”, for the reasons mentioned before in this summary. They generally recognise that oversupply is a problem. On the other hand, a reason for optimism among farmers is the natural competitive advantage for the production of *Conférence* pear. They consider it likely

⁹ Area fully converted or under conversion

that the trend towards **specialisation** in this variety will continue, and are aware of the associated risks, as it is already the major “crop” produced by top fruit farmers.

It is widely accepted that both domestic and foreign consumers appreciate **new apple cultivars** such as Pink Lady more than common Belgian apples (*Jonagold*). Many farmers believe that this is due to poor marketing, rather than the quality of the apples by itself. The need for better marketing was stressed as well in the PW, although many stakeholders claim that the rather poor quality of Belgian apples is a structural problem. The strict quality and homogeneity requirements of club varieties are often referred to as a golden standard. Some farmers on the other hand argue that the quality standards imposed on Belgian apple and pear are unnecessarily strict, and refer to other countries where they are supposed to be lower. The strong export orientation of the sector (~80% of the pears according to the participants) likely plays a role here.

The **low adaptation capacity** that is inherent to top fruit farming was mentioned often as a reason for the problems faced by farmers today. It was argued, both by farmers and other stakeholders, that the financial risk of investing in new cultivars has become too high for farmers, and such an investment is only feasible when it is backed by a coop or a retailer. On the other hand, there was consensus in the workshop that Belgian farmers have been rather slow in adopting new cultivars. For example, *Kanzi*, a club cultivar, was adopted at faster pace in The Netherlands, although it was as much targeted for production in Belgium.

Club cultivars are widely regarded as a solution for the lack of differentiation in Belgian apples. The FG revealed however that farmers are more sceptic on this solution, for the reason that farmers’ margins do not increase sufficiently and the financial risk of investing in a club cultivar is too high. How investment risks are shared among the different partners in a club is rather unclear (and possibly highly variable). Some stakeholders put forward that the coops are not doing enough effort to facilitate the investment in new cultivars. For the coops, investing in a new variety is risky, as it is hard to predict which (club) cultivar will be successful in conquering a market share, and large marketing budgets are needed. Farmers seem to be in a stalemate: new cultivar development is needed to keep up with changing consumer preferences, but the financial risk of doing it is (too) high.

Producers are strongly concerned with **perturbations of exports due to political factors**. Given the strong export orientation of the sector, the importance of the stability of export markets is evident. Remarkably, some stakeholders claim that much of the problems present in the sector nowadays would not have occurred if the Russian Boycott was not installed. Brexit is a concern for producers, because although not a major export market, the British market is important.

As discussed before, Belgian top fruit farmers suffer from competition from other production regions. Especially the development of the **Polish apple sector** is perceived as a threat. Many farmers believe that fruit production in Eastern Europe is heavily subsidised by the European Union. Some even believe that if subsidies were abolished all over Europe, Flemish farmers would benefit from this level playing field

because they are highly cost-efficient. The subsidies they incur themselves, e.g. as investment support, are deemed to be less important, or at least less distortive. Regarding competition from non-European producers (especially Argentina), the main frustration of farmers and stakeholders is that European producers are much more restricted in the use of crop protection products, but are not compensated for this by a price premium, or effectively protected from competitors working in different production conditions by trade barriers.

3.2. Trust in the cooperatives

Currently, farmers' trust in the cooperatives is very low. Some of them even deem the coops to be partly responsible for the "crisis" in the sector. Whether coops still function properly, and are still an answer to today's challenges for top fruit farmers is debated heavily by proponents and opponents among farmers as well as other stakeholders. The strong polarisation of this debate complicates its analysis. In what follows we discuss the problems that could be identified so far.

The perception that the Belgian **coops perform poorly in the marketing** of apple and pear is common among farmers. This point of view cannot be (in)validated easily because comparing sales prices of coops to individual farmers' sales prices requires interpretation: coops sell a pooled, heterogeneous supply, and are bound by an obligation¹⁰ to sell all the produce offered to them by their members. Individual farmers however have more freedom to speculate on market price evolutions. Another critique often heard is that the Belgian auctions have become too large, and thus are not flexible and quick enough to perform well as a broker. Some farmers argued that the marketing performance of the coops was never really tested before the Russian boycott was installed, as Russia was a "very easy" export market, offering good prices at low requirements.

A common feeling among farmers is that their voice is not being heard any more in the management of the cooperative. When asked to farmers whether they consider their coop as a democratic institution, the answer was clearly: "No". What is remarkable is that the F&V coops were spoken of as **separate entities**, rather than farmer-owned institutions. A common notion is that the coops have bypassed the common interest of farmers and have developed their own, proper interests. Many farmers complained as well that their coop is not doing enough effort to sell their individual produce. This is known in the literature as the measurement problem: individual farmers cannot measure the effort of their sales agent (Bijman & Hendrikse, 2003).

Some farmers are discontent with the **expanded role** of the coops in the supply chain. A clear evolution is that coops have expanded their role towards wholesaling. Some farmers claim that the coops are not sufficiently transparent on their wholesale activities. Others consider the investments in shared infrastructure for

"If you dare to speak out at the general assembly, the next week your fruit will be assigned to a lower quality class"

¹⁰ More precisely: the obligation to do all the effort that can realistically be expected to sell their members' produce.

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. Various reasons were reported for this preference: some farmers are located too far away from their coop and incur too much transportation costs, while others want to be independent in planning the post-harvest processes, etc. Another reason may be that the largest fruit farmers have now reached **firm sizes** at which individual post-harvest processing becomes profitable. For these farmers, the added value of the cooperative is lower. Some argue that the support (generally 30%) for certain investments that can be obtained from VLIF reduces the added value of cooperatives in Flanders.

Despite of the low trust and the 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 fact, some farmers believe that a lack of solidarity is at the root of the current problems in the sector, and that a renewed, stronger solidarity is part of the solution.



