

Vertical integration as future strategy to increase value absorption of primary producers: the Belgian sugar beet and the German rapeseed case

Katharina Biely^a, Susanne von Münchhausen^b, Steven Van Passel^{a,c}

^aCentre for Environmental Sciences, Faculty of Business Economics, Hasselt University, Hasselt, Belgium, Katharina.biely@uhasselt.be; Steven.vanpassel@uhasselt.be

^bUniversity for Sustainable Development Eberswalde, Germany, Susanne.vonMuenchhausen@hnee.de

^cDepartment of Engineering Management, Faculty of Applied Economics, University of Antwerp, Antwerp, Belgium

Abstract: *Vertical integration is a means to increase market power. While for some agricultural products it is easier for farmers to exert control over their product beyond the farm gate, for others it is more difficult. The latter instance shows two main characteristics. First, the farmer cannot sell the respective product to final consumers without processing. Second, processing is capital intensive. Consequently, farmers have limited sales channels, and vertical integration of the supply chain is a complex and therefore, challenging task. It implies cooperation among farmers to process the raw material at a profitable scale and to finance the installation of processing facilities. Thus, for these product categories farmers are prone to market power issues, since they depend on private businesses who have the financial means to install processing facilities and the logistic capacities to organize the collection of large amounts of raw material. This paper aims to identify and analyse the role of the supply chain integration under changing policy and market conditions. Two case studies serve as the basis for the analysis; sugar beet in Flanders/Belgium and oilseed rape in Hessen/Germany. While for sugar beet, the effects of market power are emerging only now with the termination of the quota system, farmers growing oilseed rape have been experiencing these problems since the 1990s. Our analysis concludes that most strategies to maintain or improve farm income are exhausted. Nevertheless, a combination of horizontal cooperation and vertical integration may be a potent option in the future.*

Keywords: *supply chain, vertical integration, horizontal cooperation, qualitative research*

Introduction

The term value chain refers to the creation of value within the supply chain (Al-Mudimigh et al. 2004; Gereffi et al. 2005), while supply chain, describes the sequential combination of commodities to assemble a final product. When the focus is on where value within the chain is created and which company absorbs it, the term value chain is rather suitable.

The term supply chain is (despite its common usage) unclear (Bertazzoli et al., 2011; Mentzer et al., 2001) and often confused with the term value chain¹. We follow the definition of Bertazzoli et al. (2011: 307) who defined the supply chain “[...] as a group of economic entities involved in fulfilling the functions of production, transformation, and distribution of the agri-food product, and which are linked by functional and structural relationships aimed at meeting the food requirements on the demand side.” Their definition is very similar to the one of Mentzer et al. (2001), who defined supply chain more in general terms, rather than for the agri-food sector specifically. Since the analysis presented in this paper applies to the agri-food sector the definition of Gereffi et al. (2005) is taken up. The agri-food supply chain links three sectors; agriculture, food processing and distribution (Bukeviciute et al., 2009).

Companies may only operate in one part, in a couple of parts of this chain or they may integrate all parts of the value chain. For the profitability of a company, it is pivotal to decide in which parts of the value chain to operate (Gereffi et al., 2005). The degree of integration is not only determined by profit considerations but also by the commodity type. Standardization allows a higher degree of fragmentation, for example. Other factors that influence integration are knowledge and technology (Gereffi et al., 2005). Supply chain management is in a continuous process of reorganization, reacting to changing circumstances regarding production processes and technologies as well as consumer demand (Al-Mudimigh et al., 2004). Some research suggests (core competence theory) that companies operate more profitably if they only perform core activities, while outsourcing and subcontracting less profitable activities. Subcontracting and outsourcing allows companies to maintain control over the value chain, while not being directly responsible for them (Gereffi et al. 2005). Gereffi et al. (2005) provides a schematic categorization of how value chains can be organized and how this relates to power asymmetries.

Companies can gain higher profits by reducing costs (Al-Mudimigh et al., 2004), by for example reducing transaction costs along the supply chain (Gereffi et al., 2005). Reducing transaction costs, may induce companies to vertically integrate other segments of the supply chain (Díez-Vial, 2007). Profits can also be increased if an actor has higher bargaining power and imposes less favorable contracts on up- and / or downstream actors. Hence, this allows raising profits without increasing vertical integration (Bukeviciute et al., 2009). Vertical integration may also be incentivized by market power considerations of companies (Díez-Vial, 2007), as vertical integration can increase or consolidate a company's market power. Imperfect price transmission can be an indication for power imbalances along the supply chain. While market concentration downstream the supply chain could be related to imperfect price transmission, Assefa et al. (2014) demonstrate that concentration on the farm level may not counterbalance downstream concentration.

