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A case study on the barriers and opportunities for the upscaling of short food supply chains. The perspective of stakeholders in Wallonia, Belgium.

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List of abbreviations

AFN : alternative food network

IC : institutional catering

NCL : negative cold lead

PCL : positive cold lead

SFSC : short food supply chain

WL : warm lead

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Abstract

Despite an increasing interest in short food supply chains in the last years, these have failed to go beyond niche market and are mostly reaching wealthy consumers and small scale farming holdings. In our industrialized agriculture systems, the scaling up of these alternatives to mid- and large-scale farming holdings and to larger groups of consumers is a main issue to spread the benefits of SFSCs. Nevertheless, important logistical and structural barriers are restraining them to access these markets.

To find these out, we conducted in-depth interviews in a case study of representative stakeholders in Belgium to study the issues related to the creation of direct cooperation between mid- and large-scale farming holdings devoted to field crops and institutional catering.

Our results show that on the one hand the *mediation* issues - the difference between the offer and the demand - are important barriers. To overcome these, stakeholders have to increase their understanding and communication of each other to federate around common projects, farmers would have to cooperate among them to offer a more stable and diverse range of products and institutional catering would have to become more flexible by training their staffs to new practices and invest in transformation material. On the other hand a certain context should also be in place; external actors should be involved to facilitate the process and governmental bodies could impose scope statement to create new markets.

Keywords: short food supply chain, upscaling, institutional catering, agriculture in the middle.

1. Introduction

1.1. Passing through the conventional supply chain

Belgian farmers, such as most European farmers, are facing growing difficulties to compete on the international food markets. Indeed, food prices are often too low compared to their production costs and subsidies from the CAP are a major source of income for farming holdings (Moreddu, 2011).

Even if efforts are made to support the agricultural community, the economies of scale needed to face the global competition are pushing the size of farming holdings up in most Europe countries, Belgium included (Eastwood et al., 2010; FAOSTAT, 2014). In conventional food systems, competition between sellers as well as between buyers is a main driver.

On the one hand, farmers are competing to keep their gross margins to stay financially viable. Either by lowering their production costs to improve their economies of scales or by betting on products differentiation to increase their margins of the total added value of food products. In the past decades, farmers have constantly decreased their margins on agricultural products. Between 1995 and 2005 the agricultural sector in the global food supply chain in Europe has lost 7% of the added value they were capturing while the food industry, retail and wholesale were growing. It dropped from 31% to 24% only in 10 years (EUROSTAT 2014). Meaning that more and more value is captured by other actors downward the chain.

On the other hand buyers are competing between each other to offer low prices to consumers. In Belgium for instance, the retail market has gradually evolved to a near-monopolistic market with only 5 companies holding 88% of the market share (STATBEL 2013a). This competition drives both sides of the supply chain by leading many farmers to bankruptcy and by constantly redistributing market shares among retailing companies.

Regarding producers, two alarming trends illustrate these changes in Belgium: the total number of farming holdings dropped by 63% between 1980 and 2010 (an average of 3,4% every year). In the meantime, the average farms size has more than doubled , growing from 8,4 ha to 21,8 ha in Flanders and from 20,8 ha to 51,1 ha in Wallonia (STATBEL 2013b). These bankruptcies mainly touch the familial mid-scale farms, recently named as the *Agriculture in the Middle*¹ in North America. These farms are facing the dilemma of either growing in size to increase their economies of scale and focusing on industrial crops, or increasing the added value of their products by transforming their agricultural commodities in a differentiated product (Kirschenmann et al. 2008). Unfortunately not all farms have been able to adapt and undergo these key transformations often requiring heavy structural

¹ This term has appeared recently in the USA to characterize middle scale farming holdings being too small for competing on the commodity market and too big for direct marketing, i.e. in the USA a range of gross sales per year between \$50,000 and \$500,000. <http://www.agofthemiddle.org/>

and logistical changes from their part. Bankruptcies have thus continued and have led to personal and familial dramas, in Belgium the milk sector has been heavily touched in the past decade. Moreover this has also consequences from environmental and social perspectives by forcing farmers to increase pressure on their agroecosystems to increase their productivity as well as by threatening constantly their profession and way of living (Horrigan et al. 2002).

Even more, this has to be combined with an increasing number of EU-imposed environmental regulations and a change in consumers' expectations (Weatherell et al. 2003) that has contributed to increase pressure on farming activities and considerably reduced farmers' flexibility.

In this perspective, new solutions have to be searched for, at the same time protect farming activities and address the issues raised by the society to improve the sustainability of agriculture and contribute to the rural development (Moschitz and Home 2014).

A viable alternative to conventional food supply chains that has been found successful in many areas of the world is to have one or none intermediary between producers and consumers, commonly named *Short Food Supply Chains* (SFSCs) or with the broader concept *Alternative Food Networks* (AFNs) (Goodman et al., 2012) in opposition with the *Conventional Food Networks* (CFNs) usually referring to the industrial model. Among other goals, these are aimed at redistributing the added value of food products to farmers to increase their income and soften the fluctuations of international food market prices, ensuring their activity to stay economically viable without being exclusively dependant on market prices and subsidies for their survival (Goodman et al. 2012, Renting et al. 2003). This is mainly achieved by reducing the number of intermediaries previously capturing most of the added-value (Renting et al. 2003; Sonnino and Marsden 2006).

1.2. Upscaling SFSCs

If these alternatives have become trendier in the last years and studied under many perspectives, major questions remain regarding their scale and impact on the agricultural world and rural development.

Small scale farming holdings and the organic sector are mainly concerned because their higher diversity of production enables them to provide consumers with a diverse food basis (Little et al. 2010); meanwhile their small scale also allows them to redistribute their working force on other activities such as the transformation and commercialization of products. When it comes to middle- and large-scale farming holdings with highly specialized production, they often have no other choices than selling their production to traditional retailers. Their negotiating power on prices is then very low not to say inexistent, and they are subject to market fluctuations with the consequences indicated above.

A major question of the current debate about AFN is the ability of SFSCs initiatives to scale up and go beyond niche markets to increase their impact on the landscape by including either more or larger

consumers and producers (Goodman et al., 2012; Allen et al. 2003; DuPuis and Goodman 2005; Goodman 2004; Seyfang 2008).

Hence, when it comes to consumers an important issue on the scaling up of SFSCs is related to the public they target and reach. Most consumers currently reached by these supply chains are wealthy and few initiatives are reaching low-income level. Despite the fact that criteria of sustainability such as the SUSTAIN tending to include the question of being “*Accessible in terms of Affordability and Socially Inclusive of all People in Society*” (Sustain, 2000), few initiatives have succeeded in touching these social classes. In the case study of Ibery and Maye (2005) in the north of the United Kingdom they have found that only one out of 6 farms working with SFSC has reached this goal. This question is as much related to the price offered to consumers as to the accessibility thru channels usually used by the different income and social classes (Chambers et al. 2007). Today, most SFSCs are reaching educated social classes composed of people “aware” and “concerned” about environmental issues and often represent ethical choices from these groups of consumers (Clarke et al, 2008; Watts et al, 2005; Whatmore and Clark, 2006).

When it comes to production, some important challenges are still to be undertaken. Industrial crops such as cereals, sugar beet or potatoes face difficulties to integrate SFSCs as they require substantial transformation before reaching consumers. Even more, farmers are cropping large areas and they spend most of their time focusing on production issues. As stated earlier, the main economical benefits of SFSCs usually come from the suppression of income-takers (processors, distributors and retailers) by farmers to recapture the added value of their products. In this perspective the transformation, distribution and commercialization for such agricultural productions would require heavy investment from farmers both in terms of labor and infrastructure.

The scaling up of SFSCs is of great importance in Western Europe and North America as most of the agriculture is industrialized and most farmers are thus left out of the possible benefits of such supply chains.

Today, targeting mid- and large-scale farming holdings has to become a priority as they are now the predominant type of farming holdings and are covering large shares of our landscapes. If one wants to have impacts on the landscape this can serve as strong levers.

1.3. Opportunities for the mid- and large-scale farming holdings

Concerned about these issues, initiatives have tried to link mid- and large-scale farming holdings to institutional catering (IC). Indeed, IC are preparing large number of meals per day and can be the large consumers needed to sell large productions. Even more, reaching consumers where they eat daily can help increasing the impact on transitioning food systems towards innovations (Shove and Walter, 2010).

For reaching these markets, farmers have developed vertically integrated supply chains to retain the added value of their products (Mount, 2012). Different examples exist around the globe, such as the *cooperative* structure in France.

Although these heavy investments can prevent farmers from taking part to such development, many examples show how this can be successfully achieved. For example in North America see Donald (2009), Harvie and Steffey (2010), Friedmann (2007) or Lyson et al. (2008). In France, Le Velly et al. (2010), Le Velly and Bréchet (2011), and the municipality of Charlevilles-Mézières² offer a set of interesting examples all including local and sometime organic food within IC' food supply chains.

These examples offer us an interesting perspective on the challenges such SFSCs face to be viable. Indeed, the upscaling of SFSCs has been studied throughout successful and failed initiatives. The work of Le Velly et al. (2010) and Le Velly and Bréchet (2011) deepen the understanding of these barriers by offering an overview of a set of case studies on the supply of local food in IC. They sustain that the most important is to look at so-called *mediation* problems, i.e. socio-technological processes permitting the offer and demand to meet. Hence, summarizing the development of SFSCs can be approached by understanding the different issues supporting and hindering the relations between producers and consumers. These barriers have been summarized by Mount (2012) into three categories: logistical, structural and regulatory.

1.4. Objectives and methods

This research is exploring the question of these mediation problems from a stakeholder's perspective. The aim is to enrich the debate on the upscaling of SFSCs by studying the issues related to the creation of direct cooperation between mid- and large scale farming holdings and IC. Hindering and supportive forces are studied in the context of an industrialized country to extract mediation issues relative to the implementation of this type of SFSC.

To enable us to do so, we selected a case study (Yin, 2014) in three agricultural regions in Belgium mainly devoted to large scale field crops. We analyzed the potentialities of the current situation and the barriers perceived by stakeholders of this case study by conducting in-depth interviews. From then on we extracted the main mediation issues perceived and discussed them in their current context.

² In 2005 the municipality has started a movement to introduce organic and local food in schools. They have developed a SFSC furnishing a central kitchen dispatching meals to canteens. They serve about 430 000 meals per year with a progressive increase in content of organic products. In 2012 they reached 20%.