“The original goal of the auctions is lost for some time now. They had to enable transactions from producer to buyer, but nowadays they buy from a producer at a certain price and sell to a buyer at another price. And there is no more transparency on this at all”

3.3 The strength of the position of farmers in the supply chain

Just as the majority of European farmers, Belgian top fruit farmers consider themselves to be in a weak position in the supply chain. They especially emphasize the market power of actors one step downstream the supply chain, who in their view determine their sales prices and conditions. The strong concentration of food retail in Belgium is often mentioned in this context. Also the small number of exporting wholesalers is a concern to them.

In the focus group, some farmers complained on unfair trading practices occurring in the frame of quality control. The situation whereby sold fruit is assigned a quality class by the buyer only after the transaction appears to be prone to such unfair practices. Moreover, it gives producers the feeling that they have no bargaining power at all.

On the side of inputs, there appears to be an oligopoly of suppliers of crop protection products. A few firms supply nearly the whole market. Crop protection products are the second to highest variable production cost for top fruit farmers. According to stakeholders, the licensing of crop protection products at the national level contributes to both high prices and a limited range of products, as the procedure to obtain a license is costly, and the Belgian market is small. Remarkably, attempts to unify farmers in purchasing unions (buying coops) were never really successful in Belgium, whereas in Italy for example it is common practice.

“We tried to gather all farmers in one crop protection product buying group, but that did not really work out. This would give a lot of power to the farmers as buyers.”

3.4. Institutional arrangements

3.4.1. Forms

Marketing cooperatives are the primary institutions for the marketing of fruits and vegetables in Flanders. We also discussed before the difference between the two traditional “auction” cooperatives and the two smaller “POs”. Yet, to preserve the trust of farmers we did not ask for which one of the four cooperatives the respondent is member of. 84% of the farmers in our sample is member of a cooperative, which is in line with the general trend in the sector (no census data are available to test a possibly significant difference). Producers belonging to a cooperative (referred to “coop” infra) produce lower amounts of apple and pear on average than other producers (referred to “non-coop” infra). Yet, the variation in production volumes (and hence size of operations) is extremely high both within the coop and non-coop groups, so it is hard to tie any conclusions to this difference of the means. If fact, none of the respondent or farm specific variables asked in the questionnaire are significantly different between both groups. Hence descriptive statistics are reported for both groups simultaneously.

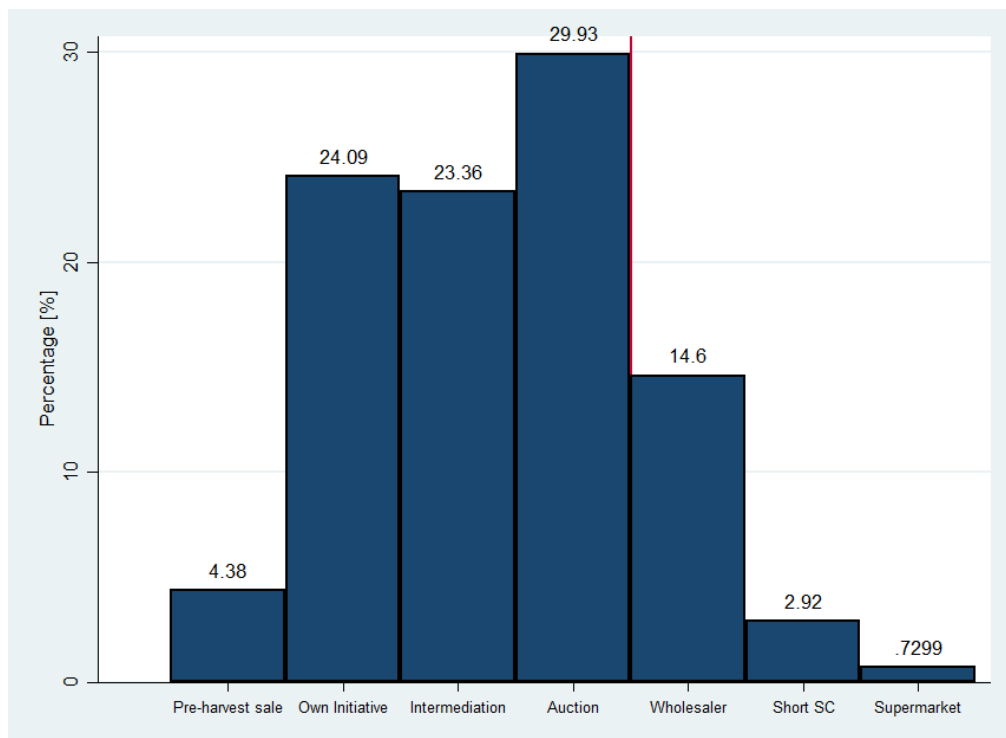
Members of cooperatives are obliged to sell the entirety of their production through the cooperative¹¹. In the sales channels offered by the four marketing cooperatives, four types of sales channels can be distinguished: pre-harvest sales (known as “Stamverkoop”), sales on the farmers own initiative (Initiative), sales on the initiative of the cooperatives’ sales agents (Intermediation) and auctioning (Auction). Pre-harvest sales are usually contracts that determine the purchase of a specified volume of fruit of a certain orchard, at a fixed price. Both the sales on the farmers’ initiative and the cooperatives’ initiative are bilateral agreements between the producer and the final buyer (cf. footnote 11), concluded after the time of harvesting. Auctioning was once the only form of commercialisation, but is nowadays often a back-up for batches of fruit that do not find a buyer in the former three sales channels. Coop farmers generally combine sales in different types of sales channels. The composition of the combination of sales channels can be the result of very different strategies. Our current hypothesis is that more risk averse farmers will prefer pre-harvest sales over bilateral sales and certainly auctioning, while more risk loving farmers will speculate on market prices to go up as time passes by after the harvest, and will aim to sell bilaterally on their own initiative, at a favourable moment. Somewhat surprisingly, 29.9% of the respondents has sold the majority of the produce of 2016 by auctioning (Figure 1). However, this does not imply that it is their preferred sales channel. As stated by some respondents, the composition of sales channels changes from year to year. Similar numbers of farmers have sold the majority of their produce by bilateral sales on their own or the coops’ initiative (24.1% and 23.4%). Pre-harvest sales appear to be rarely the main sales channel (4.4%), at least for the 2016 harvest.