Another approach is to improve the characteristics of a commodity to increase the consumer's valuation of that commodity (Al-Mudimigh et al., 2004; Manning, 2015). The latter point is related to product differentiation and the branding of the product (Manning,

¹ See for example the definition of Gary Gereffi, John Humphrey, and Timothy Sturgeon, 'The Governance of Global Value Chains', *Review of International Political Economy*, 12/1 (2005/02/01 2005), 78-104. For a value chain: “In its most basic form, a value-added chain is ‘the process by which technology is combined with material and labor inputs, and then processed inputs are assembled, marketed, and distributed.’ This does not differ from the definition of a supply chain provided by J. T. Mentzer et al., 'Defining Supply Chain Management', *Journal of Business Logistics*, 22 (2001). or Gereffi, Humphrey, and Sturgeon, 'The Governance of Global Value Chains', (

2015). A product can appear of higher value to the consumer not only because of better performance (technologically, ethically), but also due to design characteristics (like apple products). The ability of a company to fetch created value along the supply chain is indeed related to their competitiveness (Gereffi et al., 2005). Due to the homogeneity of agricultural raw produce, farmer's ability in augmenting consumer's valuation of their product is limited. In contrast refinement and processing of agricultural commodity crops can increase product differentiation and thus, create higher value (Stevenson and Pirog, 2008). This is particularly the case if products need processing before being sold to final consumers (grain, oilseeds, sugar beets etc.).

Not only vertical integration but also horizontal integration is related to the competitiveness of a company. "While vertical integration [...] requires the acquisition of different types of capacities, horizontal integration requires capacities that are similar. The strategy of horizontal integration aims at increasing market share, diminishing competition and increasing cost competitiveness" (Pellinen et al., 2016: 1183). The European Commission (2011) acknowledges the economic benefits of horizontal cooperation, while also pointing out the danger of creating power imbalances.

In a report on the future of the Common Agricultural Policy (CAP) The European Parliament (2011) pointed out the decreasing economic profitability of farm operations, due to market concentration downstream the supply chain. Therefore, measures to improve the bargaining position of primary producers are suggested. The Common Agricultural Policy (CAP) acknowledges this by supporting producer organisations and inter-branch organisations (Velázquez and Buffaria, 2017). A producer organisation fosters "joint production or marketing of agricultural products or the use of joint facilities, unless such joint action excludes competition [...]" (EU 2013). An inter-branch organization is a self-organized, vertically integrated entity created by different players and branches of the agrifood chain, including always representatives linked to production and at least one partner from another part of the supply chain (EU 2013: Article 157). Hence, the EU supports horizontal cooperation as well as vertical integration in the agricultural sector. Horizontal cooperation and vertical integration are potent means to improve the economic situation of primary producers (Bertazzoli et al., 2011; Severini and Sorrentino, 2017; Velázquez and Buffaria, 2017). However, while producer organisations establish horizontal coordination, they may in some cases not be potent enough to maintain or improve the economic situation of farms (Assefa et al., 2014). Therefore, additionally vertical integration may be necessary to support the economic profitability of primary production.

The following analysis will expand on the limited success of horizontal cooperation for the sugar beet cultivation in Belgium and the oilseed rape cultivation in Germany. First the methodology employed for the analysis is outlined. Then the two case studies are briefly introduced. Thereafter, the current situation and challenges as well as strategies of primary producers are discussed. Finally, we conclude by comparing the two case studies.

Methodology

In order to understand the situation of European farmers several research steps were conducted. Due to the exploratory character of the research question qualitative research was performed. Qualitative research was split up in four stages (see figure 1) 1) desk-based research, 2) interviews, 3) focus groups, and 4) work shop aiming to collect various perspectives for an encompassing analysis.



Figure 1 Sequential research steps

Results from each step served to refine further research steps. Thus, the desk-based research aimed at getting acquainted with the general situation as well as preparing the next research step. Interviews with nine Belgian farmers and with eight stakeholders of the German rapeseed industry were conducted. Interviews were analysed and main challenges identified, which were further investigated in focus groups with farmers. Once more, results were analysed and further discussed in workshops with representatives of the value chain.

Table 1 Qualitative research steps for both case studies

Research step	Sugar beet case	Rape seed case
Interviews	9 semi structured face to face interviews	8 telephone interviews with case study stakeholders and experts from the processing industry
Focus groups	2 with farmers	1 with farmers
Workshops	1 with representatives from the value chain including farmers	1 with representatives from the value chain including farmers

In the Belgian case study the semi-structured face to face interviews and focus groups were audio recorded, transcribed, translated to English and analysed according to grounded theory (Strauss and Corbin, 1998) with the assistance of the NVIVO software. As mentioned interviews followed a semi structured format, the same is true for the focus groups and the workshop. Aiding materials during the focus group were *strategy cards*. These cards contained key words as well as an illustration that briefly described the identified strategy. These cards were reused during the workshop. The analysis of the workshop was based on notes taken by two note keepers as well as on flip charts and sticky notes created during the workshop. Direct statements of farmers that are used within this article are anonymized, hence names of farmers were changed. Moreover, company names are not mentioned in this paper to preserve their integrity.

In the German case study, notes were taken while conducting the eight explorative, open ended telephone interviews. Reoccurring issues, were further investigated in following interviews to gain additional information and insights. Key statements were cross-checked in subsequent interviews. Methodologically, the interview approach was based on the concept of grounded theory (Tolhurst, 2012). During the focus group that consisted only of farmers and the researchers, one team member took notes and prepared minutes after the event. A large 'flow chart' with drivers, (potential) strategies, and reached/aimed results served as template. During the discussion, this chart was completed. Currently lacking strategies emerged from this focus group process. This strategy-focused chart served as starting point for the stakeholder workshop. The focus group discussion was audio recorded. After the focus group, the minutes were circulated aiming to give participants the opportunity to comment and clarify. Statements of participants were anonymised and the minutes of the focus group were translated into English. Participants of the subsequent workshop were representatives of the oilseed value chain. During the workshop discussion cards showing relevant key issues were collected on pin boards.