2. Methodology, materials and methods

2.1. Case study

2.1.1. Selection criteria

The aim of using the case study methodology was to illustrate and deepen the question of upscaling SFSCs to mid- and large-scale farming holdings as well as to larger groups of consumers. In this perspective we have chosen three agricultural regions in Wallonia (the silty, the sandy-loam and the Condroz region see Figure 1.). As these regions produce mostly wheat, sugar beet, oilseed rape, potatoes, barley and winter barley (DGSIE 2013), we have purposely limited our study to farming holdings devoted to field crops. Indeed, these crops offer a perfect example of field crops produced on large fields and mostly requiring heavy transformation before reaching consumers' plates. They illustrate thus perfectly the difficulties the agriculture in the middle is facing while being representative of the local agricultural production.

The reason for choosing these three regions lies behind the fact that the Belgian agriculture as in many other industrialized countries is highly specialized. The constraints are thus pretty high both for farming holdings that have become mostly devoted to one activity and to the supply chains that have been shaped by this specialization. These constraints will help us illustrating the barriers and opportunities stakeholders are facing in a locked system (see Appendix 1 to have more details on the agricultural landscape of Belgium).

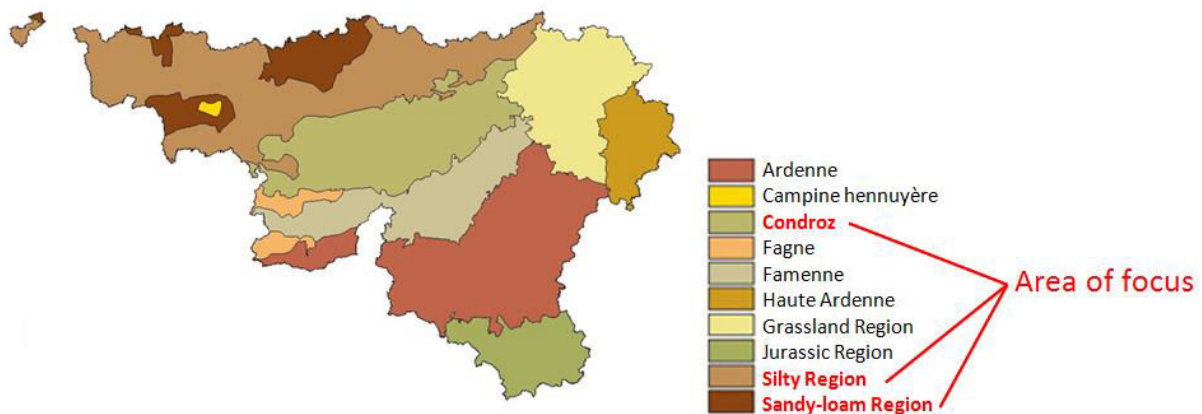


Figure 1. Agricultural regions in Wallonia (source: adapted from DGSIE)

The specialization can be seen both between regions (Figure 2 a, b and c.) and among the farms of a specific region. In the Walloon area, a specialization among regions can be isolated by three main distinctive economical orientations for farming holdings: the silty and sandy-loam regions are mainly

devoted to field crops due to their good soil quality and little slop inducing high yield potentials (Figure 2 a.). The milk production is more specific to the grassland area in the East and the Haute Ardenne devoted to pastures (Figure 2 b.). Finally, beef production with cattle ranching is mainly situated in the Ardenne and the Jurassic region (Figure 2 c.).

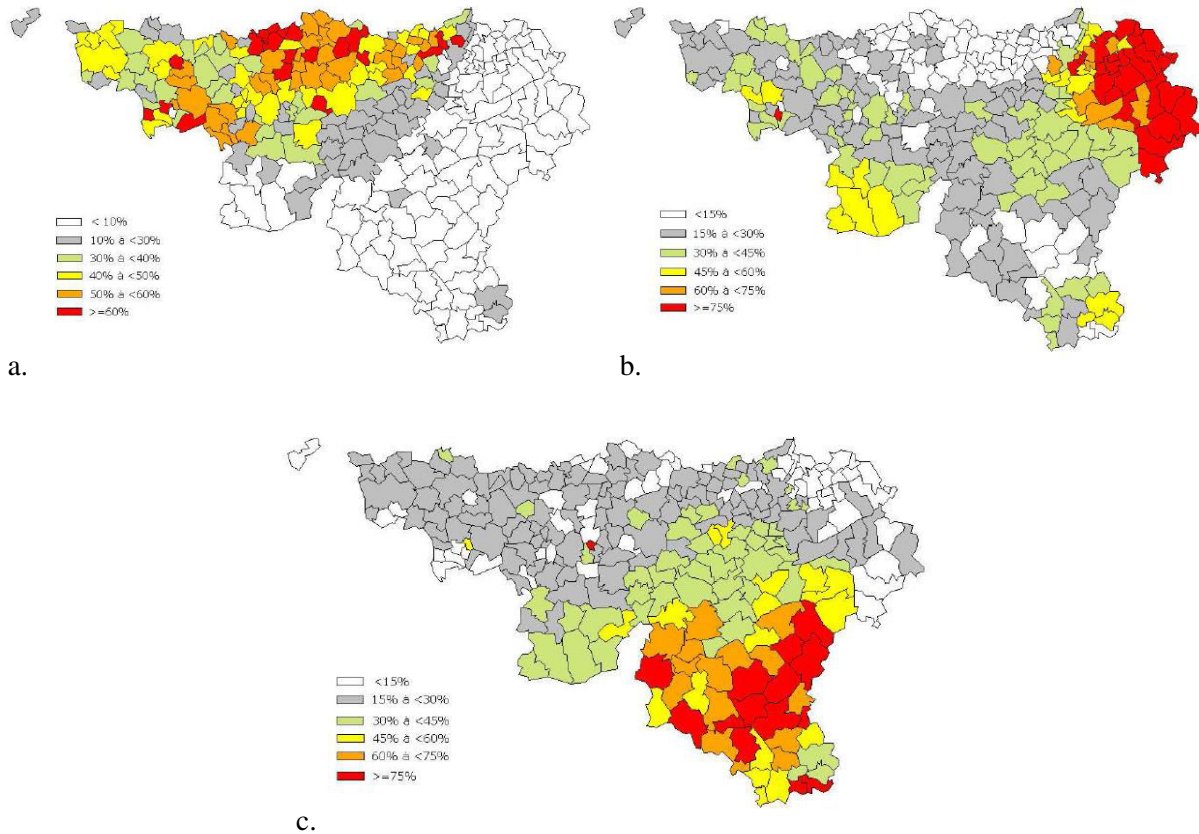


Figure 2. Percentage of farming holdings specialized in; a. Field crops in each municipality, b. Milk production, and c. Beef production (Source: DGSIE 2013).

2.1.2. Description of selected case

The case study is focusing on the perspective of a set of representative stakeholders of the various levels of a potential new SFSC. It studies their perspective on the barriers they perceive for creating this model of SFSC in the regions mentioned above. As the aim is to discuss short food supply chains, only producers and IC have been selected. Intermediaries have been voluntary not included as the aim is to inquiry direct linkages between the two categories mentioned. Governmental bodies were also included as they represent a strong regulation and incentive force for both categories, as well as buyers in certain cases.

Basing this research on stakeholders' perspectives has been chosen mainly for two reasons. First, as a case study allows one to study a contemporary phenomenon I had to focus on the current situation although my aim was to identify barriers for future development. Hence as data I collected the *current*

perspectives on the creation of potential SFSCs (Yin 2014). From there on I could develop the themes to investigate the situation but collecting the data to analyze has been done within a strict methodology.

Second, as the implementation of innovations in agriculture is as much a technological process as a sociological one, capturing the perspectives of stakeholders playing a role in alternative food networks will illuminate their needs. Involving potential actors to create a feeling of ownership has been pointed as a major issue for successfully implementing new supply chains (Wubben et al., 2013). Indeed, if one wants to implement new SFSCs with an ownership from the stakeholders, a first step is to understand their conditions to become involved in the process. Although this type of SFSC seems to be working in various areas of the world, it has to be adapted to the local actors and understanding their needs is a first important step to take.

2.1.3. Criteria and methods for selecting stakeholders

The stakeholders and potential stakeholders of these processes have been chosen by their potential involvement in projects concerning the upscaling of SFSCs in Wallonia, by their practical knowledge on the topic or by their potential position within such supply chains. They have been chosen following my research advisor in Belgium, Jérôme Rassart. A set of ‘Snowball’ sampling was also used to complete the list of stakeholders and ensure the research to be as representative as possible (Kitchen and Tate, 2013). Each stakeholder was asked to list persons he/she thinks could contribute to the research by its own history related to the topic, its expertise on the subject or its potential interest in developing or contributing to SFSCs,

As the aim of the study was to analyze the perspectives of stakeholders of a non-existing group in order to promote future actions, the stakeholders have not been selected by their current *actions* but rather by their *intentions*. Therefore and to serve the purpose of this research, I delimited the borders in terms of the *roles* the stakeholders are playing in potential scaled up SFSCs. Although this approach can seem to be blurred, restricting the stakeholders to their role either as actors or supporters of SFSCs has drawn the limit between the stakeholders involved in the phenomenon and the ones playing a role in its context. This approach has been advocated by Bland and Bell (2007) by supporting a *holon* approach to agroecology and system thinking. By doing this, it enables researchers to look at a constantly changing system that is defined and created by the *intentions of its stakeholders* rather than fixed spatial boundaries. This was also supported by the methodology of a *relativist* case study that is “*capturing the perspectives of different participants*” (Yin, 2014).

2.1.4. Description of selected stakeholders

In the end, 9 in-depth semi-structured interviews have been conducted. The following stakeholders have been interviewed:

- For the production and transformation of oilseed rape, a relatively new-born company extracting rapeseed oil and developing new local supply chains in Belgium and in neighboring countries. This is a farmer-initiative and they have been trying to introduce their products in institutional catering for the past years. They are known to be the only non-industrial rapeseed oil producers in Belgium.

- For the production and transformation of potatoes, an ancient family company producing potatoes and other classical field crops on a total of 1500 hectares. They have been flexible to the markets needs and have evolved continuously. Nowadays their potatoes are sold to the industry yet they have large storage and cleaning facilities to allow them waiting for better market prices and calibrate their potatoes to certain market categories.

- A regional agency promoting the Walloon agriculture and its development since 2003. Their missions are to develop the image of agriculture in general, to develop more specifically the visibility of the Walloon producers and products, to commercially and technically assist producers and to create local labeling. Their missions have been introduced in the Walloon Code of Agriculture (ART. D225 and D 226 of the *Code Wallon de l'Agriculture*) first voted in 2014 by the Walloon Parliament. Among their missions, they have developed a tool to link institutional catering with local producers.

- A provincial agency for sustainable economic development. Among numerous goals, they serve as facilitators and coordinator between stakeholders to create initiatives and they offer expertise on business planning for local companies. In this perspective, they have been involved in various studies and projects with local producers for finding new markets and ways to promote their products. Their role of coordinators offers them a broad perspective of both private and public actors in alternative food supply chains. Even if historically they have been more focused on the industry, they now work with small producers and local initiatives.