Farmers who are not member of a cooperative generally sell the majority of their produce to wholesalers (14.6% of the sample, 2016 harvest). This became clear in the qualitative research actions and is confirmed by the survey. Selling primarily to wholesalers appears to be often the only option for farmers who have left a cooperative in the near past, as selling primarily in short food supply chains would require a smaller scale of operations than what is typical for Flemish top fruit farms, and selling to supermarkets directly is a rare and rather new phenomenon. This is not surprising as roughly 80% of the Flemish pear production is exported, and wholesalers mainly engage in exporting (cf. previous sections). Only in exceptional cases, supermarkets buy apple or pear directly from producers instead of from cooperatives or wholesalers. Only one farmer in our sample has sold the majority of his production as such in 2016. Selling primarily in short supply chains appears to be more common (2.9% of the sample). Remarkably, none of the six farmers who produce organic apples or pears rely on short food supply chains as their main sales channel. On the other hand, four non organic producers do so.

“We have contracts of up to 10 and 25 years. We even had a long-term contract with a firm that was taken over a few times.”

¹¹ This means the cooperative is the official buyer of farmers’ produce, and sells again the produce to the final buyer. As an exception 25% of a firm’s produce can be sold directly to consumers.

Figure 1: Main sales channels for the respondents' produce of 2016. Pre-harvest sale, Own initiative, Intermediation and Auction are sales channels in cooperatives. Wholesaler, Short Supply Chain (SC) and Supermarket are sales channels available to non-coop farmers.



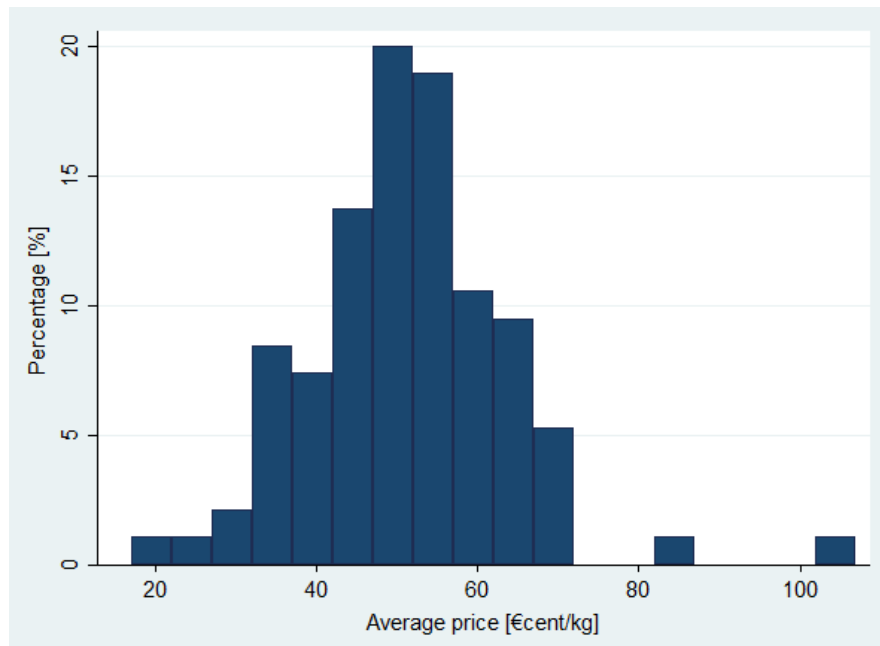
3.4.2. Characteristics of sales agreements

A first look was taken at the **prices** obtained by farmers in the different sales channels. Market prices of apples and pears are generally different per cultivar, therefore, we cannot simply compare prices across cultivars. Luckily, Conférence pears were the most important cultivar in terms of production volume for 95 out of the 137 respondents. This allowed us to do some preliminary comparison of yearly average Conférence prices in different sales channels.