Case study description

Rapeseed and sugar beet cultivation are chosen for this analysis due to similarities regarding the crop as well as the role of the farmers' organization. Both are commodity crops that cannot be directly sold to a final consumer but need to be further processed. Processing is a rather expensive activity that needs to make use of scale effects in order to be profitable. Therefore, primary producers cannot take over refinement individually. They either have to sell their harvest to a refinery or they need to organize and invest in their own common processing facilities. In both cases, farmers are organized horizontally to improve bargaining power and conclude favourable contracts with the processing enterprise. Additionally, to farmers' dependency from the processors, the final product is very homogenous. Thus, value creation may rather happen through further processing and in food and beverage manufacturing than by quality properties of the commodity crop. Since sugar as well as oil make up only one part of complex final products, the value of primary producers' input is rather low. Moreover, through the globalization of sugar and vegetable oil markets, primary producers have to compete with world market prices. Furthermore, both case study regions are located in neighbouring European countries with relatively similar production systems and natural conditions.

Sugar beet in Belgium

Sugar beet makes up a particularly interesting case due to the termination of the quota system in September 2017. Already since 2006, the quota system has gone through a major overhaul aiming at a stepwise adaption to free market conditions. This meant not only a reduction of distributed quota, but also a considerable reduction of the minimum price for sugar beet. From the sugar beet campaign 2016/17 sugar beet farmers are vulnerable to market price fluctuations, putting an end to the rather secured profitability of sugar beet cultivation. Apart from this, sugar beet is an interesting case study due to the high concentration on manufacturing level. The number of sugar beet refineries has reduced dramatically since 1970. Today only two sugar beet refining companies, and three refineries, remain in Belgium. While this instance did not pose major problems in the past, concerns regarding market power are now raised (Aragrande et al. 2017). During the quota period, sugar beet farmers in Belgium negotiated interprofessional agreements collectively through the farmers' sugar beet association (CBB) with the refineries. Thus, all aspects apart from the price (which was predetermined by the EU) were negotiated commonly. This approach strived at creating a level playing field among farmers, by increasing transparency and setting common conditions for all farmers, as well as between farmers and refineries by counterbalancing the concentration on refinery level. Up until the campaign of 2016/17 this approach seemed to have worked well.

Belgium is the fifth largest sugar beet producer in the EU with total harvested sugar beet area of about 60,000 hectares in the 2014/2015-crop season. This represents about 4.5% of the agricultural area in Belgium. In Belgium, the total sugar production from sugar beet is about 646,000 tons (CBB, 2017b). There are about 7500 sugar beet farmers in Belgium spread across the 14 agro-ecological zones (CEFS, 2015; Peeters, 2010). Between 1968 and 2015 the number of sugar beet farmers reduced from 36114 to 7513. Alone since 2006, 6184 sugar beet farmers have been terminating their operations. The number of sugar beet growers has been declining steadily over the last decade with a sharp decline occurring between 2007 and 2008. The concentration on the refinery level is even more pronounced. 174 sugar beet factories could be found in Belgium by 1872 (CBB, 2017b). Today only three refineries remained in Belgium, which are owned by two companies (CBB, 2017b).

Rape seed in Germany

Rapeseed is an oilseed cash crop that competes on international markets for vegetable oil and meals. In 2014, the rapeseed harvest accounted for 6.2 million tonnes but around 9.6 million tonnes were processed in Germany. A volume of 3.8 million tonnes were imported, mainly from France and Poland (OVID, 2016). Consequently, the development of the

rapeseed price in Germany depends on international markets, and changes with prices for crude oil, soy, and soybeans. Regional fluctuations in yields have no impact on rapeseed prices.

In Germany, the oil mills usually set prices following the given market conditions and key quality criteria which are the oil content, the humidity and the contamination of seeds. This system is well established and widely accepted. Rapeseed supply chains have bottleneck structures because the seeds have to be cleaned, dried and pressed for vegetable oil production. Due to the concentration process within the sector, Germany has only 10 oil mill companies.

Since Germany is a large country with a large variety of regions driven by heterogeneous conditions for farming, we selected one area (Wetterau district) to highlight exemplarily farmers' cooperation and the challenges for an integration of the value chain. The Wetterau district is located in the middle of the German Federal State of Hessen. Both rural and urban structures characterise the area due its rural towns and villages and the proximity to the Rhine-Main conurbation. The region is one of the most productive agrarian regions in Germany: the climate is moderate and the soil is very fertile. Intensive agriculture is widely spread. Arable crop rotation with wheat, oilseed rape or sugar beet are characteristic. Sometimes pork production or dairy is linked to arable farming. Over decades, a steady decrease of livestock farming took place. Only the number of horses increased over time. Around 1,300 farms are located in the area. About 55% are full time farms. Due to a prosperous regional economy with various industry and service enterprises, unemployment rates are low. Back in history, the Wetterau was the fertile backyard of the growing cities of the Rhine -Main area. Farmers' entrepreneurial orientation and close cooperation has a long tradition because they always aimed to address the requirements of these complex market places.