- A communal educational department in charge of providing food to schools within the commune or willing to benefit from this system. They serve on average 650 meals per day in cold lead (see Appendix 2 for details about cold lead and warm lead). They have been pioneer in providing healthy food for institutional catering as they have developed a very strict scope statement for their call for tenders. Sustainable development has been in the agenda for long and their experience has inspired other communes to implement such practices. The Wallonia-Brussels Federation has modified this scope statement slightly to propose it to the entire French-speaking schools of the country to contribute to the promotion of local food.

- The kitchen and supply manager of a private clinic located on the commune interviewed. Their running is totally independent of the commune and, in consideration of the new federal law on public tender; they are free to decide themselves their food programs. They serve on average 1500 meals per day in cold lead.
- The restaurant manager of a university located on the same commune. They serve on average 2000 meals per day in cold lead. In the last years they had a strong will to improve the quality of the food served and to purchase local food as much as possible. They have a strong focus on increasing the efficiency of the system as a whole and decrease their impact on the environment.
- The supply manager as well as the head chef of an elementary and high school that has putted the focus on healthy and sustainable food in the past few years. They have gone through big changes with a transition from a very basic cuisine to a fresh and mostly organic menu. They serve an approximate 180 meals per day in warm lead and they also propose lunches (sandwiches, pastas and salads).

2.2. Interviews

2.2.1. Process and protocol

We created a semi-structured in-depth interview protocol based on our knowledge on the topic and the literature review (Weiss, 1995). We started the interviews by presenting the global context and the potential creation of SFSCs linking mid- and large-scale farming holdings to IC. We then asked open questions about their current involvement in SFSC, their ideas for the future and a set of questions related to the barriers they perceive for their involvement in future SFSCs. The interview questions were all based on the same timeline with three categories of questions: *What is currently being done?* *What could be done?* and *What are the key issues to develop these supply chains ?*(see Appendix 3 for an example of interview protocol).

The questions were adapted depending on the group they belong to (producers, consumers, governmental bodies). We also adapted the questions to the specific activity of the stakeholder interviewed. All kind of specific questions were determined to understand the barriers and opportunities they saw in order to develop these SFSCs.

Each interview has been conducted by the same interviewer, ensuring the protocols to be the most alike. The interviews lasted for an approximate 1.5-2 hours each and were recorded. They were later listened to carefully extract the information.

2.3. Data analysis

Out of each interview were extracted the main barriers and opportunities approached by stakeholders. To simplify their lectures they were divided in the three main categories suggested by Mount (2012); logistical – structural – and regulatory issues.

We then regrouped these in *themes* to which these issues were related. They were determined in accordance with the literature reviewed. These themes were used to regroup the barriers into larger issues to simplify the analysis of the interviews. To do so, the analytical method *open coding* (Berg and Lune, 2004) has been used. A *code* is “typically a word or summarizing short phrase attributed to the data, by recognizing common properties, that captures the essence of an identified message.” (Bryman 2004 cited in Wubben et al., 2013). After having determined these themes – or *codes* as named after Berg and Lune – we isolated them in the discourses of stakeholders and counted the number of times they were referring to these issues either directly or indirectly. To simplify the lecture again we divided the groups of stakeholders in three categories, namely producers, governmental bodies and consumers. This would help seeing similarities and differences between stakeholders on the basis of their role in food supply chains.

Even though the literature review has been done to be as comprehensive as possible, most codes were not pre-determined while they are of major importance for this topic. Such issues have been found to be very context-dependent. Furthermore the aim of this research was also to let stakeholders express their perspectives by pointing new themes and issues related to their activities and worldview. To integrate these remarks, recurring themes pointed by stakeholders were also integrated and deepen in the discussion.

We then discussed these findings in the Discussion section by completing these themes with other sources of information to better explore the Belgian context and tackle the topic one step further. The predominantly themes cited have been deepened to offer a better understanding of most important issues raised by stakeholders. As interviews offer both personal experience and facts, the facts have been crossed with other sources of evidence (mainly documentation and archival records) and confronted with other stakeholders’ perspectives. This has been done according to Yin’s recommendation to use Patton’s *data triangulation* (2002) of data sources.

3. Results

In the end, 8 themes have been perceived as barriers and opportunities by the stakeholders interviewed. Some of the themes have been perceived both as opportunities and barriers. All themes, except *Market issues*, are specific to one of the three categories of mediation issues. This section is thus divided into three parts (3.1. Logistic, 3.2. Structural and 3.3.Regulatory) and presents the main findings. We present the themes in tables to show an overview on the groups having cited them and their occurrence. We then briefly detail what stakeholders meant with these themes.

In appendix 4 we give the raw results for each stakeholder interviewed.

3.1. Logistic

Concerning logistic issues, we can see that stakeholders have considered it mostly as barriers. This highlights some core knots that is mainly related to the transformation of the product necessary to meet the IC's expectations.

Table 1. Logistic issues according to each group of stakeholder in the pre-determined themes.

| Barriers | Producers | Governmental bodies | Institutional catering | Total |
|----------------------------|-----------|---------------------|------------------------|-------|
| 1. IC demand constraints | 1 | 1 | 5 | 7 |
| 2. Decreasing workforce | 3 | 2 | 2 | 7 |
| 3. Transforming foodstuffs | 1 | 2 | 4 | 7 |
| 4. Market issues | 1 | 1 | - | 2 |
| Total | 6 | 6 | 11 | 23 |
| Opportunities | Producers | Governmental bodies | Institutional catering | Total |
| 1. IC demand constraints | - | 1 | 1 | 2 |
| 2. Decreasing workforce | - | - | 1 | 1 |
| 3. Transforming foodstuffs | - | 1 | 2 | 3 |
| 4. Market issues | - | - | - | - |
| Total | 0 | 2 | 4 | 5 |

3.1.1. IC demand constraints

Barriers

The main issue cited is referring to the inherent difference between producers and IC. The first ones offering high variability due to the essence of their activity depending on weather and events occurring during the growing season. These irregularities have mostly been pointed as problems related to the guarantees of delivering specific quantities of a determined lot at a specific timing.

For the IC, the barriers identified referred to their little flexibility and reactivity if any unexpected event were to occur. The first barrier is their responsibility of delivering meals to their consumers and the fear of having shortages in foodstuffs that would prevent them from achieving their meal preparation. Most kitchens had little margins in terms of timing for preparing and serving meals. The second issue pointed was related to the reactivity their retailers were able to give them to a new ordering. This requires having a reactive interlocutor able to provide them exact quantities in short period of time.

Opportunities

In terms of opportunities, stakeholders have seen two opportunities. The first one is their ability to create new menus adapted to local products that could be achieved if IC receive help. The second is that they can plan meals long time in advance, facilitating the preparation for the growing season of farmers.

3.1.2. Decreasing workforce

Barriers

On farm, the decrease of workforce availability reduces the ability of farmers to diversify their activity by integrating new steps of the food supply chain. The transformation, transport and commercialization would both require a substantial amount of work off-farm and the need to learn a whole new set of jobs. Producing an interesting products does not imply being able to sell it as we tend to forget as pointed by producers.

From consumers' standpoints two barriers related to workforces have been pointed. The 1st concerns the necessity of increasing the number of employees to be able to process raw products in particular and deal with a higher heterogeneity within the foodstuffs lots in general. The second concerns the competencies of these employees. Employees will have to be trained if they change from 4th and 5th range foodstuffs to raw products.

Finally, both groups of stakeholders want to simplify delivering as well as billing to reduce working hours. As a consequence they usually prefer to deal with only one interlocutor that centralizes the products and dispatches them. All the IC interviewed expressed this as a requirement for any involvement in new SFSCs.

Opportunities

The only opportunity identified concerns the new possibilities emerging of larger groups of buyers due to the creation of groups of clinics creating scope statements together. They were force to do so to simplify the work as each clinic does not dispose of competent staff to write the document.

3.1.3. Transforming foodstuffs

In relation with the two first issues, the transforming of the foodstuffs is seen as an important step to overcome.

Barriers

IC have been used to work with conventional retailers for years and their organizations have been shaped by these long-term relations. The staff is often not used to process the foodstuffs anymore and kitchens are mostly not equipped in processing facilities. Stakeholders have expressed their preoccupations on the amount of changes it would take to train employees and adapt their equipment.

IC are mostly not equipped to raw products anymore and require often clean and homogeneous lots. IC have pointed the fact that strong communication issues are taking place as they can adapt to a certain extend but only for certain products. As IC all have different facilities and equipments they all require different foodstuffs lots qualities.

Concerns have also been raised about the need to train employees to new practices.

The last barrier identified connects most of the barriers mentioned above; the need of creating transformation facilities. Although producers or IC could potentially assume a part of the transformation, this would require investments on the one side or the other. Indeed, the targeted productions require heavy transformations and are often produced under large quantities. A producer willing to invest in transformation facilities will need market guarantees that will allow him/her to sell large quantities. Whereas IC investing in small units of transformation for some products would need either to increase their budget for food production or increase efficiency to save money in other parts of the kitchens. Whatever the supply chain looks like, new transformation facilities will need to be constructed as they are currently very few that can transform these three crops in Wallonia.

Opportunities

Although also perceived as a barrier, stakeholders have said that increasing communication means between stakeholders could facilitate the understanding of each others' needs to know in which form foodstuffs have to be transformed.

Some also saw trainings on working with raw products as opportunities to promote the emergence of such supply chains.

3.1.4. Market issues

The next barriers deal with constraints due to market rules and habits. No opportunities have been raised by interviewees.

Barriers

Stakeholders perceive little guarantees offered to both sides of the supply chain. On the one hand IC feel they have no guaranties that their orderings will be fulfilled in time and quantity. On the other producers have the same feeling of insecurity regarding the guaranty for their products to be sold. The last ones are then more likely to sell their products to the first buyers even if later prices can be higher.

Another issue related to markets is the fact that even if IC are serving large number of meals per day, they represent small amount for farmers of the area. Logistical costs can then be too high. This issue is particularly true for rapeseed oil production where IC have little needs per year and for which the transformation facilities require heavy investments.

3.2. Structural

Regarding structural issues, stakeholders have identified many barriers they see being transformed in opportunities if dealt with carefully.