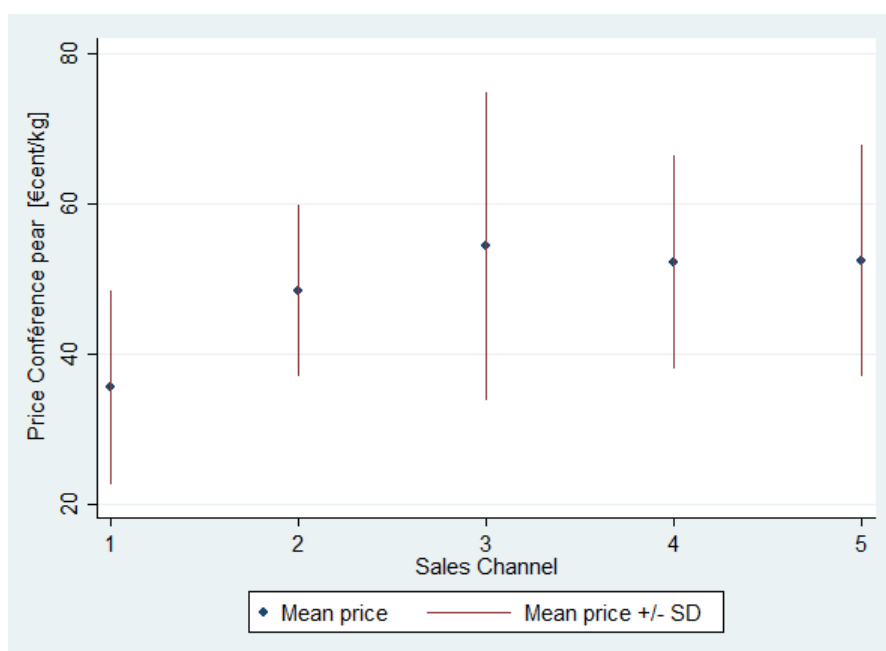
Overall, the variation of the yearly average prices received for Conférence pears by respondents is rather high (Figure 2). The mean of the reported prices is 51 €cent/kg, while the median is 50 €cent/kg. The high variation in yearly average prices causes the differences between the mean price per sales channel to be not statistically significantly different (Figure 3). At first sight, the lower average price of pre-harvest sales (39.3 €cent/kg) is striking as compared to average prices of bilateral sales on the farmers' own initiative (50.5 €cent/kg), bilateral sales on the coop's initiative (53.0 €cent/kg), auction prices (51.9 €cent/kg) and prices obtained directly from wholesalers (50.1 €cent/kg). One might think that this confirms that prices in sale agreements which involve a higher degree of risk sharing are lower. However, the price for pre-harvest sales is an average of only four observations, while the other averages rely on 24, 18, 35 and 14 observations, respectively. The reliability of the mean price for pre-harvest sales is thus low. An important conclusion is that prices paid by wholesalers are not significantly higher than the prices obtained in the three

main types of sales channels of cooperatives, while many farmers believe that this is the case. Furthermore, it is interesting to note that the Intermediation (coop's initiative) sales channel is less frequently used for *Conférence* sales than for apple and pear sales in general.

*Figure 2: Yearly average prices of *Conférence* pears (harvest 2016) received by respondents.*



*Figure 3: Average prices of *Conférence* pears in the sales channels Pre-harvest sale (1), Own initiative (2), Intermediation (3), Auction (4) and Wholesale (5, non-coop). The red line represents the interval of the mean price \pm the standard deviation.*



When asked what percentage of the selling price of their main cultivar (either apple or pear) corresponds to the total **production cost**, 42% of the respondents indicated not to be able to give this figure. For the other 58% of the respondents, the answer was 79% on average, but again with large variation in the answers. 10% of these respondents (or 5.8% of the total sample) indicated that the production costs were equal or higher than the selling price. Another interesting statistic is that 88.5% of the respondents indicate that price they receive in their main sales channel is linked to the market price at the time of delivery. This confirms somehow the statement made by several farmers in the interviews and FG: that prices in any bilateral sales agreement are largely determined by the BFV auction price.

The **timing of payment** (before, at the time, after delivery) in sales agreements depends on the type of sales channel. Cooperative farmers usually get paid before delivery in the case pre-harvest sales, and always after delivery in the case of own initiative and coops' initiative bilateral sales and auctions. It should be noted that in all sales channels, except for pre-harvest sales and supermarket contracts, producers have no certainty at all on their revenue before the time of sale. This is the case for the main sales channel of 95% of the farmers in our sample. Top fruit producers are thus exposed to a great deal of uncertainty with respect to their income. Further research into the composition of farmers' sales channels combinations is necessary to reveal how farmers currently - and potentially might - mitigate uncertainty by combining sales channels.

Also the **costs associated to sales** are mainly determined at the cooperative level, instead of at sales agreement level. In addition to the compulsory contribution for marketing and promotion by VLAM¹², cooperatives engage in marketing activities, mainly oriented at foreign destination markets. Almost 100% of the producers have to pay a commission on their sales. For coop members, this is commission goes to the cooperative and amounts up to 4%, in the case of intermediation by the cooperative. For non-coop members, this commission goes to either wholesalers or middlemen (brokers).

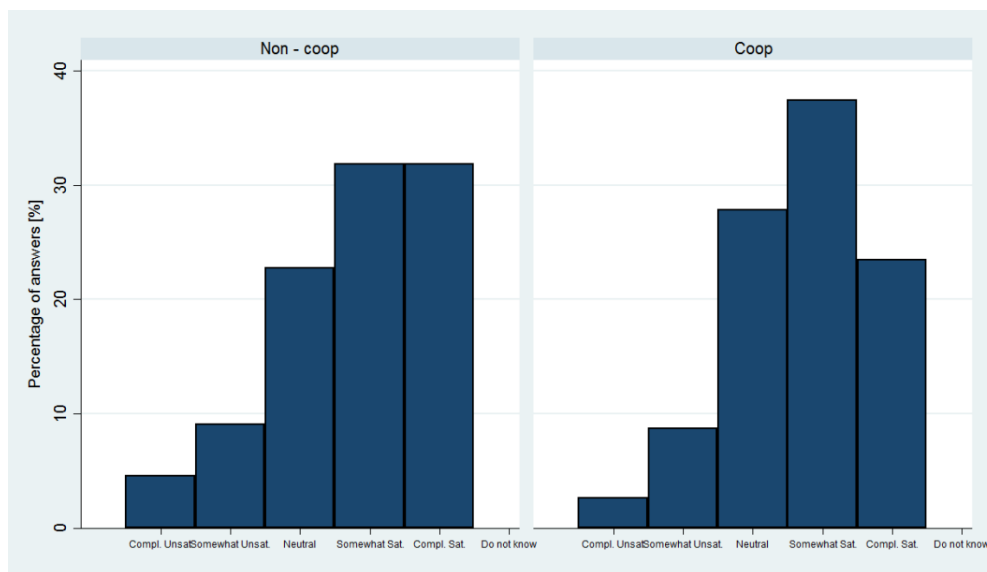
Standards are well-established in the sector. All coop farmers are required to comply with at least the GLOBALG.A.P. standard, which sets requirements on the domains of food safety, traceability, and environment (i.e. pesticide use). In addition, the two traditional "auction" cooperatives and one of the two POs have their own organoleptic quality standards (i.e. taste, colour, structure of the fruit). Overall, 97% of the respondents mentioned to have to comply with standards on the quality of the final product, on food safety and on ecological sustainability. Yet standards on mitigation and adaption to climate change are inexistent.