Results

The role of horizontal cooperation in the supply chain

The Belgian sugar beet case

Since September 2017 the quota system has been terminated. This means that for the campaign 2016/17 the farmers' association had to negotiate sugar beet prices with the refineries. While the termination of the quota system was in 2013 seen as an opportunity (CBB, 2013), the negotiation process for the campaign 2016/17 changed this perception, at least for some farmers.

Since the campaign 2016/17 the two remaining sugar refineries can offer different sugar beet prices. While one refinery maintained the prices of the previous campaign the other refinery, changed their pricing strategy. Farmers delivering to the former refinery where satisfied with their contract, the contrary was the case for farmers delivering to the latter refinery. The results were negotiations lasting for months, which could only conclude due to the involvement of political actors (VILT, 2017). For the campaign 2017/18 a similar scenario is taking place. While the negotiations with one refinery were concluded quickly, the opposite is the case for the other refinery.

The main concern for farmers regarding the conditions offered by the second refinery is that they are much less predictable. Farmers are payed in steps within one campaign. The actual price farmers receive are only determined later within the campaign. Therefore, farmers have to deal with price insecurities. Moreover, it is criticized by farmers that the negotiations with the second refinery are more difficult, since the refinery has to report back to the parent company.

Generally, farmers fear that increased production will lead to reduced prices, making sugar beet cultivation unprofitable. For the plantation year 2017/18 the overall sugar beet sowing increased (CBB, 2017b). Interviews and focus group discussions revealed that farmers

already depend on subsidies, because of the low revenue from sales. Though, farmers stated that this is not a desired situation. Rather farmers should be able to live from their sales. A further reduction of the income from sugar beet will require farmers to pick up new strategies.

The German rapeseed case

Farmers' close cooperation has a long tradition in the Wetterau area. Back in the 1980s, farmers established a machinery ring. A subsidiary company of it is the Hessian Producer Organisation for Oilseed Rape, the HERA economic association. HERA collects the harvests, negotiates prices and settles sales contracts with oil mills or sales companies, organises joint purchases of inputs (seeds, fertilizer, pesticides), and provides farm advice.

Since the 1990s, policy and legislation supported on farm energy production. In 1994, the Renewable Resource Organisation (NAWARO) was founded in the Wetterau aiming to enhance oilseed rape sales. NAWARO activities focused on negotiations among a biofuel processor in Nordrhein-Westfalen and farmers' representatives. This initiative started with 150 members and 500 ha of rape from set-aside-areas, and aimed to realize the highest possible price for the member farmers and to manage the registration and subsidy payment for set-aside-land for its members. (EZG, 2016) The NAWARO association offered biodiesel, biodiesel-service stations and biodegradable lubricants, and provided farm advice. The initiative managed to set-up a regional market for biofuels in cooperation with other distributors and machinery rings in the wider region. The consortium of steadily expanding farmers' organisations was a success model realizing a higher added value for rape seed.

Although nationally produced biofuel volumes and the proportion of bio-fuel in fuel mixtures for vehicles has remained relatively stable in Germany even after the economic crisis of 2007/08, the area for rape cultivation for bio-fuel shrank (DBV, 2016; Deutschlandfunk, 2016). However, the production of renewable energy from Wetterau farming was less cost-effective than in other areas, and the NAWARA association adjusted its strategy and switched to sales with the food industry. Accordingly, the name HERA replaced NAWARO.

For several years, HERA was very successful with a contract-based cooperation with a large-scale food processor. This contract included environmental standards and payments for participating farmers (EZG, 2016). Farmers received a slightly higher price (1-2 €/ton) for their environmentally friendly production. During these years, HERA was the role model for this international processing enterprise but the involved oil mill closed down, and the food corporation shifted its vegetable oil production to northern Germany. Moreover, the CEOs of the corporation lost interest in this enterprise branch that should be outsourced (Dierschke, 5/2017). Due to these changes in the food corporation, Wetterau farmers experienced reduced profits from arable farming and higher economic risks with oilseed rape cultivation.

Comparison of past strategies aiming to tackle current challenges

As pointed out above, farmers need to develop strategies to maintain or improve their financial situation. The interviews allowed us to identify a number of potential strategies. Most of these strategies were either fully exploited or only of theoretical nature. One of these strategies is vertical integration. Given the importance of vertical and horizontal integration to improve the economic stability of the farm, we are interested in further investigating this strategy. Before doing so, other potential strategies are briefly outlined below, and explained why they are not applicable.