Table 2. Structural issues according to each group of stakeholder in the pre-determined subcategories.

| Barriers | Producers | Governmental bodies | Institutional catering | Total |
|---------------------------|-----------|---------------------|------------------------|-------|
| 1. Cooperation | 4 | 5 | - | 9 |
| 2. Adaptability to change | - | 2 | 5 | 7 |
| 3. Market issues | 2 | 3 | 1 | 6 |
| Total | 6 | 10 | 6 | 24 |

| Opportunities | Producers | Governmental bodies | Institutional catering | Total |
|---------------------------|-----------|---------------------|------------------------|-------|
| 1. Cooperation | 3 | 4 | - | 7 |
| 2. Adaptability to change | - | - | 2 | 2 |
| 3. Market issues | 2 | 1 | 1 | 6 |
| Total | 5 | 5 | 3 | 15 |

3.2.1. Cooperation

This issue is strongly linked to the Belgian culture and represents a barrier not to underestimate. Indeed, most stakeholders interviewed have spoken about cooperation issues both among stakeholders' groups and between these groups, emphasizing the inability of cooperating between stakeholders in Wallonia.

Barriers

Concerning producers, there are strong brakes on the way of creating cooperatives. Most of them are aware of the many advantages of investing together in transformation facilities.

On the other end of the supply chain IC have expressed their preference of working with farmers' cooperatives rather than with conventional retailers. They have also expressed their need of knowing that growers will make a step into their direction and propose them foodstuffs matching to some extent their needs.

Notwithstanding all these advantages, interviews have revealed that producers do not believe such mechanisms can be implemented among producers in Belgium. They have referred to cultural issues specific to Wallonia and to the independent nature of farmers to justify the very poor landscape of farmers' cooperatives. There is a strong need for reinforcing the following of collective projects for federating farmers groups. This question has been presented as a major issue by producers and governmental bodies in order to reach IC markets with local products.

Communication has been raised as a major issue to enable stakeholders of different groups to cooperate. Producers and governmental agencies have spoken about the need to bring actors around the table to discuss possibilities of creating these SFSCs. Most actors have highlighted the little knowledge they have on the constraints of other stakeholders and the projects ongoing. These lacks of information are seen as barriers to potential development of local food supply chains in IC.

Actors have also expressed their surprise of knowing that other actors were working on very similar issues and that cooperating could have helped them improving their work quality, speedup their actions and increase their impact.

Finally, other particularities of Belgium hindering cooperation are the partitioning of ministerial competencies between the different governmental bodies as well as the fact that education is, to a certain degree, competitive. Actors thus do not tend to cooperate as they often stick to their position and personal competencies.

Opportunities

Although very detrimental to the creation of new SFSCs, most of these barriers can be transformed as opportunities according to stakeholders. Especially if people were to bring actors around the table to federate their interests, share their advancements, understand their concerns and create collective projects benefiting for all.

3.2.2. Adaptability to change

The second barrier perceived by governmental bodies and IC deals with the ability of systems to change and the importance of the processes they would have to undergo.

Barriers

All stakeholders having spoken about this issue have shared the importance of considering transitioning as a long term movement and as a progressive path. Their arguments can both be found in the inherent nature of organizations and in the particularities of the Belgian context. In the first case, long term relations with conventional retailers will take time to turn the other way round. Both for employees to get used to and trained for investments in new facilities to be made. In the second case, they pointed the inertia of the Belgian system and to a broader extent the Belgian culture.

The other aspect of transitioning progressively for IC is linked to the facilities currently used and the potential new ones needed to participate to new SFSCs involving different range of foodstuffs. If they were to invest in new equipments this would have to be done progressively to amortize costs on the long run. Indeed, they highlighted the need of re-allocating resources during these processes. By allocating more money on foodstuffs or by investing in new equipments they will often need to change other parts of the kitchens for raising the funds needed. These kitchens having undergone changes had to deal with situations where they needed to increase the amount of work to process foodstuffs without increasing their budget. They pointed the need of strongly improve the efficiency of their system to put money aside for these new needs.

Two other aspects related to the particular context of Wallonia have been raised. The first one concerns the availability of certain products on local markets or rather the unavailability. As some products cannot be found, IC have to let the time to farmers to adapt to new markets and cooperation have to be progressive.

The second aspect is dealing with the culture in Wallonia and is rather hard to define precisely. Some actors found Belgium a difficult country to change as they perceived heavy inertia in the administrations and institutions. Although difficult to isolate accurately, the Belgian governmental structure has been cited as a part of the problem in combination with some intrinsic cultural issues.

Opportunities

These barriers have been turned into opportunities by stakeholders by highlighting the fact that if one takes the time to implement gradually changes it will allow employees to integrate on the long run these new ways of functioning. Stakeholders have also shown that investments can be amortized on the long term if these are well prepared and shared among actors.

3.2.3. Market issues

The main issues raised here concern the saturation of the market and its heterogeneity.

Barriers

In terms of market saturation, stakeholders interviewed were concerned about the implementation of new products on the market. As justly expressed by producers, producing anything new does not go without finding potential markets before; it is a prerequisite they need before investing into new infrastructures. As explained by the rapeseed oil producer, they have developed a unique product, the quality has now reached high standards and they built the entire infrastructure needed to ensure the production to be constant the whole year round. Nevertheless, they have difficulties to integrate their products on markets already saturated.

A first reason was already explained earlier in regard with the competencies needed to commercialize new products. A second can be found, they say, in the contracts already running between retailers and IC. Since the new regulations of 2013 where IC receiving subsidies have had to enter the rule of call for bids, many new contracts have been signed and will be running for 3 to 5 years. Potential new SFSCs thus have to be aware of the right timing as the markets might not be available before some time.

Three concerns have been identified by stakeholders regarding market heterogeneity.

From a producer's standpoint, they pointed the problem of heterogeneity between all IC they have to deal with. They see heterogeneity between IC depending of different governmental bodies and thus subject to different regulations. Indeed, these different regulations have an influence on the kitchens themselves and the logistic farmers have to implement to fulfill these needs. Even more, heterogeneity can also be found among IC of the same municipality due to their intrinsic constraints. The final picture offers a very diverse range of IC and combines thus very different needs at the end that are hard to capture precisely for producers. This fuzziness is seen as a barrier to invest in transformation means for producers.

For consumers there are some issues regarding the availability of the local offer. The first one touches the diversity of products offered in some regions that does not fulfill IC' needs. The high farms specialization of some regions combined with fewer transformed products has reduced the offer over the years. IC willing to buy local products are thus not always able to find their needs on the local market and can have to look for other markets. The second one is that when the diversity is there, quantities are not always present. If an IC wants to deal with local products they may face a problem if they approach one farmer as this one might not have enough quantities for them.

3.3. Regulatory

Governmental bodies and institutional catering have identified the most barriers related to regulation. Although this type of barrier has been cited fewer times than the two other categories, an important issue has been raised and could be an important step to bring local food into IC. Indeed, as most IC receive subsidies for each consumer they serve, the legislative and executive possess important levers as they can legislate and offer subsidies.

Table 3. Regulatory issues according to each group of stakeholder in the pre-determined subcategories.

| Barriers | Producers | Governmental bodies | Institutional catering | Total |
|------------------|-----------|---------------------|------------------------|-------|
| 1. Call for bids | 1 | 3 | 4 | 8 |
| 2. Subsidies | - | 2 | - | 2 |
| Total | 1 | 5 | 4 | 10 |
| Opportunities | Producers | Governmental bodies | Institutional catering | Total |
| 1. Call for bids | 1 | 3 | 4 | 8 |
| 2. Subsidies | - | 2 | - | 2 |
| Total | 1 | 5 | 4 | 10 |

3.3.1. Call for bids

Since July 2013 all IC receiving governmental subsidies have to make call for bids for their provisioning³. The scope statement is then used to detail precisely the requirements of the contract and wholesalers are then contacted.

Although offering many advantages, this change has also brought some constraints for the development of SFSCs.

Before this regulation they could sign contracts for specific products at specific moments with specific actors. They could, for example buy a lot of fruits of the nearby farm for a one time action. Which has now been made difficult as they have to allow a fair competition by making public call for fulfilling the market offered. Writing specific scope statement for each food purchase is logistically not foreseeable and would require substantial amount of energy.

The other constraint is that stakeholders perceive this rule as promoting wholesalers who are offering lower prices. If IC have full authority to define precisely the scope statement, if a wholesaler offers

³ This federal governmental decree is valid for all type of organizations depending of more than 50% of subsidies for their global budget. Its implementation follows a Directive from the EU of the same year aiming at facilitating competition and free trade. The Directive specifies that above certain amount, subsidized organization procurements have to be made on the European market. Under these thresholds, call for bids are only intended to the national market. Nevertheless, no geographical mentioning is allowed.

them the lower price they have to sign the contract with him. Stakeholders have seen the number of wholesaler decreasing constantly and are expecting these regulations to confirm the trend. This will be discussed in the next section as we will see that it can be prevented by ingenious means.

The principal barrier identified concerns the scope statement of IC. It is notable that most barriers have been identified as opportunities as well by stakeholders. This will extensively discuss in the next section.

The first barrier pointed says that most scope statements of municipalities are currently preventing the provisioning of IC by local markets and local producers. Indeed, some scope statements have logistical requirement preventing the access of local producers to the markets.

The second issue is related to the actions implemented by the government and currently ongoing. Indeed, if the government is making important steps by promoting local farming, they have only defined objectives for producers and none for consumers. The implication of IC is thus left to their goodwill and no constraints are applied on the scope statements except if the municipality decides so.

A strong demand exists from stakeholders interviewed to impose scope statements supporting local products.

3.3.2. Subsidies

The first issue has been identified as a barrier but also as an opportunity. In the question of developing SFSCs a key point is the transformation of the raw foodstuffs and the question of who is going to do it. Several structures of supply chains could be envisaged from the farmers' cooperatives having transformation facilities to the equipped IC provided in raw products stopping by every intermediary. A central issue for the proper supply chains to implement is the question of *who is going to invest in the creation of facilities?* The importance of the investments has been seen as a barrier. Nevertheless, as suggested in the interviews, federating farmers among a common investment might require patience and is not guaranteed to be a success. In this perspective, it has been suggested that the movement could be enhanced by the government with financing the beginning of projects that could later become financially viable. A study has been done on the topic and shows that financing transformation facilities for 2-3 years could be enough to make the project financially viable on the long run (Ecores, 2007).

In a broader perspective, the second barrier pointed is about the prioritizing of export toward local food supply chains. Stakeholders have said that it was easier to get subsidies for exporting products than for developing local markets. Pointing that if the government really means to develop these supply chains they should allocate the right means for it and devote more money to it.

4. Discussion

These results offer us an interesting picture of the current issues related to the development of SFSCs with IC in Wallonia. Stakeholders have pointed crucial barriers as well as great opportunities. Although the number of barriers identified is usually higher than the number of opportunities, we have perceived a strong will of these actors to implement new supply chains promoting the consumption of local food in IC. Nevertheless, they have also pointed important knots to undo in order to achieve these objectives.