Despite of the often highly pessimistic discourse of top fruit producers and – stakeholders on the sectors' viability, producers are **rather satisfied** about their most important sales channel (note: sales channel refers to the four types of sales channels for coop farmers, or wholesale/short SC/supermarket for non-coop

¹² Governmental agency for marketing and promotion of agricultural products

farmers). About 60% of all respondents are “somewhat” or “completely” satisfied about their main sales channel. When comparing the level of satisfaction between coop and non-coop farmers, it is interesting to note that non-coop farmers seem to be more satisfied about their sales channel than coop farmers, as the share that is “completely” satisfied is more than 10 percentage points higher in the former than in the latter group (Figure 4). Hereby we must not forget the rather small sample of non-coop farmers (N=22).

Figure 4: Satisfaction level of producers with respect to their main sales channel, split for non-coop (N=22) and coop producers (N=115). Satisfaction had to be indicated on a scale of 1 to 5: “Completely unsatisfied”, “Somewhat unsatisfied”, “Neutral”, “Somewhat satisfied”, “Completely satisfied”.



The satisfaction of farmers with their main sales channel is elucidated in a more detailed way with a set of seven statements. Farmers were asked to indicate on five-point scale (“Strongly disagree” to “Strongly agree”) to which extent they agree with the statements listed below. The answers reveal great differences in the level of satisfaction of farmers with different characteristics of their main sales channel (Figure 5).

Statement 1: “I do not have any alternative options to sell my products”

When questioning the existence of alternative options to sell their products, producers share different opinions: almost 30% of them think they do have alternative options, while almost 50% of them think they do not have any. Investigating the difference of opinions across coop versus non-coop groups reveals that it is mainly the group of coop members that expressed diverging opinions, with extreme opinions (“strongly disagree” and “strongly agree”) being more frequently mentioned in this group than in the other one.

Statement 2: “This sale agreement provides higher prices than alternative buyers”

Farmers respond positively to this statement: 46% agree, and very little disagree strongly. Remarkably, the portion of producers that strongly agree with this

statement is 10% point higher in the non-coop group than in the group composed of cooperative members.

Statement 3: “This sale agreement provides more stable prices from year to year than alternative buyers”

The distribution of opinions on this statement is very similar than for the former one. Yet, even if the portion that agree or strongly agree is of the same size among both coop and non-coop producers, the share of them that strongly agree is 3 times higher among the non-coop producers. In the same vein, only 4% of non-coop producers disagree with this statement while this is the case for a significant 14% of the coop producers.

Statement 4: “This sale agreement provides more possibilities for negotiating prices”

The agreement on this statement is significantly lower than for the ones on the level and stability of prices: almost 35% disagree or strongly disagree. Remarkably, this is mainly driven by the opinions in the coop group, as in the other group, 56% agree or strongly agree with this statement.

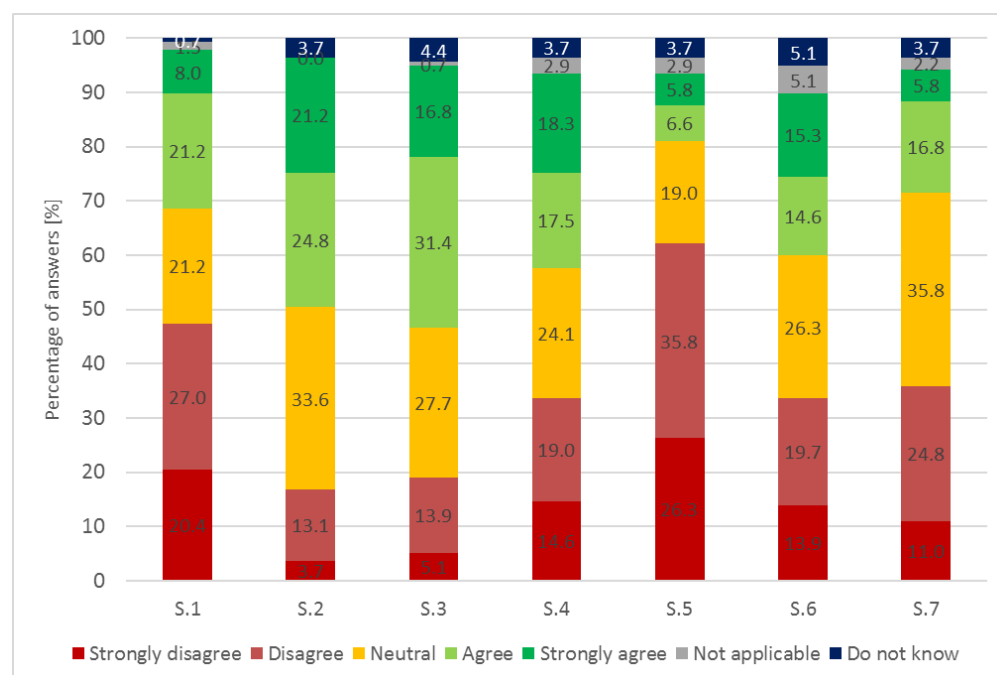
Statement 5: “There are delays in the payments”

Only 12.4% agrees or strongly agrees on this statement. Hence, we assume that delays in payments are not a big issue the sector.

Statement 6: “The cost associated with this sale agreement are too high”

Nearly 30% of the respondents believe that this is indeed the case. Those are mainly producers belonging to a cooperative; non-coop producers mainly strongly disagree with this statement.