Table 2 Comparison of past strategies between both case studies

Strategy	Sugar beet case study	Rapeseed case study
Choosing another manufacturer	In fact, it is impossible to choose another refinery due to high transportation costs and no alternative choice in proximity.	Farmers have alternative options to sell rapeseed: to mills, distributors, at commodity exchanges, futures exchanges (different types of contracts). However, these sales channels do not ensure profitability in low price years and do not cover additional environmental standards.
Innovation	This strategy refers to innovation regarding cultivation technique, inputs and seeds. Innovation is seen as the most important strategy of the past, but farmers indicated that a limit has been reached	Innovation has been an important strategy to maintain or even increase income. However, by now this strategy is not sufficient to maintain income.
Intensification – upscaling	Intensification in terms of more output per hectare, is covered by innovation. As stated, this strategy might be exhausted. Upscaling refers to increased farm size to make advantage of scale effects. However, farm land is limited and most farmers do not have the possibility to expand their operations.	The very same is true for the German rape seed case for both, the exhaustion of innovation as strategy, as well as regarding the availability of land for agricultural purposes.
Alternative crops	For some farmers, this will be an option. Still, several factors have to be taken into account when this strategy is considered. If a larger proportion of sugar beet farmers switches to another crop, the market for the alternative crop may crash. Generally, the market situation for alternative crops need to be considered. Other factors that limit the viability of this strategy are, crop rotation, soil and climatic conditions or the lack of buyers.	Rape has a positive effect in crop rotation with wheat and other cereal crops. Without rape, rotational benefits would vanish. Risks will be higher and the system's resilience will be lower. Rape is expected to realize a higher profit. Without this crop, economic sustainability of the arable system as a whole might be at risk.
Risk management	Other insurance mechanism were suggested that are more synchronized with climatic and market conditions. Though there might be some scope, it was not mentioned as a main strategy.	On the EU level, some stakeholders promote policy support for insurance mechanisms, though German policy is not supporting this initiative. The traditional insurance system is well-working with farmers deciding which yield insurance type they want to choose.
Branding	One sugar refinery is already using a brand that has a high customer recognition within Belgium. Though, this does not affect the farmers' revenue positively.	The food industry has sustainability standards for their <i>B2B</i> marketing. These standards do not cover production systems on the farm. There is not enough demand from retailers (consumers) for e.g. higher agri-environmental standards in rape cultivation.
Alternative end-products	With, sustainability becoming more and more important other end-products may increase demand and thus prices. However, alternative end-products such as bio-fuels or bio-plastics, that are both competing with products based on cheap petroleum, are not yet generating enough demand.	There are several alternative end-products from oilseed rape. However, none of these ensures higher prices for higher sustainability standards because they are <i>anonymous</i> commodity inputs in various types of products such as animal feed, pharmaceutical crèmes, lubricants, etc.
Additional income	Within the farm household often already at least one member has an employment outside the farm. Thus, this strategy is exhausted.	If farming was no longer profitable, farmers would find an alternative employment in the area. Due to low unemployment rates and high

Striking for better prices	Farmers pointed out that if they would not deliver their crop within a campaign, the refinery would need to close down permanently. Hence, this strategy is counterproductive and not picked up.	income in non-agricultural sectors, farmers would stop farming. Rape seed farmers would not be able to improve their situation with striking, since their commodity is substitutable by global supply.
Strengthening the farmers' union	The CBB is already a role model for a farmers' association. It was not stated that the organization could be improved considerably, or that such a change would improve the farmers' position.	Farmers mostly intend to stay with HERA, since they believe in the association's potential to develop new strategies ensuring profitability of rape production.
Freedom of choice	This strategy referred to farmers' being able to decide themselves, when to sow and when to harvest their crop. While this was mentioned during interviews, farmers did not expand on it. Mainly, restrictions are caused due to logistic reasons, as refineries cannot process all sugar beets at the same time. While certain improvements may be possible in this regard, this strategy will not be a solution to farmer's problem	Since most oil mills have often insufficient storage capacities for oilseeds during the harvesting season (farmers have no storage). Farmers cannot expand or change the harvesting time due quality reasons and weather conditions.
Leaving the farmers' union	Sugar beet farmers in Belgium are obliged to be part of the CBB. Only some farmers would prefer abandoning the farmers union. Most probably only large farms would profit from individual contracting.	Since prices realized by the PO were lower than expected recently, more farmers seek for individual sales. This strategy only works for larger farm businesses with higher volumes. Small farms with reduced negation power do not realize higher prices.
Sustainability	On the one hand, sugar beet is perceived as being superior compared to sugar cane regarding the sustainability of production process (including environmental as well as social variables). On the other hand, sugary products are products that are potentially less consumed by environmentally conscious consumers. Thus, the willingness of consumers to pay for a sustainable product is low.	Contract farming with the food corporation generated additional income and farmers implemented higher agri-environmental standards. This model solution of vertical integration ended. Since then, farmers tried out different approaches in the last years aiming to realize again financial compensation for sustainability standards. An agreement with a local water supplier that compensated for reduced N-levels, has a risk of non-compliance under unfavorable weather conditions.

To summarize the most important aspects, for the sugar beet case farmers are faced with a monopoly, having no option to sell their crop to another buyer. All strategies seem to be exhausted or close to exhaustion. Additionally, to this the characteristic of the crop increases the inflexibility of farmers. Due to the perishability of sugar beet, the crop needs to be processed short after harvest. Thus, farmers cannot store the crop and wait for better prices. Farmers cannot sell their product directly to a final consumer, since the crop needs refinement. The traditional refinement process is cost intensive, rendering it impossible for individual farmers to further process their crop themselves.