On the one hand results confirm the *mediation* concept explained by Le Velly and Bréchet (2011) as most of the challenges highlighted were concerning the differences between the offer and the demand. Indeed, many logistical issues about transformation and distribution have been raised, mostly by IC due to their high structural constraints (4.1. and 4.3.).

On the other hand, our results show that mediation issues alone would not be sufficient to create such supply chains. Indeed, stakeholders have expressed the need of involving external facilitators to invest in common transformation facilities (4.2.) as well as the government to create new markets by implementing special scope statements (4.4.).

At the end of this section, we also discuss the limitations of our findings and possibilities to tackle the subject one step further (4.5.).

4.1. The Farmers' share

Cooperatives – Common investments in transformation facilities

As explained earlier, a weakness of the agricultural world in Wallonia is its inability to federate around common projects. Although farmers are mostly aware of the advantages of investing in common facilities, very few examples of farmers' cooperatives can be found. Indeed, even if some farmers have invested together in the past in production material thanks to subsidies, almost no farmers are transforming, transporting and commercializing their products together in Wallonia.

However, the concerns expressed by the IC on logistical issues would almost always require to deal with a central interlocutor. If farmers wanted to recapture the added value of their production they would then have to cooperate among themselves to federate the offer and transform it in forms that fits with IC constraints. IC have expressed their will of working with farmers rather than with intermediaries.

Among other, stakeholders have expressed that creating farmers' cooperatives would allow to:

- Transform the foodstuffs in the right form for IC by investing in common transformation facilities,
- Recover the margins currently captured by intermediaries,
- Increase their negotiation power,
- Guaranty an offer wide enough for IC to be willing to deal with them,
- Be a structure big enough to buffer seasonal irregularities and have a constant offer,
- Reduce the number of interlocutor for IC,
- And be able to respond to open call for bids by federating a common response to it.

Results have shown that IC fear logistical issues. In order to work with other type of stakeholders they will require strong guarantees ensuring them to continue their activities in a proper way. Creating cooperatives could be perceived as a strong message of organization and regularity, showing the will of farmers to work with IC.

Growers have expressed their will of creating cooperatives in a business form to approach new market. They have shown interest in taking part of an organization managed by professionals where farmers would be shareholders. Such models exist in Wallonia but some growers have expressed their feeling of distance with such structures as well.

Nevertheless, many actors are aware of the problems linked with this particular issue and are trying to improve the situation. These actors support a long term approach; they are currently trying to bring farmers closer and show them successful experiences such as the cooperative model in France.

The process is on its way and might take some time, but if growers want to access IC markets they might have to tackle this issue in a near future.

4.2. Kitchen in the middle

Creating common facilities

Confirming the assumptions made in the introduction concerning the difficulties of transforming cereals, colza and potatoes to some extent, the transformation process has been pointed out as a main concern. If one solution for farmers is to cooperate, another is the creation of common facilities by different actors. Transformation could be undertaken by external actors and could have different forms.

One possibility that has been suggested by the municipality having implemented the special scope statement and confirmed by the case of Charlevilles-Mézières is the creation of central kitchens. Centralizing the cooking of meals that are then dispatched in smaller kitchens can help dealing with raw products requiring more transformation.

In Charlevilles-Mézières, the central kitchen has permitted to buffer the differences between growers and IC. If growers have made their share by offering wider range of products, the central kitchen has invested in transformation facilities simplifying the demand as well. They have progressively increased the share of local and organic products while continuing to work with conventional retailers to soften the local fluctuations of the offer. This progressive path has also been advocated by many stakeholders interviewed.

Even more, the municipality has suggested an interesting option for the creation of this kitchen. They have argued that a well-made scope statement could spare them making the heavy investment. This scope statement would state that the organizations would have to invest in new buildings themselves. They argue it would be possible thanks to a long-term deal allowing the organizations to amortize their costs on the long run. Stability would then be offered to producers, IC as well as to the intermediary. By doing so they would have an impact on the landscape by offering new markets to local producers that would then have the time to adapt their productions gradually.

This initiative may emerge in a near future, but as the municipality has risen, it would require actors to cooperate and communicate much more than it is currently done. They have also pointed the need of having high governmental levels involved as it is beyond their competencies to achieve such a project.

4.3. Transforming kitchens

Increase Flexibility – Efficiency

A first remark can be pointed with the little flexibility they currently propose. If some constraints cannot be changed due to their inherent structures, other can totally be changed if well managed. An interesting option chosen by the university interviewed was to propose a much larger set of recipes. This is allowing kitchens to adapt both to seasonal variation as well as punctual irregularities in the offer. By doing this they would considerably reduce the pressure on growers and offer them more flexibility to evolve gradually.

Some IC interviewed have undergone massive changes concerning the spectrum of menus proposed to their consumers and have highlighted the importance of training the staff. Indeed, if infrastructures can be reasonably quickly changed, human management requires more patience and care. Even if some training courses are offered to IC, governmental bodies could definitely increase their support of such intrinsic changes by favoring these practices and offering trainings.

The second remark deals with the usually higher costs implied by working with SFSC. Even though they reduce the number of intermediaries, these supply chains often propose higher prices due to their higher logistical costs. In this regard, IC might have to rethink their budget to enter SFSCs. If IC wants

to integrate local products and devote a bigger share of their budget to foodstuffs, they might have to release significant financial means.

If IC do not dispose of higher budget, an interesting option has been suggested by stakeholders with increasing the efficiency of the system to considerably reduce their running costs. Indeed, IC having tried this approach have been able to:

- reduce their foodstuffs purchase by lowering wastes in improving their menus and allocating precise quantities to every plate,
- improve the staffs' efficacy on tasks,
- and decrease energy expenditures.

However, increasing efficiency within IC would imply more constraints and less flexibility for the offer. A collaborative effort would thus have to be made with different stakeholders to ensure this path not to imply fewer opportunities for local markets.

4.4. Policy implications

Scope statement – Cooperating between competencies

A major input of this research is the common call made to the government to impose scope statement to IC depending on their subsidies. Most actors have highlighted this issue as being primordial to the future access of local food in IC.

It has been pointed as a major leverage mean to create new markets and even sometime as a necessary step.

Even if these are under EU regulations and WTO directives, the freedom currently in place permits the promoting of local food through indirect means. Notwithstanding the fact that EU rules forbid to refer directly to the origins of food in the scope statement in order to promote free trade within the European borders. This issue can be overcome with some imagination and commitment as it has been done by the municipality interviewed.

Indeed, they have succeeded in creating a very precise scope statement including some features favoring the purchase of local products, for instance by citing environmental issues referring to the food miles or by using precise terms that are allowed by the law but somewhat borderline. Stakeholders can define themselves how they make their choice for the call for bids as long as it respects the laws and is clearly stated in the document. They thus have a very strong power by being precise. On the other hand, other stakeholders have expressed the difficulty they had to create their own specific scope statement (which is obligatory since July 2013).

In this perspective, the government should serve as a driver toward change. In 2012 they have proposed a scope statement promoting the use of local food in IC, strongly inspired by the one of the municipality interviewed. But this is a shy step; firstly because this is optional and left to the goodwill of the local authorities. Secondly because this document is not adapted to IC having specific constraints, such as clinic for instance. Thirdly because it has been published by the *Fédération Wallonie-Bruxelles* which is in charge of the education but not of the health system, illustrating again the problem of competencies' partitioning in Belgium.

The second call to the government asked from stakeholders is to devote more financial means to SFSCs. Indeed, as said in the results by stakeholders, it is currently easier to find markets on the export than local ones. Stakeholders said that there are currently no more common transformation facilities in Wallonia. A study has been done on the topic and shows that financing transformation facilities for 2-3 years could be enough to make the project financially viable on the long run. Subsidies could thus be used as a launching pad to favor the emergence of new markets for producers. For the moment, these projects have to apply for financing means through the LEADER program of the CAP.

4.5. Limitations and further research

In our research we have chosen two levels of production specificities for illustrating the issues related to the scaling up of SFSCs; the agriculture in the middle – dealing with high volumes and large areas preventing them to sale directly or to conventional markets – and within this group the farming holdings devoted to field crops – inducing high level of transformation before reaching consumers, except for potatoes.

While being crucial for succeeding in the implementation of local food in IC, some findings are not only specific to the agriculture in the middle as smaller holdings or cattle husbandry and milk production would face similar issues. Indeed, the logistical and structural constraints that are not directly linked to the nature of the foodstuff we selected can also apply to other type of holdings willing to integrate IC's markets. It goes without saying that a favorable legislative context as suggested earlier would also benefit to other type of farming holdings.

In terms of limitations for the scope of interpretation, our study is limited in determining the scale of importance of the issues raised by stakeholders. Indeed, the methodology allowed us to extract important issues and discuss them within the context but it did not permitted us to analyze which issue is of more importance than the other. We have used no such tools and the use of statistics to enable us to do so would have required us to collect larger sample of interviewees.

For further research, another interesting input would be to approach the situation through the eyes of the demand in general and public procurement in particular. Indeed, a large amount of literature on the

subject is available that could help targeting important features of the demand. If in our research we investigated the link between producers and consumers, focusing on the consumers and public procurements would be an interesting approach to dynamize the sector. Acting on the demand is a strong lever in the current context and consumers as well as consumers' organizations could be involved in the research process.

In the broader context of contributing to the debate on the sustainability of food systems, we suggest further research to be conducted on the sustainability of similar SFSCs already implemented. Indeed, some actors have raised concerns about the question whether including conventional agriculture in SFSCs would not prevent reducing pollution by continuing applying pesticides and chemical fertilizers. Literature on different type SFSC has shown that alternatives can also pollute more than conventional systems (Coley 2009) and do not always imply sustainability (Born and Purcell 2006). A complete and precise analysis of such supply chains would be necessary to ensure its impact on the environment to be lower than conventional supply chains.

5. Conclusion

By interviewing representative stakeholders, our results point precisely the barriers to overcome for the scaling up of SFSCs to mid- and large-scale farming holdings and IC, suggesting that SFSCs could indeed reach larger groups of consumers and producers and thus extend its benefit to these groups. Although our results are strongly linked with the potential supply chain we analyzed, our selection of large producers and groups of consumers permit us to better understanding the issues related to the scaling up of SFSCs in general.

On the one hand our results have permitted us to highlight the main mediation issues perceived by stakeholders. In a nutshell the major issues pointed to overcome are the following: stakeholders have to increase their understanding and communication of each other to federate around common projects, farmers would have to cooperate among them to offer a more stable and diverse range of products and institutional catering would have to become more flexible by training their staffs to new practices and invest in transformation material.