Figure 5: Producers’ agreement with statements on the satisfaction with their main sales channel.



Statement 7: “The production/quality standards required are too restrictive”

Although farmers involved in earlier research activities have frequently mentioned very high quality requirements, only 23% of the respondents agrees that they are too restrictive.

In a nutshell, the level and stability of prices are not major issues. However, there is a major divergence in the opinion of coop and non-coop producers. Indeed producers belonging to a coop do not believe that they have much opportunities to bargain the price received for their products, while the non-coop producers express the reverse. The same applies to the level of the costs associated with the sale agreement, which seems to be a major issue for the coop producers only. Again, bear in mind that the sample of non-coop farmers is much smaller than the one of coop members.

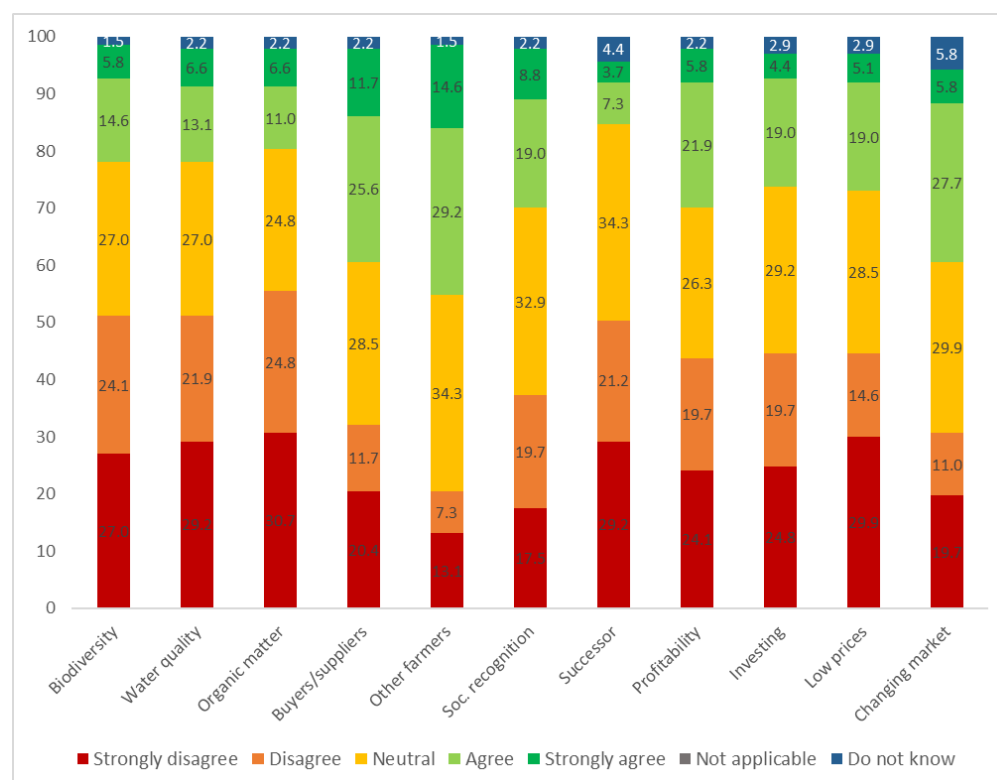
3.4.3. Sustainability impact of the main sales channel

To assess the **impact on sustainability of the institutional arrangements** chosen by farmers for the marketing of their produce, a set of 11 statements on the ecological, societal and economic sustainability impact of the main sales channel was proposed to the producers. Respondents were asked to indicate their degree of agreement on a scale of one (“Strongly disagree”) to five (“Strongly agree”) on the question whether the production choices they made in relation to their main sales channel helped them to maintain biodiversity; maintain water quality; maintain soil organic matter; create a good connection with buyers and input suppliers; connect with other farmers; achieve societal recognition of their farming activities; secure a successor; maintain profitability; invest in their farm business; sell the products in periods of greater difficulty where prices were low; and cope with changing market conditions. The results are displayed in Figure 6.

A striking observation when inspecting Figure 6 is that respondents are rather pessimistic regarding the impact on sustainability of the production choices they made in relation to their main sales channel. All criteria receive at least 20% of strong disagreement, except for the social aspects of “connecting with other farmers” and “achieving societal recognition of your farming activities”. The level of strong agreement on the other hand surpasses 10% only for the same two social criteria. The ecological sustainability impact is considered to be especially negative, as the first three statements receive about 50% of disagreement and not more than 20% of support. It is worth pointing out that the producers that express a positive feeling about the ecological impact of their practices are not the producers who have some share of organic production. This might of course be explained by the fact that organic production is only a minor fraction of the total production for four out of six of these farmers, and this set of questions refers to their main sales channel.

The societal sustainability impact is judged more positively, especially when it comes to creating good connections with either buyers and input providers or other farmers. Unsurprisingly, non-coop farmers are more positive on the creation of a connection with buyers and input providers, whereas coop farmers drive the positive response on the question of connecting with other farmers. When it comes to

Figure 6: Respondents' appreciation of the sustainability impact of their main sales channel, measured as the degree of agreement on 11 statements on a scale of 1 ("Strongly disagree") to 5 ("Strongly agree").



achieving societal recognition, less than 30% of the producers considers the impact of their main sales channel to be positive. Even more remarkably, 50% of the producers considers the impact on securing a successor to be negative, and only 11% considers it to be positive.

The impact of the production decisions made in relation to the main sale agreement on economic sustainability is considered to be negative on average, except for the issue of "coping with changing market conditions". About 33% of the producers agreed or strongly agreed on a positive impact on this item. Remarkably, this last observation is mainly driven by the opinion of coop members.