The situation for the Wetterau rape seed farmers is similar. Global competition reduces their space for maneuver to negotiate better prices. On-farm strategies to maintain or increase their income are exhausted. The invisibility of rapeseed oil within final food products, reduces transparency and hence the ability to raise awareness about a high-value ingredient. Direct marketing is, again, impossible, since the seeds need processing.

This ostensibly hopeless situation calls for new pathways. The remaining strategy that has not been discussed yet, is vertical integration. In the next section the potential of this last strategy will be outlined.

Vertical integration as major future strategy

The Belgian sugar beet case

As described above, horizontal integration in the Belgian sugar beet sector can be regarded as exemplary. Therefore, 1) it can be stated that this is a strategy already implemented successfully, but that this strategy is 2) not sufficient to balance off market concentration on the refinery level. From this it can be concluded that further cooperation may be needed. Vertical integration was a topic often mentioned by farmers. Either it was related to farmers being engaged in the sugar production or to the possibility of ‘selling the land to the refinery’.

Selling the land to the refinery was a cynical statement by a farmer during the interviews. Despite the cynical character of the statement it was taken up as a potential strategy to be further discussed during the focus groups. As soon as the strategy card *selling land to refinery* was discovered a controversial discussion started. Initially, there was no understanding why such a strategy card was even put on the table, but in the course of the discussion it became clear that for some farmers this is a last resort. Selling the land to the buyer would allow farmers to stay in business and retain them from shame of losing their property. While selling land to other farmers would make such a step public, selling land to the buyer remains undisclosed. However, it became clear that such a step is related to a hopeless future perspective and is thus not a strategy that aims at maintaining the farm business on the long run.

The other strategy regarding vertical integration is getting involved in sugar production. Although farmers do hold shares within the sugar refineries, it was bitterly stated that it was a missed opportunity to not take over one of the refineries in the past as it was offered for sale. The shares do not allow Belgian sugar beet farmers to compensate for lower sugar beet prices, neither do they equip them with an increased right to say within the refinery. This situation is compared to Germany, where farmers commonly hold more than 50% of the refinery they are delivering to. In contrast, according to the interviews, farmers hold only about six percent of each of the Belgian refineries.

The ability to harvest dividends is perceived as an advantage of German farmers. Moreover, one interviewee indicated that the German farmers do not understand the Belgian farmers and thus, do not understand why the Belgian farmers need different conditions than the German farmers. Anyhow, it is also understood that farmers in Germany can neither dictate the price, since they are also obliged to increase profits to satisfy the other shareholders.

Therefore, it may not come as a surprise that a model that gives farmers more control over the production is palatable. The Dutch sugar refinery serves farmers as example in this regard. For some farmers getting involved in sugar processing to a larger extent is a potent strategy to reduce the risks caused by price volatility.

In fact, while this research is conducted, Belgian sugar beet farmers consider such steps. One can think of two options. The first option is buying more shares. However, this is not the option under investigation by the farmers. This might be due to the fact, that buying shares of a foreign company may only increase their income in terms of dividends, but does not improve the communication flow or the right to say within the company. Another option, that is indeed much more venturous, is building their own cooperative refinery. Plans to do so have been under investigation since early 2017. In one of the focus groups this option was first mentioned (February, 2017).

At this time the idea of building a new cooperative refinery was not very clear. Though, a couple of months later, the idea got more concrete and a feasibility study was commissioned (Belge, 2017; Boom, 2017; Meijering, 2017). In the September issue of the *De Bietplanter* (2017a), it is stated that by spring 2018 a decision regarding the feasibility of the new cooperative refinery will be made. Not much is made public up until now, however, the short report in the *De Bietplanter* indicates that the amount of sugar beet refined within one campaign will be more than for the international Belgian sugar refinery. As we know from the focus groups, the new refinery would be the result of the international Belgian sugar refinery not accommodating the needs of the sugar beet farmers. During the focus group, it became also clear that instead of additionally planting sugar beet for the new cooperative refinery, farmers would switch to the new cooperative refinery. Subsequently, this would mean the end of refining sugar for the international Belgian sugar refinery. This also means that instead of meeting farmers half way, the German parent enterprise prefers to lose one of its most profitable subsidiary companies.

The future will show, if this strategy will be taken up. Building a new refinery is nothing that can be implemented easily. Many sugar beet farmers need to be found that are willing to cooperate, share the risk and provide the funds. Apart from this, buyers need to be found for their end product, for the price that sugar beet farmers envision.

The German rapeseed case

HERA association and individual farmers face the competition of the global market for oilseed crops. For that reason, they aim to develop a new strategy that helps to tackle the economic challenges. The objective is to realize prices or payments that compensate for agri-environmental services above the legal baseline such as reduced fertilizer application, bee protection measures, etc. Since standards of arable farming and the related controls are relatively high in comparison to e.g. some Eastern European countries, farmers agreed that either a self-organized marketing channel for the high-value product would be necessary, or a payment for environmental-services would be a solution. However, adequate strategies to implement such a business goal are still missing.