On the other hand, this study also shows that mediation issues are not the only issues perceived by stakeholders. Indeed, they also suggest that other actors should be implied in the process and that a certain context is needed to encourage and enable the upscaling of SFSCs in the model we presented. The role of external facilitators for facilitating the creation of farmers' cooperative, to create common transformation facilities or to increase stakeholders' communication has been advocated. The role of the government who could impose scope statement to create new stable markets would have a strong impact both on the farming community and the daily consumption of many citizens.

We thus conclude that if the mediation issues identified are mandatory to overcome, they need to be supported by a certain context favoring and facilitating their implementation.

All stakeholders interviewed were supporting the upscaling of SFSCs but, as we have shown here, they have pointed major steps to take suggesting that the actors concerned should start acting toward these goals.

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Appendixes

Appendix 1. State of art of the Belgian and Walloon agriculture.

1. Main productions

Belgium has a developed industrial agriculture highly specialized. This specialization can be seen both between the different regions depending on their production capacities and among farming holdings within these regions. If the northern regions (Flanders) are more directed toward off-ground meat production with intensive hog and poultry industries, the southern part (Wallonia) has both field crops in the plains and extensive grazing systems for milk and meat production in the sloppier area. Crops count for 43,0% of the total agricultural output of 8 510,0€ million when the animal output counts for the other 57,0% (EUROSTAT, 2013). Although being a minor share of the gross domestic product (0.58% in 2011, DGSIE), agriculture plays major environmental and cultural roles as it uses 43,8% of the land (DGSIE, 2013).

In terms of crop surface, if permanent pasture use most of the land (36,6%), cereals are the main crops grow. Wheat (14,0%), maize (5,3%) and barley (3,3%) being the main ones. Then follows fodder maize (13,0%), potatoes (5,0%) and sugar beet (4,6%) as the first industrial crop (DGSIE 2013).

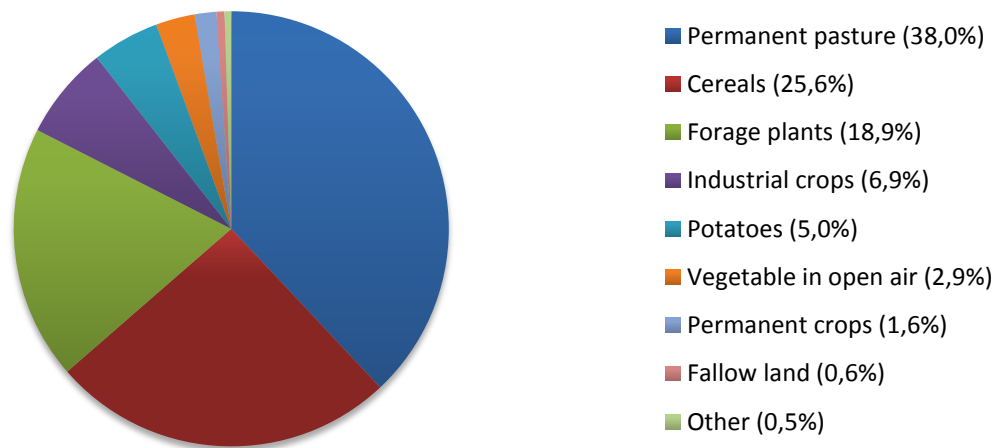


Figure 3. Crop surface repartition in Wallonia (adapted from DGSIE)

When it comes to animal production, hog production is highly dominant in terms of land use. The repartition pattern has been relatively stable in the last years. Considering the tradition of beef and milk production in some area, especially in Wallonia, this stability is encouraging. Also, we can see an increase in terms of middleweight per slaughtered cattle (DGSIE 2013).

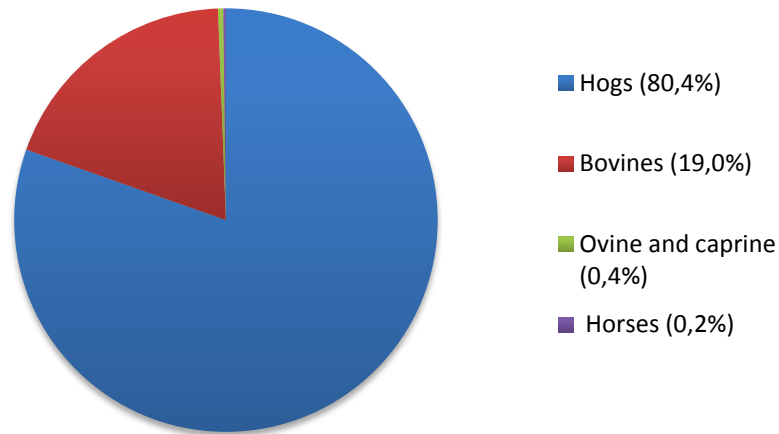


Figure 4. Meat production in Belgium (adapted from DGSIE)

Nevertheless, hog production is a major characteristic of Flanders and giving a closer look to farming holdings in Wallonia offers a different picture and shows how food production is highly specialized between regions (Figure 2 a, b and c in the core article). To better understand the distribution of these farming systems, one has to know that 85,7% of farming holdings are specialized in one activity, meaning by that they earn 2/3 or more of their income with this activity.

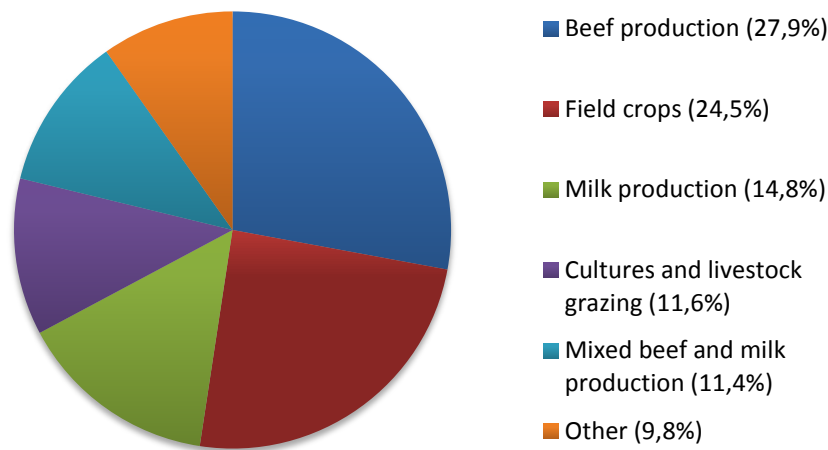


Figure 5. Distribution of farming holdings by their major economical orientation (adapted from DGSIE)

2. Organic sector

About 6.9% of the agricultural land is certified or on its way to be certify organic. The major part is in Wallonia (50 125ha out of 54 800ha in the whole kingdom). Most of the land certified organic is dedicated to fodder with 89% of the total land under organic certification (with grasslands covering

85.6% of it) as it is easier to switch from conventional agriculture to organic in these extensive systems compared to crop production for instance. This can be easily seen on the map where most of the organic land is in the south and south east.

Regarding the commercialization, middle- and large-size supermarkets are distributing 58.2% of the gross sales and specialized organic shops are following with 29.1% of the gross sales. The market is constantly increasing with 245 millions in 2006 to 435 millions in 2011 (78% increased in 6 years). Nevertheless, organic products are only 1.8% of the total foodstuffs sales in Belgium. It is to be known that the domestic production is not sufficient to answer the demand and that organic products have to be imported to full this gap.

3. Problems of price volatility

To highlight the problem of price volatility, we here present the evolution of the main field crops of Wallonia in the recent years. Knowingly cereals, potatoes and sugar beet.

Cereals:

Price volatility has been mostly influenced by the different politics implemented at the European level as Belgium is part of the Common Market. Here is a figure of the price evolution of the two most important cereals in terms of production in the whole kingdom.

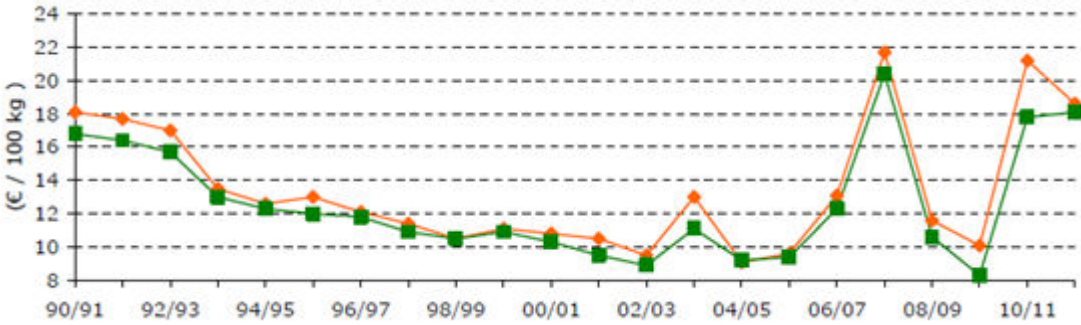


Figure 6. Price evolution of common wheat (orange) and barley (green) in Belgium from 1990 to 2011 (€/100kg) (source: DGSIE 2013)

Since the “Agenda 2000” and the liberalization of the sector caused by a will of the European Union to reduce its impact of foodstuffs prices, price volatility has been very high and is now matching the global food market prices. Climate conditions in important production zones in the world and speculation of food markets are now driving the economy of Belgian growers. This is causing damages to farmers’ income security and farm resiliency among cereal growers.

Potatoes:

Potatoes are not covered by the Single Common Market Organization but instead prices are defined by the international markets prices, inducing high volatility.

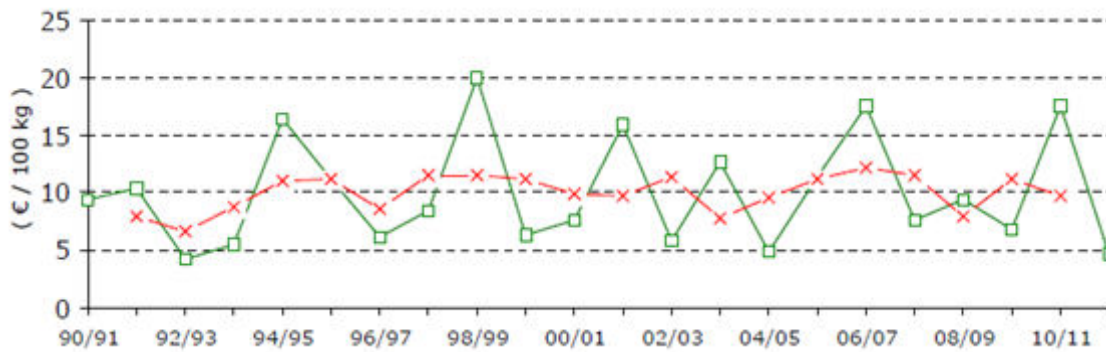


Figure 7. Price evolution of potatoes (green) and the average on 3 years (red) in Belgium from 1990 to 2011 (€/100kg) (source: DGSIE 2013)

For instance, prices have gone up 155% between the 2010/2011 growing season and the previous one with a drop of 73% the following season. Although this has a strong influence on farmers' incomes, it is to be known that a high share of potatoes growers are under contracts fixing the price the previous year. This does secure their production to be sold, as long as they fit into the lot requirements predefined with the buyers.