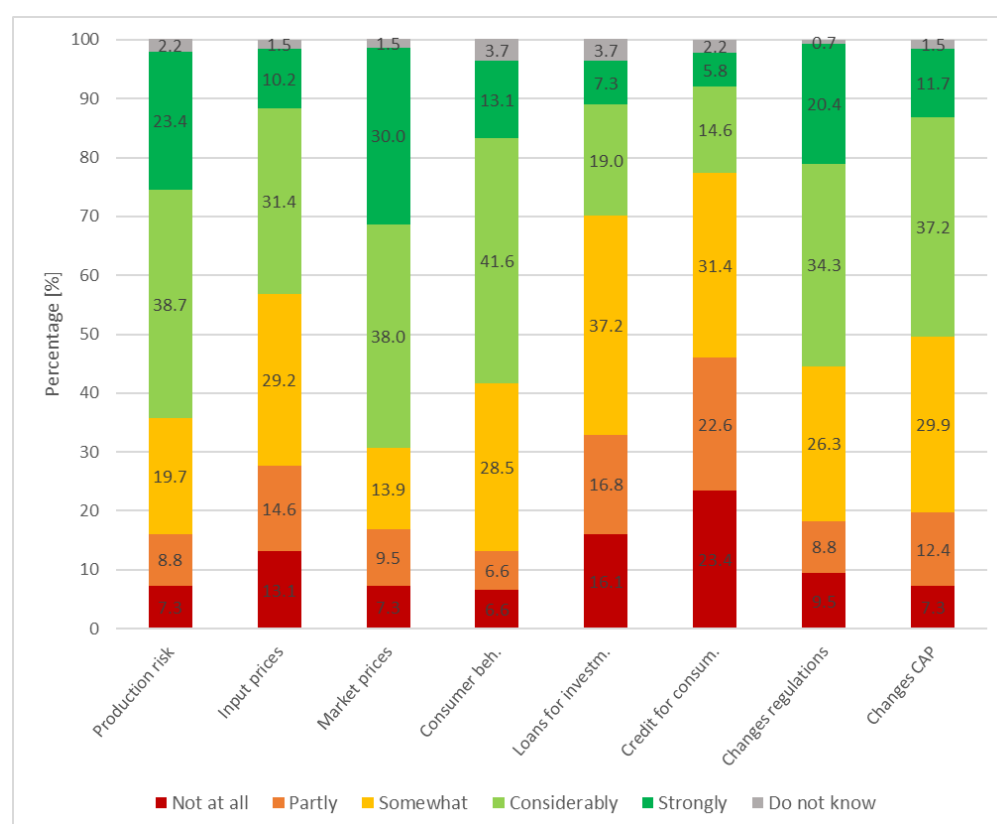
3.5. The future

In a last section of the SUFISA questionnaire, farmers were asked about the wider strategies they adopt in their farming activities. The first part of this section focuses on **factors that might influence farmers' decisions** on production and farming activities. Farmers were given a list of eight factors, and were asked to rank each of these on a scale of one ("Not at all") to five ("Strongly") with respect to the potential of influence their strategy. The possibility was given to mention an additional missing factor. The results are displayed in Figure 7.

A "severe drop in market prices" was pointed out as the factor with the highest potential influence. The second most importance was given to "adverse climatic

conditions or pests”, which is easily justified by the extreme event that happened in the last production season: due to severe frost at the time of flowering, 50% of the producers in our sample lost 80% of their apples, and again 50% lost 30% of their pears. Producers also believe “changes in consumers behaviour and/or preferences” to have a high potential influence. This can be explained by the contribution of decreasing apple consumption to the current situation of oversupply in apples. “Changes in farming regulations” were reported to be of high potential influence as well. One straightforward explanation for this is the high use of pesticides in the sector. During the focus groups and workshop, crop protection possibilities were pointed out as a key issue for the sector now and in the years to come. “Changes in the CAP” are believed to have a considerable impact by a large group of farmers (37%), but not many believe the impact to be strong (12%). This might be explained by the low dependence of top fruit farmers on direct payments¹³. On the other hand, “access to loans for capital investments” and, to a smaller extent, “access to credit for farms consumable inputs or materials” are believed to only have a limited or no potential impact on producers’ strategies. Thus, access to credit does not seem to be a major issue in the Flemish fruit farming sector, as was already pointed out during the participatory workshop.

Figure 7: Reported potential influence of diverse factors on producers’ strategies. Respondents assigned a score of one (“Not at all”; red) to five (“Strongly”; green) on the potential influence.



¹³ Direct payments consist of only 2% of top fruit farmers income, on average.

The second part of this section of the survey focuses on the farmers' **strategy for the development** of the firm, at the time horizon of five years. Firstly, farmers were asked whether they plan to maintain the existing scale of operations, expand it, downscale or abandon farming in five years. It is interesting to note that coop and non-coop farmers answered in a highly similar way to this question (p value of Pearson's Chi² test is 0.35). In total, 27.7% of the respondents plans to maintain their scale of operations, 54.7% plan to expand it, 3.7% plan to downscale their operations and 10.2% plan to abandon farming. This is a major result: apparently, the majority of Flemish apple and pear farmers aims for scale enlargement, although there is an oversupply on the world market of apple, Russia as former main destination market for pears is not yet replaced by other destination markets, and liabilities on apple and pear orchards have increased significantly in the last years¹⁴.

Secondly, farmers were asked which production and market related changes they expect to implement within five years, in order to achieve the desired development of the firm. The responses are presented in Figure 8 and 9. Clearly, farmers have stronger intentions to implement production related changes (percentage of "Yes" answers between 27.4% and 46.7%) than market related changes (percentage of "Yes" answers between 15.3% and 35.8%). This difference is especially large with respect to insurance: only 15.3% of the respondents intends to insure against volatile prices, while 45.3% intends to insure against crop losses. Again, the extreme damage due to frost in 2017, and the regular high damage that top fruit farmers experience because of hail easily explains the given answers. The fact that insuring against crop losses is not a more common intention than further specialising the production (towards either pear production or apple production, of which the latter is unlikely) is perhaps more surprising. 39.4% of the respondents plans to invest more in its production, which confirms the earlier conclusion that many farmers plan to expand the scale of operations. 5.1% of the respondents plans no production related changes at all, a lot less than the share of respondents that has no plans for market related changes (13.9%).