Since there is no public or private program available for the support of higher agri-environmental standards in rape cultivation, this idea was dismissed by the farmers' group. However, the development of a regional marketing strategy for vegetable oil from rape cultivation in Wetterau is currently discussed as a potential strategy.

During the period of legislative support of alternative energy production, farmers' strategy with the producer association in Wetterau was a success story. However, with changing economic conditions, the producer organization adjusted its strategy focusing, instead, on supplying the food industry and had a model contract including agri-environmental payments with a food corporation. As pointed out, with increasing global competition and the lacking engagement in sustainable oil production of the business partner, this path was no longer profitable. During recent years, the producer organization sold the farmers' harvest to different processors or sales companies. However, price negotiations are difficult due to the

strong competition on the commodity market for oilseed crops. The highly concentrated processing industry purchases nationally and internationally. There are three potential strategies for the future that are related to vertical integration: a) direct marketing of individual sales, b) increasing public awareness, and c) common marketing within Wetterau for a regional product.

Direct marketing of individual sales: the producer organization supported an initiative of some farmers and farm shops to produce a small amount of vegetable oil in glass bottles. This idea has been realized, and around 1000 bottles per year have been produced annually in the area. However, HERA managers cannot identify a potential market for increasing sales. Another problem is that storage time is limited because the oil needs to be used within one year for quality reasons.

Increasing public awareness: Farmers wish to communicate their sustainable production systems to customers, and thus create an added value. They agree that self-marketing of the high-value production process would be necessary, but an adequate strategy is still missing. They argue that regional and GMO-free production are appreciated by consumers (but currently not paid). Social media could be a suitable instrument for the communication of these quality aspects with the public and consumers in the area. It should be possible to highlight this asset of oilseed rape produced in Germany compared to imports.

Common marketing within Wetterau for a regional high-quality product: Members of the producer organization and the farmers' union representatives are currently in the process of negotiations with a retailer, who is currently interested in strengthening its regional and high-quality assortment. However, various issues have to be discussed. The processing needs to be subcontracted by a large-scale oil mill. Transport of seeds to the mill and the transport back into the region represents an additional effort. Processing in the mills needs to be separated from other seeds, otherwise the project risks credibility. The size of containers or bottles is a key decision addressing the final buyer (individual households or catering/processing businesses). Regional production cannot depend on only one customer as it would increase risk. Some meetings between key persons took place already and time will show if a vertical integration strategy will emerge from the initiative aiming to establish a marketing channel for a locally produced high-quality rapeseed oil.

Discussion

The above presented analysis compares two case studies, sugar beet in Belgium and oilseed rape in Wetterau, Germany. Although farmers are located in different countries and produce different crops they share similar challenges, which are related to the characteristic of their production and the liberalization of markets. In both cases farmers face the obstacle of direct marketing to final consumers due to the necessity of processing of the product. While, it is possible that farmers process the crop themselves, this step is connected with substantial investment costs. Moreover, since profitable processing calls for a minimum scale, vertical integration is also related to logistical challenges. For these reasons, so far farmers in both case studies abstained from this step and rather sold their crop to a processor. However, due to changing conditions this sales strategy is no longer profitable.

The need for processing, and the invisibility of the product in other food and non-food products has the effect that increasing consumers' value for their product is difficult. Consumer valuation could be increased by awareness raising strategies. While there seems to be some scope in the rapeseed case, there is less so in the sugar beet case. The low valuation of the two case study crops by consumers, reduces farmers' ability to negotiate higher prices.

It has been pointed out that farmers of both case studies identified and experimented with various strategies to maintain or increase their income. Though, a bottleneck has been reached, as past strategies are exhausted. Therefore, new pathways need to be taken. In the sugar beet case, farmers evaluate the possibility to set up their own refinery. Wetterau

rapeseed farmers are assess three different pathways. A main aspect of these is increasing consumers' awareness about the product in order to in tandem increase consumers' valuation of rape seed oil. This together with either direct marketing or a strong partner who supports the marketing of the product may be a fruitful future strategy.

Sugar beet farmers as well as rape seed farmers use their horizontal cooperation to develop and explore new pathways and intend to go one step farther in the supply chain. They intend to get engaged in the production process and / or aspire to become active in sales promotion.

Both cases vividly illustrate that primary production require farmers to be businessmen, who proactively observe the market and develop new creative strategies. Even if vertical integration is a potent future strategy, the Wetterau case showed that even a well-established chain integration can suffer from significant changes and therefore, requires on-going adjustments or even radical changes.

Acknowledgements

Researchers of the sugar beet case study would like to express their thankfulness to Julie Roba who conducted the interviews with the sugar beet farmers in Belgium.

The authors would like to thank the reviewers for their time and their comments on the draft version. This paper was supported by the Horizon 2020 project SUFISA (Grant Agreement No. 635577).