Sugar beets:

Prices are relatively stable because of the production quotas imposed by the European Union. Indeed, since 2006 there is a global quota for the entire continent that is divided among member states. Together with a fixed minimal price, these measures are aimed at stabilizing the production and reduce price volatility for growers.

Evolution of global food prices and costs of production:

Although not precise enough and depending strongly from the foodstuffs, comparing the global evolution of the costs of production with the prices received for that production allows one to an overview of the current evolution of the economic perspective of farmers.



Figure 8. Price index evolution of foodstuffs in Belgium from 1990 to 2011 (2005 = 100) (source: DGSIE 2013)

After having globally increased until 1990, prices have decreased, reaching their minimum during the dioxin crisis of 1999. After that, they have gone up with fluctuations from year to year. Since 2005, prices have been increasing except for the year 2009.

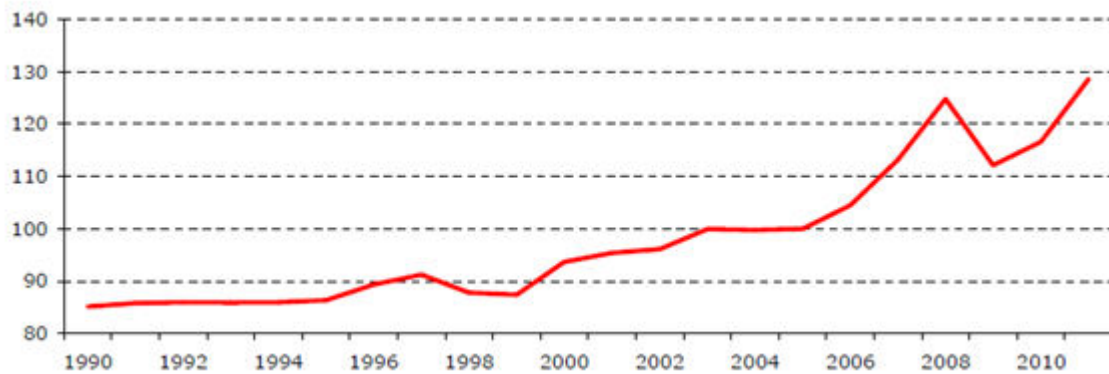


Figure 9. Price evolution of production means in Belgium from 1990 to 2011 (2005 = 100) (source: DGSIE 2013)

In comparison to the evolution of foodstuffs price that has been up and down, we can see that production costs have constantly risen in the last years except for the year 2009.

Appendix 2. Warm and Cold Lean.

In institutional catering, a main difference between kitchens lies in the temperature meals are kept between the cooking and the serving. This has consequences in terms of infrastructures as well as in logistical constraints for food delivering and purchasing. We hereby present the main leans that have been presented to us according to the explanations of the stakeholders interviewed.

1. Warm lean (WL)

1.1. Principle

From the cooking to the serving, only two hours can pass and meals are kept at 65°C. Germ proliferation is prevented by never going under this temperature.

Two different modes have been presented to us:

- The kitchen is adjacent to the dining hall. Meals are cooked and then directly served into plates or larger containers to be served to consumers. The food is easily kept warm until it reaches the plate which is mostly done in less than an hour.
- A central kitchen dispatches the meals to satellite kitchens. After being cooked, meals are kept in isotherm containers for staying higher than 65°C during the transport. Satellite kitchens might need extra material to keep the food at the right temperature after arrival.

1.2. Advantages

Few infrastructures are needed for implementing this technique, inducing little investments and little knowledge for the staff.

All food types of food can be prepared and food habits don't have to be changed in that regard.

1.3. Disadvantages

Keeping the temperature above 65°C might require substantial investments in infrastructure otherwise germ proliferation can quickly happen at lower temperatures.

Kitchens dispose of very little time to react to unexpected events. Indeed, their little margins on the timing offer them very little flexibility. This has consequences both in terms of infrastructures and with the food purchasing they need to be reactive and fast. Working with smaller retailers is often difficult for this type of organization as they are stressed by being able to provide food to their consumers in *just in time*. Workforces also have to be well organized and concentrated on the hours of cooking and serving.

Another disadvantage lies in the fact that food not consumed on the same day has to be thrown away; increasing food wastes if meal number is not well planned.

2. Cold lean

Two types of cold lean have been presented to us: the positive cold lean (PCL), keeping temperature between 0° and 3°C and the negative cold lean (NCL) lowering the food up to -18°C.

2.1. Principles

Positive Cold Lean

Meals are prepared in a central kitchen and can be later dispatched in satellite kitchens. After being cooked, they are cooled to +10°C in less than two hours. They are then placed in a cold room to reach their transport temperature of 0° to 3°C. Sealed in isotherm containers they can then be stored for a maximum of about 6 days.

If dispatched in satellite kitchens food has to be kept under 3°C and warmed in less than an hour before being served at 65°C.

Negative Cold Lean

Such as for PCL, meals are quickly cooled to +10°C in less than two hours. They are then frozen to -18°C within three hours. If kept at such temperatures they can be stored up to 6 months.

If dispatched in satellite kitchens food has to be kept under -18°C and warmed in less than an hour before being served at 65°C.

2.2. Advantages

Cooking and serving can be dissociated in time. This facilitates the logistic both in terms of food purchasing and workforce allowance. Indeed, large quantities of products can be purchased to be cooked at the same time and later warmed up, offering more flexibility in case of unexpected event and lot irregularity.

The exact quantity of meals can be heated in accordance with the number of consumers in the dining hall for each day, reducing wastes and thus reducing costs.

Meals keep well their nutrients and are in high hygienic safety.

2.3. Disadvantages

Infrastructures are important and require heavy investments. Stakeholders have said that these investments can be earned back thanks to an increase in efficiency this mode has compared to WL. It nevertheless requires larger kitchens and is more often associated with larger dining halls.

Some meals cannot be cooked under this mode, such as fries or other meals requiring oil. Additional material is then needed if the satellite kitchen wants to cook such meals.

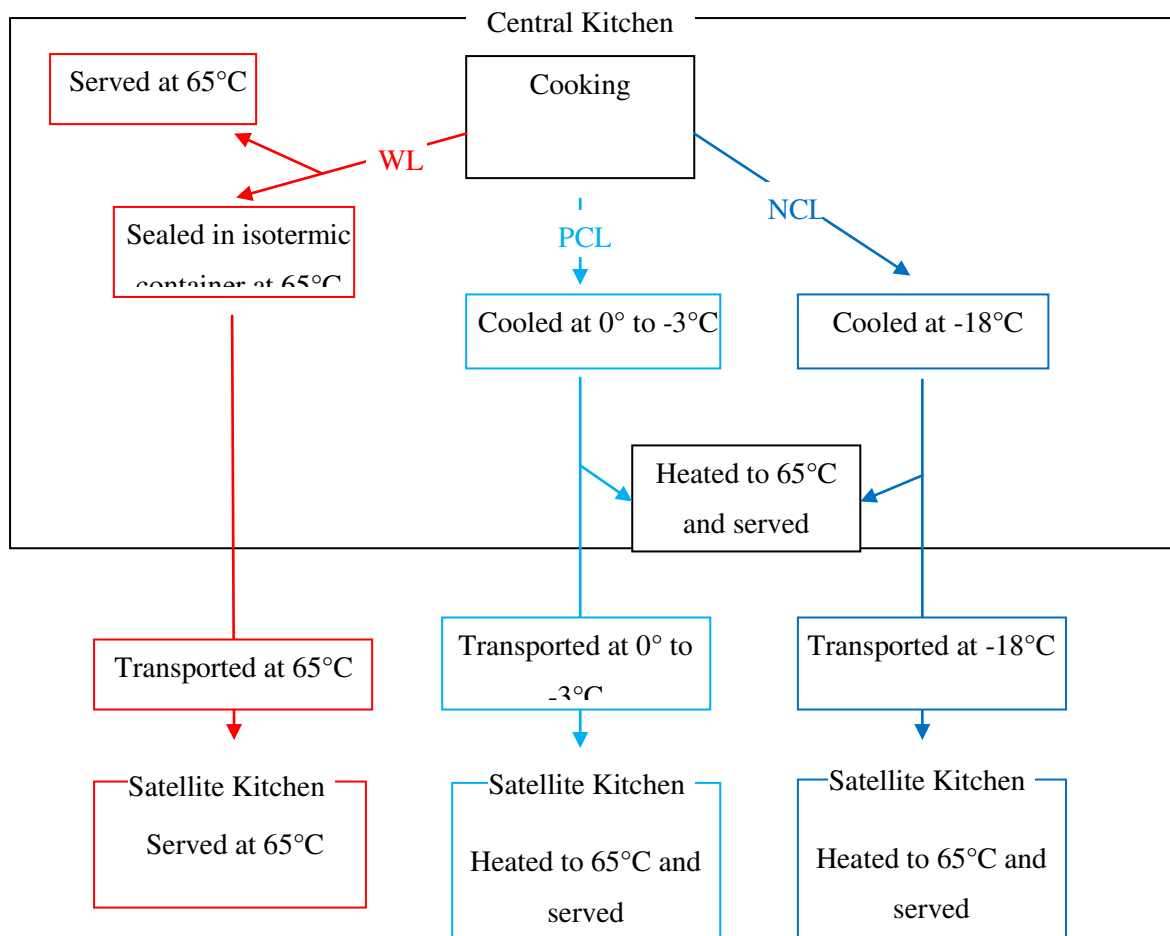


Figure 10. Warm lead and cold lead (source: interview with stakeholders)

Appendix 3. Semi-structured interview protocol example.

In this appendix, we give an example of the interview protocol prepared before interviewing a producer. The interviewer being the same, the protocol is the most alike between the different interviews. Questions have been adapted to the role of the interviewees in the supply chain. All interviews have been recorder to ensure the interview staying fluent while collecting the information. These were conducted in French and later translated in English by the interviewer.

First, we took five minutes to explain the context of the research and the aim of conducting it. We presented them the idea of linking mid- and large-scale producers with IC in order to scale up the concept of SFSCs and spread its benefits in Wallonia. We also detailed the goals of the interview, the way their testimony was going to be used and the information we were looking for. We then proposed them to follow the list of question we here present but we specified the interview could go beyond if they felt important information were not asked or discussed by the interviewer.