Among the market related changes, the development of sales channels and the diversification of crops are the most popular, although only one third of the respondents plan to do so. Given the generally negative perception of the current marketing possibilities, these numbers are not higher than expected. Secondly, the development of new partnerships and adding value to the produce (by having it certified as local, residue-free, organic, etc.) are intended by about 30% of the respondents. Insuring against volatile market prices or prices of inputs is clearly not a popular option. Hereby we must mention that such insurance schemes are currently rare in Flemish horticulture. The low popularity might thus reflect that farmers do not think this is an option.

Lastly, producers were asked to state their current expectations on the **succession** of their farm. 53.7% of the respondents has no expectations at present. For 57% of the respondents within this group (or 31% of the total sample), this is because

¹⁴ In addition, increasing liquidity problems with top fruit farmers were mentioned in the interviews, focus groups and workshop.

succession is currently not in issue. As 44% of the respondents is younger than 50, this figure is no surprise. In addition, 16.9% expects a family member to take over the farm, which is less than the number of respondents which expects to sell the property (20.6%). 8.8% of the respondents was not able to respond to this question. Interestingly, the distribution of answers is highly similar across coop and non-coop farmers (p-value of Pearson's Chi² test equals 0.76).

Figure 8: Production related changes that respondents expect to implement in the coming five years.

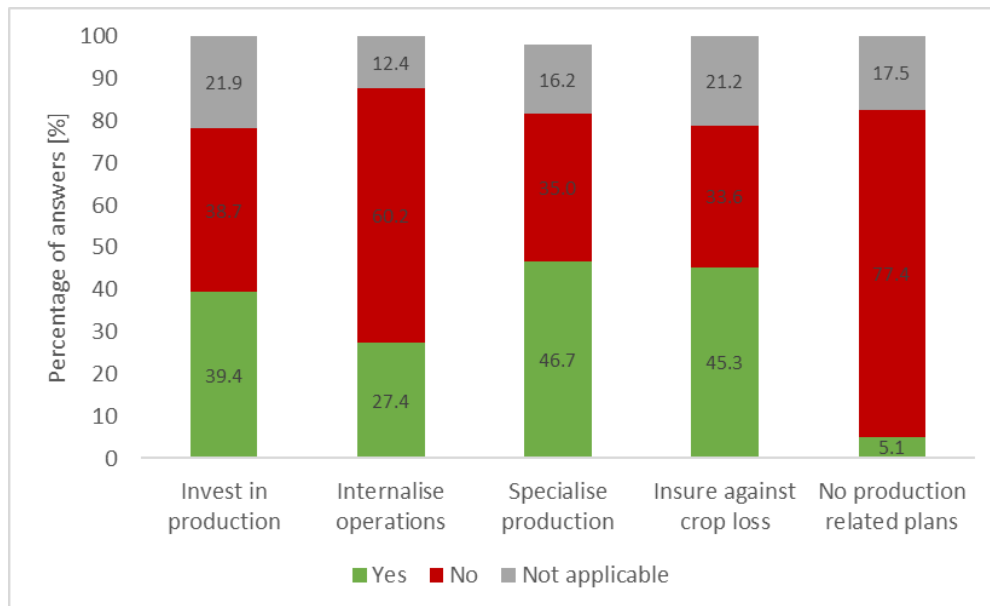
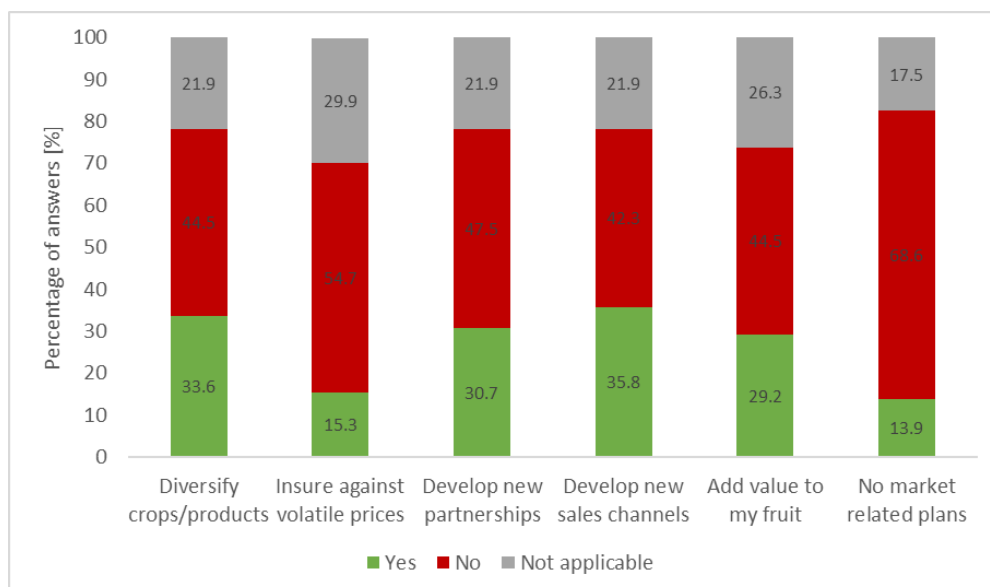


Figure 9: Production related changes that respondents expect to implement in the coming five years.



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KU LEUVEN

University of Leuven
Department of Earth and Environmental Sciences
Sustainable Food Economies Research Group
Celestijnenlaan 200E, 3001 Leuven (BE)