References

- Al-Mudimigh, Abdullah S., Zairi, Mohamed, and Ahmed, Abdel Moneim M. (2004), 'Extending the concept of supply chain:: The effective management of value chains', *International Journal of Production Economics*, 87 (3), 309-20.
- Aragrande, Maurizio, et al. (2017), 'The effect of EU 2006 sugar regime reform on vertical price transmission', *Agricultural and Food Economics*, 5 (1), 18.
- Assefa, Tsion Taye, Kuiper, W. Erno, and Meuwissen, Miranda P. M. (2014), 'The Effect of Farmer Market Power on the Degree of Farm Retail Price Transmission: A Simulation Model with an Application to the Dutch Ware Potato Supply Chain', *Agribusiness*, 30 (4), 424-37.
- Belge, Sillon (2017), 'Nieuwe coöperatieve suikerfabriek op komst in Wallonië?', *VILT*, 24.07.2017.
- Bertazzoli, A., et al. (2011), 'Food Chains and Value System: The Case of Potato, Fruit, and Cheese', *Journal of Food Products Marketing*, 17 (2-3), 303-26.
- Boom, Niels van der (2017), 'Quotumeinde opent nieuwe suikerfabrieken', *boerenbusiness*, 31.07.2017.
- Bukeviciute, L., Dierx, A., and Ilzkovitz, F. (2009), *The functioning of food supply chain and its effect on food prices in the European Union*, occasional papers n. 47, may 2009, directorate general for economic and Financial Affairs of the European Commission, Brussels.
- CBB (2013), 'Activiteitenrapport 2013', (CBB - Confederatie van de Belgische Bietenplanters).
- (2017a), 'Haalbaarheid nieuwe suikerfabriek op initiatief van de planters: stand van zaken', *De Bietplanter*, 09.2017.
- (2017b), 'Activiteitenrapport 20-16-2017', (CBB - Confederatie van de Belgische Bietenplanters).

- CEFS (2015), 'CEFS SUGAR STATISTICS 2015', (Comité Européen des Fabricants de Sucre (CEFS)).
- Comission, European (2011), 'Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions. The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future'.
- Dierschke (5/2017). Telephone interview with Georg Dierschke, CEO of HERA on the 17/05/2017
- Díez-Vial, Isabel (2007), 'Explaining Vertical Integration Strategies: Market Power, Transactional Attributes and Capabilities', *Journal of Management Studies*, 44 (6), 1017-40.
- DBV - Deutscher Bauernverband (2016). Entwurf der EEG Novelle ist unzureichend. <http://www.bauernverband.de/dbv-haelt-entwurf-der-eeg-novelle-fuer-voellig-unzureichend>. Downloaded in June/2016
- Deutschlandfunk (2016). EEG – eine Bremse für Energiegenossenschaften. http://www.deutschlandfunk.de/eeg-reform-bremse-fuer-energiegenossenschaften.697.de.html?dram:article_id=356315. Downloaded June/2016
- EU (2013), 'Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007'.
- European Parliament (2011), 'The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future (2011/2051(INI))', (European Parliament).
- EZG - Erzeugergemeinschaft HERA (2016). Über uns. <http://www.ezg-nawaro.de/index.php?id=224>. Downloaded on the 28.9.2016
- Gereffi, Gary, Humphrey, John, and Sturgeon, Timothy (2005), 'The governance of global value chains', *Review of International Political Economy*, 12 (1), 78-104.
- Manning, Louise (2015), 'Determining value in the food supply chain', *British Food Journal*, 117 (11), 2649-63.
- Meijering, Luuk (2017), 'Waalse telers willen eigen suikerfabriek', *Boerderij*, 20.07.2017.
- Mentzer, J. T., et al. (2001), 'Defining supply chain management', *Journal of Business Logistics*, 22.
- OVID (2016). Unsere Branche. <http://www.ovid-verband.de/unsere-branche/> Downloaded 6.10.2016
- Peeters, Alain (2010), 'Country Pasture/Forage Resource Profiles', *Women*, 10, 558.
- Pellinen, Jukka, Teittinen, Henri, and Järvenpää, Marko (2016), 'Performance measurement system in the situation of simultaneous vertical and horizontal integration', *International Journal of Operations & Production Management*, 36 (10), 1182-200.
- Severini, Simone and Sorrentino, Alessandro (2017), 'Efficiency and coordination in the EU agri-food systems', *Agricultural and Food Economics*, 5 (1), 15.
- Stevenson, G. W., & Pirog, R. (2008). Values-Based Supply Chains: Strategies for Agrifood Enterprises of the Middle. In T. A. Lyson, G. W. Stevenson & R. Welsh (Eds.), *Food and the Mid-Level Farm: Renewing an Agriculture of the Middle* (pp. 119-143). Cambridge: The MIT Press.
- Strauss, Anselm and Corbin, Juliet (1998), *Basics of Qualitative Reserach: Techniques and Procedures for Developing Frouded Theory* (2nd edn.; Thousand Oaks, London, New Delhi: Sage Publications).

- Tolhurst, E. (2012) Grounded Theory Method: Sociology's quest for exclusive items of inquiry, *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 13, 3, Art.26.
- Velázquez, Beatriz and Buffaria, Bruno (2017), 'About farmers' bargaining power within the new CAP', *Agricultural and Food Economics*, 5 (1), 16.
- VILT (2017), 'Bemiddelaars bereikten akkoord na 2 dagen onderhandelen', VILT, 16.03.2017.