Then, we started the interview with the stakeholder and came back to the list of question to note the ones answer, check the ones still to discuss and make sure we were staying focused on the interview protocol.

| What is currently being done? | |
|--|--|
| How many hectares are you currently cropping? | |
| How many of them do you possess? | |
| Do you work alone? | |
| What crops do you now have? | |
| On what area? | |
| What is your average harvest? | |
| When are the harvesting periods? | |
| How have your crops' choices evolved in the past years? | |
| How do you see your production evolving in the next years? | |
| How do you usually sell your harvest? | |
| How is the transport organized? | |
| Who are your buyers? | |
| Are you selling any foodstuffs directly to consumers? | |
| How have the prices evolved for your produces? | |
| How are the prices fixed? | |
| Are prices fixed before the planting? | |
| Do you have any long-term contracts with them? | |
| Are you processing any of your foodstuffs? | |

| | |
|---|--|
| Have you ever done so? | |
| What could be done? What are the key issues to develop these supply chains? | |
| Would you be interested in participating in the model presented earlier? | |
| Have you heard about any similar projects? | |
| What do you see standing in the way for developing these SFSCs? | |
| What are the main constraints you see? | |
| What are the main opportunities you see? | |
| Do you think it could be of any benefit to your farm? | |
| What are your prerequisites for being involved in such SFSC? | |
| What do you know about IC constraints? | |
| What initiatives could you take to facilitate working directly with them? | |
| What steps would you need IC to do in your direction? | |
| How would you imagine such cooperation could take place? | |
| What actors should be involved? | |
| How do you see the role of the government? | |
| Would you be subsidized in any way for participating to such SFSC? | |
| Would you need any training, new competencies or other skills to acquire? | |
| If yes, do you know how to get them? | |
| Have you thought about cooperatives? | |
| Have you participated in any cooperative? | |
| Have you heard about any functioning farmers' cooperative that is transforming, transporting and commercializing their products together? | |
| What advantages would you see in doing so? | |
| What do you see to be in the way of creating a cooperative? | |
| Have you ever thought about processing? | |
| If yes, how? For which foodstuffs? How would the commercialization take place? | |
| Could you think of any important stakeholder(s) we should meet deepen our perspective on the question? | |

IV. Appendix 4. Raw results for each stakeholder.

In this section, we present the raw data collected with the stakeholders interviewed. Each line is referring to the method of open coding and is counting for one unit. These units have later been separated into the three categories logistic – structural – regulatory as explained earlier.

Oilseed rape:

- IC are ordering relatively small quantities and do not represent high market shares for them. Thus high logistical costs if for few liters.
- Market is mostly taken as call for bids are done for a few years and most consumers are already under contracts. It does take time to find a place in the market.
- Sustaining the scope statements of IC should promote local initiatives. Government could impose scope statements to IC under their subsidies because otherwise stakeholders will mostly go for lower prices instead of supporting local actors.
- This argument is supported by the fact that IC are willing to deal with only one partner to simplify their logistic.
- Although they are from a farming background and still farming, they do not buy oilseed rape directly to producers but rather to a wholesaler (SCAM). He does not believe that farmer cooperatives (transforming and selling their products) can be held together in Belgium in order to provide a diverse range of products to IC. He sustains that the Belgians are not keen on cooperatives, especially farmers that are highly independent.
- Producers are not able to offer enough regularity to buyers inducing the need of an intermediary to buffer the irregularities inherent to farming activities.
- Highlights the problems of communication and partitioning of activities between actors working on similar issues. They are often not aware that they could ally with other people for finally benefiting both stakeholders.

Potatoes:

- In general, fewer working forces on the farm in the last decades and thus less working forces available for diversifying farming activities as well.
- Hard for growers to provide homogeneous products as desired by IC.
- They are ready to invest in new infrastructures but do require to have guarantees on the availability on new markets.
- They are competent for growing food but have little knowledge on commercialization and would thus have to hire employees for that.
- Aware of the need of combining various productions to offer a wide range of products to institutional catering but has a hard time federating farmers around a collective project

implying investing money together. Nevertheless they sustain that a person having the required competencies for managing a cooperative as a business could federate farmers around such project.

- There is a miss of communication around the advantages of creating such SFSC for farmers.

Regional agency:

- Partitioning of ministerial competencies: ministers of ecology, agriculture and economical development are different. Education depends on the Communities and do not cooperate with Federal level. Federal, provincial and communal levels do not cooperate with each other.
- Although the government is supporting the development of local agriculture by creating a tool (APAQ-W), they have stopped midway on the process. Indeed, they have determined objectives for producers but none for consumers. The will of IC to integrate these supply chain is left to their goodwill and no constraints are apply to the scope statement except if the municipality decides so.
- Temporary contracts only are offer to producers. Thus IC have no guaranties that their orderings will be fulfilled and producers have no guaranties their production will be sold.
- Markets already signed and still running for many IC thus have to wait until these are open to call for bids again. It does take time.
- IC have high constraints in term of quantities and timing of delivery. This induces a need of coaching for dealing with these new logistical constraints. Dealing with new recipes might be an important issue as well.
- There is a high heterogeneity between all IC in Wallonia, and this between provinces, municipalities and even among IC within a municipality. This induces a high variety of markets and is often difficult to deal with for farmers. Indeed, if they are meant to invest for transforming their products they need a certain homogeneity and guaranty for ensuring their farming holding to be financially viable.
- Belgium is especially slow when it comes to administrations and institutions. It does take time to bring changes.
- Logistical issues such as transport and distribution are difficult to deal with for farmers as they dispose of little time and little workforce in general. Need to promote existing means and develop further new ones.
- Could enhance cooperation by bringing actors around the table to discuss their implication in such supply chains.

Provincial agency:

- Pointing the scope statements of most municipalities not adapted to local markets and local food producers.

- Raises the concern on the coaching of IC' employees that are mostly using 4th and 5th foodstuffs range. The staff is often not used to process the foodstuffs anymore and kitchens are mostly not equipped in processing facilities.
- Few pooling of the offer to meet IC' needs among producers. Farmers do not ally to create a diversified offer for IC. There is a strong need for reinforcing the following of collective projects for federating farmers groups.
- Some regions are not diversified enough for producing a wide range of products needed by IC.
- Products are rarely transformed by farmers and too often proposed raw which is not matching IC' needs. This is often due to the fact that creating a new SFSC means learning a whole new set of jobs for farmers: transforming, transporting and commercializing.
- Need of implementing big transformation facilities for cereals, oilseed rape and potatoes as these are produced under large quantities and often require heavy transformation.
- The question of who is going to invest is important because as growers do not tend to cooperate among themselves, the movement could be enhanced by the government with financing the beginning of projects that could later become financially viable.
- In a broader perspective on SFSC, the government could allow more money to its subsidy as compared to foodstuffs production and transformation destined to export where heavy subsidies are indirectly allocated.

Municipality:

- Public authorities should have a huge impact on the demand by being very precise on the scope statement. Scope statements that can even impact the upstream of the supply chain by opening new markets for producers and therefore influence their practices and have an impact on the landscape.
- No structure or movement to share the advancements on the defining of the scope statement they've made that is supporting local food supply. They would like to cooperate to enhance a broader movement of change in institutional catering and suggest that the government is responsible of implementing tools to share this scope statement as it is a health issue at the end.
- Changes have to be progressive to let the system reacting and adapting. Institutional catering are not adapted for now on the supply by local food chains but can become adapted to it if done progressively. Sometime it is also the market that is not yet available and need to let time to producers to organize the offer.
- For kids, products need to be adapted to their special diets and quantities they are eating.
- Education is, to some extent, competitive, which induces little cooperation between schools while cooperation could facilitate access to local markets and lower food costs.
- Would like to deal with farmers cooperatives but haven't found any to work with.

- Partitioning of ministerial competencies; Health, agriculture and education should work together as it has been done in France for enhancing the supply of quality food in IC.

High school:

- Since July 2013 private schools also have to call for bids for the food supplying in order to allow fair competition between wholesalers to take place. They thus have changed their practices and cannot sign certain local contracts because of their affinity with a certain type of food.
- Have undergone massive changes in the kitchen as they come from 5th range products to go to organic raw products. Underline the importance of time in transitioning to allow employees to get used to new working patterns.
- Underline the importance of learning new practices for employees.
- Underline the importance of transitioning in a progressive manner to let the system be adapted to new ways of functioning.
- They need a reliable intermediary that is able to provide in time and quantity with little provisions. As they need to serve meals at a certain timing for a specific number of people.
- Need to re-structure the system as it implied allowing more money on the purchasing of food while slightly increasing the workforce and considerably increase the amount of work. It require an ability to increase the efficiency of the system.
- Could go even further by purchasing raw potatoes to process for making Belgian frites for example but would need more employees to do that.

Clinic:

- Has to adapt to the new rules of call for bids which is promoting wholesalers who are offering lower prices. They have been constantly decreasing their number of providers and are expecting this new rules to enhance confirm this trend.
- As they are not used to this system they have joined a group of clinics to make common calls for bids in order to be in line with the new laws and decrease their food costs. Having somebody helping them with the proper writing of call for bids could have helped them ensure the quality of their provisioning.
- Can prepare menus some weeks in advance but still need a certain flexibility from the wholesaler as they are never sure of the number of patients they will have in the clinic.
- Are receiving subsidies each day for every single patient thus could be under the appliance of the regulations promoting the consumption of local food by being imposed scope statements.

- An important issue in the choice of a wholesaler is the flexibility of this one. Indeed, they need to have a quick reactivity in case of problem and they need to be furnished at specific times as they are working in cold lead and need to prepare meals two days in advance.
- They accept all range of foodstuffs but it depends on the machines they have. A cooperation would thus require heavy communication upstream to determine which products have to be delivered under which form.

University:

- Efficacy within IC can greatly reduce food losses and thus reduces food expenditures. These economies can then be re-allocated to more expensive higher foodstuffs. But this require high changes within the IC.
- Sustaining that what is the most difficult in heavy structural changes are the management qualities rather than the investment necessary. Need to be patient and to communicate a lot on the processes.
- The high precision needed in IC is hard to combine with the high variability intrinsic to the agricultural world. Needs a solid intermediary to soften these fluctuations.
- As they are working in *just-in-time* they need their intermediary to be extremely reactive to their demand. Which is definitely a problem in terms of anticipating the demand they will have and thus in creating stable markets for local stakeholders.
- Satisfied with the diversity of foodstuffs offered in Wallonia but not always by the quantities offered. Sometime producers cannot offer enough and do not cooperate among each other to be able to satisfy specific demands.
- A problem in dealing with various actors and local production is the high variability within each lot that is not always easy to deal with their equipment.
- Sustains that the government should impose a scope statement to every single IC receiving subsidies to enhance healthy food provisioning for kids.



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